ARCHAEOLOGY SOUTHWEST *magazine*

CONTINUE ON TO THE NEXT PAGE FOR YOUR FREE PDF

Archaeology Southwest (formerly the Center for Desert Archaeology) is a private 501 (c) (3) nonprofit organization that explores and protects the places of our past across the American Southwest and Mexican Northwest. We have developed an integrated, conservation-based approach known as Preservation Archaeology.

Although Preservation Archaeology begins with the active protection of archaeological sites, it doesn't end there. We utilize holistic, low-impact investigation methods in order to pursue big-picture questions about what life was like long ago. As a part of our mission to help foster advocacy and appreciation for the special places of our past, we share our discoveries with the public. This free back issue of *Archaeology Southwest Magazine* is one of many ways we connect people with the Southwest's rich past. **Enjoy!**

Not yet a member? Join today!

Membership to Archaeology Southwest includes:

- A **Subscription** to our esteemed, quarterly *Archaeology Southwest Magazine*
- **Updates** from *This Month at Archaeology Southwest*, our monthly e-newsletter
- **25% off purchases** of in-print, in-stock publications through our bookstore
- **Discounted registration fees** for Hands-On Archaeology classes and workshops
- **Free pdf downloads** of *Archaeology Southwest Magazine*, including our current and most recent issues
- Access to our on-site **research library**
- **Invitations** to our annual members' meeting, as well as other special events and lectures

Join us at archaeologysouthwest.org/how-to-help

In the meantime, stay informed at our regularly updated Facebook page!

300 N Ash Alley, Tucson AZ, 85701 • (520) 882-6946 • info@archaeologysouthwest.org • www.archaeologysouthwest.org

ARCHAEOLOGY SOUTHWEST magazine

FALL 2013

A QUARTERLY PUBLICATION OF ARCHAEOLOGY SOUTHWEST

VOLUME 27 | NUMBER 4

A New Way of Living

Early settlements on the southern Colorado Plateau

inside this issue

about us

Archaeology Southwest explores and protects the places of our past across the American Southwest and Mexican Northwest. We have developed a holistic, conservation-based approach known as Preservation Archaeology. By looking forward and acting now, we are achieving protections and creating meaningful connections between people and history that will benefit generations to come. **Learn more at www.archaeologysouthwest.org.**

Archaeology Southwest is a private 501 (c) (3) nonprofit organization supported through memberships and donations, as well as grants from individuals, foundations, and corporations. For a gift of $35 or more, members and donors receive an annual subscription to ***Archaeology Southwest Magazine*** and other benefits. For more information, or to join, contact Kathleen Bader at 520-882-6946, ext. 26, or kbader@archaeologysouthwest.org. **The convenient, preprinted envelope enclosed at the center of this issue may be used to join, renew an existing membership, or begin a gift membership.**

ISSUE EDITOR:

Sarah A. Herr

ONLINE EXCLUSIVES:

For additional commentary, images, references, and links, visit our website at:

www.archaeologysouthwest.org/asw27-4

Cover image: This diorama of an early pithouse settlement—the SU site—in the Pine Lawn-Reserve area of west-central New Mexico (see page 9) was on display at Chicago's Field Museum of Natural History for many years. Field Museum curators Paul S. Martin and John B. Rinaldo directed excavations at early sites in the region from 1939 to 1955. Produced in the 1950s with Martin's input, the diorama was one of many created by museum staff artist Alfred Lee Rowell between 1941 and 1963. Such displays were intended to breathe life into the past for visitors, offering one interpretation of what a scene of daily life in an early village may have looked like. Martin published this photo (in black-and-white) of the diorama in his 1959 popular book, *Digging into History*. Photo: ©the Field Museum, no. A95413; colorization by Catherine Gilman and Kathleen Bader. Cover design: Kathleen Bader.

Archaeology Southwest

Exploring and protecting the places of our past

Archaeology Southwest Magazine (ISSN 1523-0546) is a quarterly publication of Archaeology Southwest. Emilee Mead, Publications Director. Kate Sarther Gann (kate@archaeologysouthwest.org), Content Editor.

Subscription inquiries:

520-882-6946, ext. 26.

A New Way of Living: Early Settlements on the Southern Colorado Plateau

SARAH A. HERR
DESERT ARCHAEOLOGY, INC.

When you envision the Southwest in the distant past, what do you see? Hunters stealthily approaching a mammoth at a lush spring? Women chatting over their chores in a cliff dwelling high above a canyon? Perhaps a group of farmers setting out to make repairs on an extensive canal system fed by a red-brown desert river?

You probably do not imagine modest clusters of mud and wood structures among juniper-dotted grasslands (see cover image and caption on opposite page). Yet, understanding life in these small settlements is essential to a more complete understanding of early village life around the world, not to mention subsequent developments in the northern and central Southwest. In this issue of *Archaeology Southwest Magazine*, we explore the transition to village life on the southern Colorado Plateau (see map on page 4) prior to approximately A.D. 900. How did the mobile foragers of the Archaic period (7000–1500 B.C.) ultimately become the village farmers we recognize as the ancestors of today's Pueblo people?

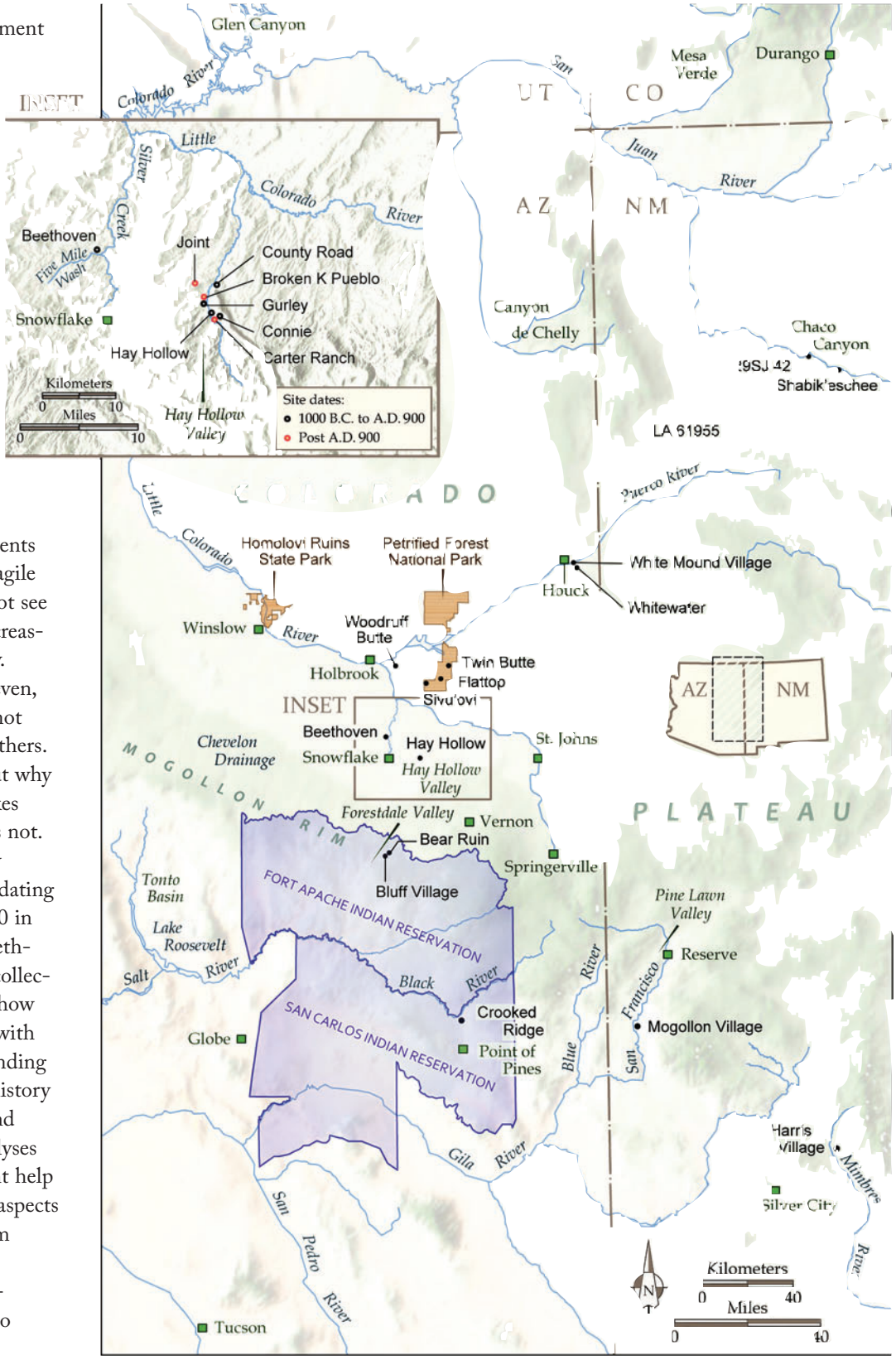
The deeply incised canyon of Silver Creek (here, heading off into the distance) and its tributary drainages are an ethereal, rugged oasis in the dry, largely featureless plain of the southern Colorado Plateau. On the plateau, weather extremes are commonly expressed in the company of high winds. In the canyon bottoms, there may be more or less water, but temperatures are moderate, one is shaded almost all day long, and there is an entrancing, quiet solitude. Because of the water, wildlife is abundant; due to the restricted nature of access points, hunting is greatly simplified. These qualities were recognized from the beginnings of human habitation, and reflected in large numbers—probably hundreds—of petroglyph (and a few pictograph) localities. The special nature of this location is also reflected in the iconographic content of the designs, which often depict shamanic and ritual themes through the eras before Europeans arrived in the Southwest. TEXT AND PHOTO: HENRY D. WALLACE

Anthropologically, understanding the transition from early settlements to villages is tied to understanding the economic and social circumstances that seem to come with villages anywhere in the world: increased use of farming, increased population and population density, increased sedentism (living in one place), and the development of social organizations that bring people together as a community. Furthermore, when people become villagers, it changes the way they see themselves, their relationships to the landscape, and their beliefs.

Archaeologically, we can document higher proportions of domesticated crop plants in botanical samples, increased numbers of contemporaneous structures and settlements, purposeful and permanent constructions, easily accessed food-storage facilities, and defined space for communal activities. When archaeologists find all of these hallmarks together, they infer that the transition to village life occurred. But on the Colorado Plateau, common use of maize (corn) does not necessarily coincide with durable architecture, and large settlements might consist of comparatively fragile structures (see page 13). We do not see a straightforward trajectory of increasing site size and social complexity. Instead, the pace of change is uneven, and a change in one aspect does not lead to an immediate change in others. Thus, there is much to learn about why and when village organization takes place—and why and when it does not.

Although there have been few recent excavations of settlements dating between about A.D. 200 and 1000 in this region, early and mid-twentieth-century work created significant collections. Authors in this issue show how we might integrate the old work with the new toward a better understanding of early farmers. We discuss the history of research, describe early sites, and consider the ways specialized analyses of artifacts and iconography might help elucidate tangible and intangible aspects of daily life in the first millennium A.D.

Prior to A.D. 1000, the southern Colorado Plateau was home to people whose material lives show characteristics archaeologists ascribe to Basketmaker–early Pueblo patterns and to the Mogollon culture, both of which



Major places mentioned in this issue. Note that Point of Pines is the name of the town and the archaeological site there. MAP: CATHERINE GILMAN

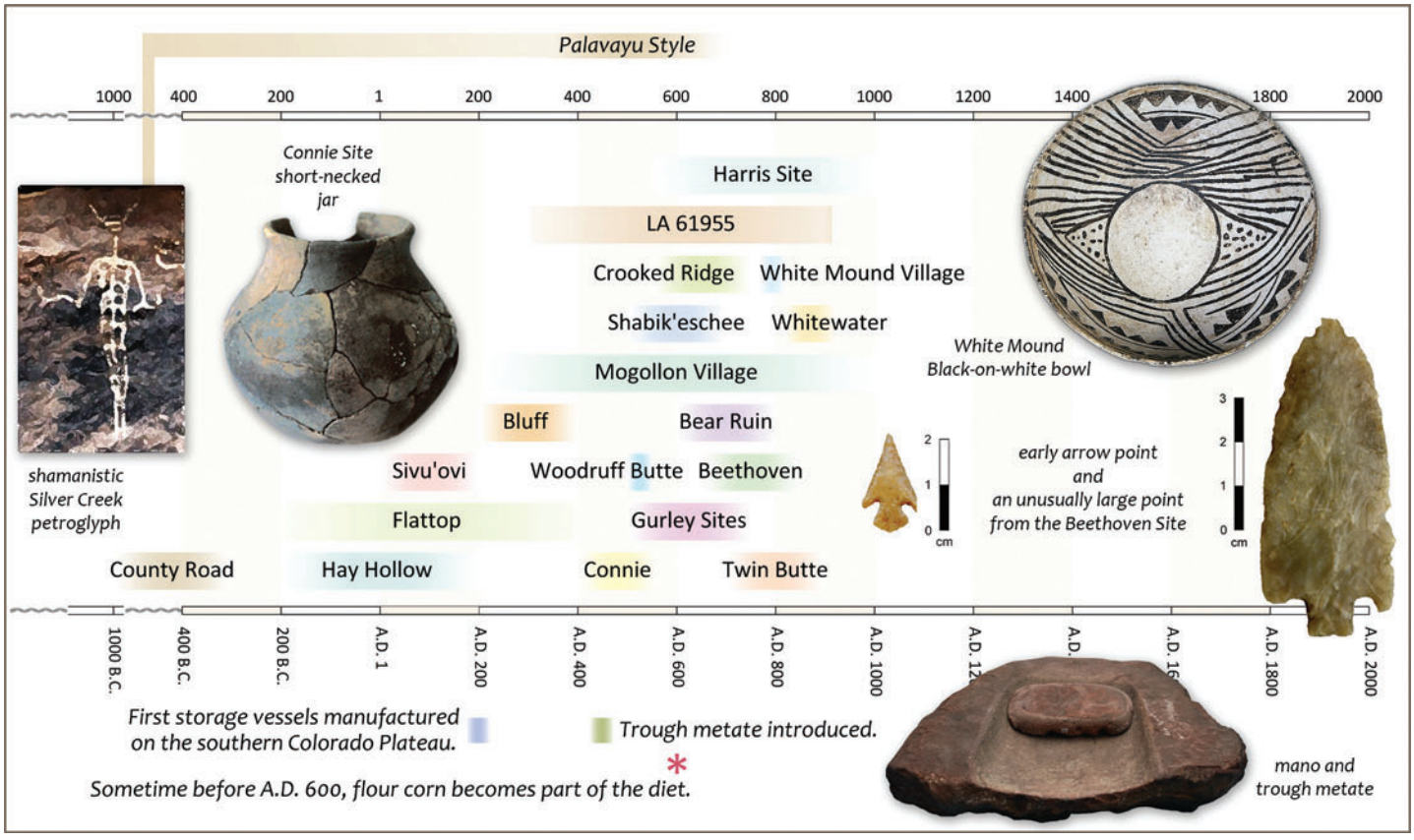
are ancestral to today's Pueblo people. From approximately 1930 to 1970, investigations of early settlements on the southern Colorado Plateau and Mogollon Rim focused on documenting and explaining the diversity in pottery and architectural styles. Several major institutions directed efforts at supporting or refuting the "Mogollon Concept."

As Stephanie Whittlesey and J. Jefferson Reid recount (see pages 7–9), archaeologists answered these questions with shovels. Detailed descriptions of house construction, burial practices, and ceramic typology informed classificatory arguments about the heritage of a settlement's inhabitants. Archaeologists conducted definitive work parsing the cultural diversity in the Forestdale Valley (see map on page 4), just below the Mogollon Rim, on what proponent Emil Haury referred to as the "front doorstep" of the Colorado Plateau. His report (see page 8) and others from this period, such as Fred Wendorf's work at Twin Butte in the Petrified Forest (see pages 18–19), are thickly descriptive.

American archaeology changed significantly in the 1960s. Archaeologists seeking inferential rigor promoted the use of scientific methods in fieldwork and analysis and called their school the "New Archaeology." Research questions changed from "who…?" to "how…?" as New Archaeologists sought commonalities among human organizations and focused on the causes of change. One question asked worldwide—and particularly well studied in the Southwest—was, what are the key factors leading to the transition from living as mobile foraging peoples to living as settled farmers?

Given New Archaeology's attention to this question, early sites on the southern Colorado Plateau remained an important source of information. Paul Sidney Martin's students were at the forefront of this shift in archaeological thinking (see page 10). The Hay Hollow Valley (see map on page 4) was their laboratory. As study of the relationships between past settlements and the physical landscape became increasingly important, Martin's students undertook numerous regional surveys that inventoried sites and helped establish an archaeological chronology for the region. Gene Rogge, an instructor in the final years of the Martin field schools, explains how his work at the Connie site (see map on page 4) helped archaeologists understand demographic changes and the circuitous path toward village life (see pages 12–13).

Despite New Archaeology's criticism of earlier, more descriptive work, its focus on rigorous methods and systemic



Timeline of major sites and developments reported in this issue. White Mound Black-on-white bowl, ©Museum of Northern Arizona, A5270, photographed by Bilby Research Center, NAU. Visit archaeologysouthwest.org/asw27-4 for information about the objects pictured here. GRAPHIC: CATHERINE GILMAN

answers meant less attention to publishing the most basic results of archaeological excavations. Steve Nash (see pages 10–11) appeals for additional analysis and reporting of a number of well-excavated, well-provenienced collections from Arizona's Hay Hollow Valley.

At present, much work on early sites occurs through cultural resource management (see *Archaeology Southwest Magazine* 26:1). For example, Schachner, Reitze, and others surveying the Petrified Forest (see pages 18–19) have documented a remarkable cultural landscape, and smaller surveys in anticipation of wind farms and other developments are adding to our investigations of the first villages.

Recent construction on State Route 77 between Snowflake and Holbrook, Arizona, has provided another opportunity to examine sites on the southern Colorado Plateau (see pages 14–16). Today, researchers working on such projects seek to integrate the "who" and the "how" to find insight into these fundamental changes in how people lived.

The Neolithic Package

In 2002, anthropologist Jean-Pierre Bocquet-Appel published an influential study in *Current Anthropology* examining the relationship between plant and animal domestication and subsequent population growth in Europe between about 6500 and 4500 B.C., at the Neolithic/Mesolithic transition. By dividing the number of people (whose buried remains had been recorded archaeologically) between the ages of five and nineteen by all those older than five, he obtained an index that documented a general increase in fertility and decrease in mortality shortly after these people adopted domesticates.

Researchers call this the "Neolithic Demographic Transition." Since Bocquet-Appel's article, archaeologists have applied his demographic method around the world. Wherever it converges with or diverges from the European pattern, we find interesting problems to examine, with implications for the model and for understanding the area under investigation.

In the southwestern United States, which received agricultural domesticates from Mesoamerica, the immediate impact of maize's introduction was underwhelming. Archaeologists have found small cobs from approximately 2100 B.C. at sites around the Southwest. Although we know people were using irrigation in some areas, we have little evidence of substantial population growth in that era. Instead, we find that population increased and people committed to a more agricultural lifestyle between about A.D. 200 and 900. What changed?

Washington State University archaeologist Timothy Kohler describes these centuries as the time when the "Neolithic Package" came together. Storage and cooking pot technologies (see pages 25 and 26–27) changed around A.D. 200, gradually replacing large, deep pits and earthen ovens. People also developed or adopted the bow and arrow, new dry-farming methods, and flour maize, which—unlike early "popcorn" maize—they could grind into meal using new stone technologies.

By the A.D. 600s, technologies related to producing, processing, storing, and cooking domesticated and wild foods had changed in ways that provided more calories and, potentially, better nutrition. Population fertility generally increased, and macroregional population curves show that overall population changed across the Southwest. Thus, understanding changing foodways is essential for understanding the emergence of more complex farming villages from simpler settlements.

— *Sarah A. Herr, Desert Archaeology, Inc.*

Food for Thought...

Settlement or villlage? In this issue, we consider the transition to villages. Archaeologists define "villages" as having a discernible level of economic and social integration that is distinct from settlements. Some assign a population threshold—a certain number of residents—to the definition of villages, as well. "Settlement" is a broader and more neutral term for aggregations of households who lived together seasonally or year-round without the increasingly complex social institutions.

The sum is greater than the parts: village.
The sum = the parts: settlement.

Emil Haury and the Definition of Mogollon Pithouse Villages, 1931–1955

STEPHANIE WHITTLESEY, INDEPENDENT CONSULTANT
J. JEFFERSON REID, UNIVERSITY OF ARIZONA

Famed archaeologist Emil W. Haury (1904–1992) had an uncanny ability—or perhaps it was simply good fortune—to select a site for excavation that would prove to answer important questions about the past and even sweeping questions of cultural definition and validity. Sites he discovered while surveying for Gila Pueblo Archaeological Foundation in the 1930s not only provided evidence for the initial definition of the Mogollon culture, but also formed the foundations of our understanding of early pithouse village life in the Southwest.

Archaeologists gathered for the 1948 Pecos Conference view a Mogollon pithouse at Crooked Ridge Village (see page 9), Point of Pines. The fifth figure from the right, with hat and pipe, is A. V. Kidder, a prominent archaeologist who had previously questioned Haury's Mogollon concept. COURTESY OF THE ARIZONA STATE MUSEUM, UNIVERSITY OF ARIZONA, NO. 3242

The 1927 Pecos Conference crystallized the culture classification and chronology of the Colorado Plateau (see *Archaeology Southwest Magazine* 27:3). Pithouse architecture and pottery, especially painted wares, were central to the definition and dating of the Basketmaker–Pueblo culture. Basketmaker pithouses were well described and dated. Nonetheless, archaeologists were observing patterns that did not quite "fit" the Pecos Classification. Thus, in 1931, Harold S. Gladwin convened the Gila Pueblo Conference in order to resolve problems of nomenclature and classification that Haury described as "acute." (The conference also alerted archaeologists to the great differences in architecture and pottery Haury had discovered at Roosevelt 9:6, a Colonial period Hohokam site on Lake Roosevelt in the Tonto Basin. That culture definitely was not Basketmaker.)

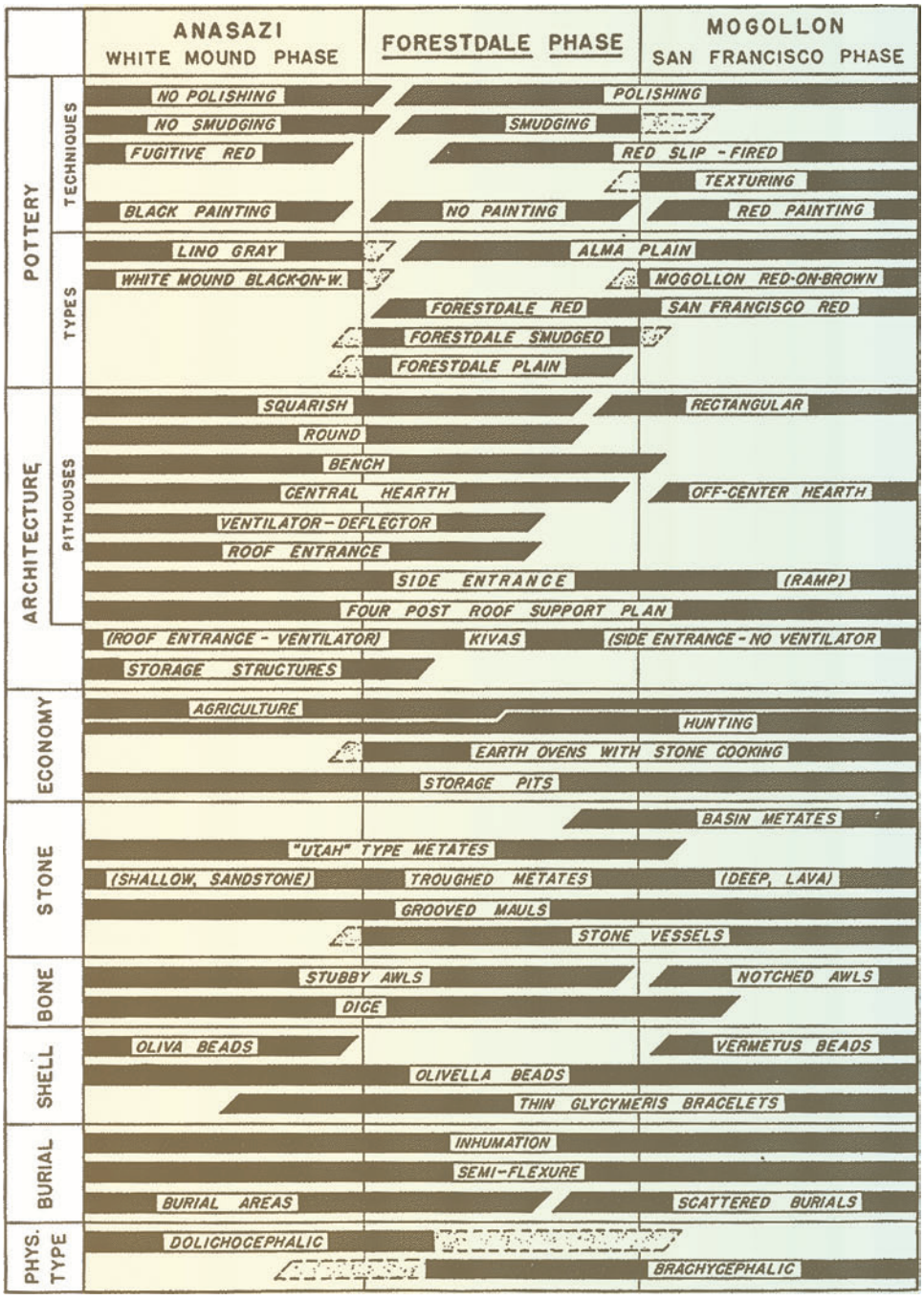
In summer 1931, after the Gila Pueblo Conference, Haury and his colleague Russell Hastings began a survey of east-central Arizona and west-central New Mexico. Their reconnaissance of this remote mountain region began at Gila Pueblo near the town of Globe. It was what we now call a "windshield survey," conducted in an old Woodie station wagon. Their travels took them to the Fort Apache Indian Reservation and the Forestdale Valley (see map on page 4). They continued to Springerville and then on to New Mexico, visiting the Pine Lawn Valley and the Reserve area, traveling along U.S. Highway 180. Eventually, they came to

the Mimbres River Valley. All along the way, Haury and Hastings saw pithouse sites characterized by plain brown pottery and perhaps a few painted red-on-brown sherds. When they returned to Gila Pueblo, they had visited and collected pottery from about three hundred sites of various periods.

Documentation: Mogollon Village and the Harris Village

But what about those sites with pithouses and brown ware pottery? In Haury's own words, "We figured we had to be dealing with a [cultural] complex here that was not accommodated in the Pecos Classification. . . the only thing to do was argue it with a shovel." In this way, Haury came to excavate at two New Mexico sites he and Hastings had discovered—Mogollon Village, situated on a ridgetop overlooking the San Francisco River north of Glenwood, and the Harris Village in the Mimbres Valley, northeast of Silver City (see map on page 4). The report of these investigations—*The Mogollon Culture of Southwestern New Mexico* (1936)—defined the Mogollon pattern, argued for its distinctiveness, and described how it changed through time. The volume kindled an archaeological controversy that persisted for decades.

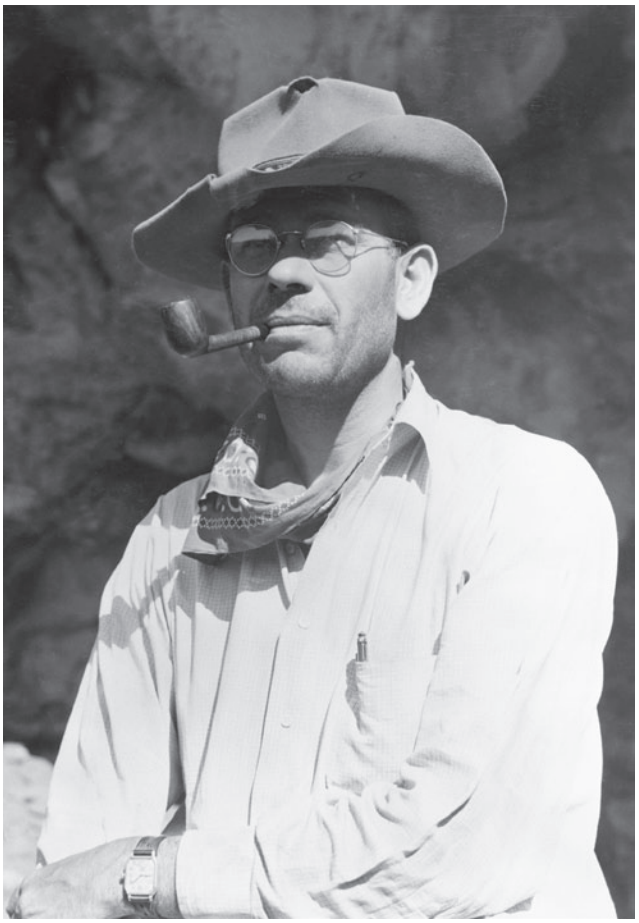
By 1938, the first opponents to Haury's Mogollon concept had weighed in, and those for and against it were set. Those who supported Haury's ideas included respected archaeologists E. B. Sayles, Earl Morris, Paul Sidney Martin (see pages 10–11), Erik K. Reed, and John B. Rinaldo. Those who disagreed with him included A. V. Kidder, J. O. Brew, and Harvard University—formidable opponents indeed. Once Haury became head of the University of Arizona's Anthropology Department and director of the Arizona State Museum, he was able to continue compiling evidence through his preferred method: argument by shovel.



First published by Emil Haury in his 1940 report on excavations in the Forestdale Valley, this chart is an example of the intellectual tools archaeologists used to compare the material patterns they observed. In this case, Haury is examining how Bear Ruin, the type site for the Forestdale phase (A.D. 600–800), compared with contemporaneous Basketmaker/Anasazi and Mogollon patterns. The far left side shows the variables that archaeologists considered as they debated whether Mogollon in those centuries was a cultural pattern distinct from Basketmaker or merely a mountain adaptation of Basketmaker. The Anasazi pattern seen at the site of White Mound (see map on page 4) is used as one point of comparison. The Mogollon pattern, as established by Haury's own work at the Harris and Mogollon Village sites in the Mimbres region (see map on page 4), forms the other point of comparison. As the central overlap suggests, Haury interpreted Bear Ruin and the Forestdale phase as evidence of a period when the blending of Mogollon and Basketmaker traditions began on the southern edge of the Colorado Plateau.

Pursuit: Bear Ruin and Bluff Village

To do so, Haury in 1939 returned to the idyllic Forestdale Valley, which he and Hastings had visited in 1931. Using the resources of the University of Arizona Archaeological Field School, he excavated sites that again proved his incredible archaeological foresight. Bear Ruin yielded evidence of a pithouse village dating between the A.D. 600s and 800s, contemporaneous with Mogollon Village and the Harris Village. With tree-ring dates, the site corroborated the antiquity claimed for those villages and demonstrated that they were not aberrant, backwater versions of Basketmaker–Pueblo culture, as some of Haury's opponents had claimed. The pattern of pithouse villages with plain brown ware pottery found in west-central New Mexico thus extended well into the Arizona mountains. In another remarkable piece of serendipity, Haury chose the Bluff Village for excavation. Although he initially thought he was excavating a Western Apache site, Haury soon discovered the earliest Mogollon site yet known, with tree-ring dates in the A.D. 300s. The pattern of plain ware pottery, specific architectural styles, and a communal structure (see pages 23–24) was thereby documented at contemporaneous sites from the southern Colorado Plateau to the mountains of New Mexico.



Emil Haury in the field, 1930s. COURTESY OF THE ARIZONA STATE MUSEUM, UNIVERSITY OF ARIZONA, NO. 56459

Confirmation: Pine Lawn–Reserve

Also in 1939, supporters Martin and Rinaldo began a long-term field program in the Pine Lawn–Reserve area of New Mexico, and their timely published reports confirmed all that Haury had discovered. Moreover, their findings extended the temporal depth and geographic spread of Mogollon pithouse villages, showing development of Mogollon from local Archaic roots, mixed diets of wild and cultivated resources, early pottery, and a developmental sequence in pottery decoration.

Vindication: Crooked Ridge Village

In 1946, Haury moved the field school to Point of Pines on the San Carlos Reservation in east-central Arizona (see map on page 4). There, he directed research efforts that conclusively resolved the Mogollon debate. Crooked Ridge Village provided all the evidence most archaeologists required. Gathered at Point of Pines in the summer of 1948, Pecos Conference attendees viewed Mogollon in the "flesh"—that is, the dirt of east-central Arizona—and a panel discussion of the Mogollon culture concept transpired (see photo on page 7).

Crooked Ridge Village was the centerpiece of Joe Ben Wheat's dissertation, the second half of which became *Mogollon Culture Prior to A.D. 1000* (1955). This evidentiary tour de force compiled every scrap of data that existed at the time, divided the Mogollon into several branches, and described the architecture, settlement pattern, pottery, and "minor handicrafts" of the ancient people in detail. Distributed widely to members of the Society for American Archaeology and the American Anthropological Association, Wheat's publication essentially laid the controversy to rest.

ONLINE EXCLUSIVE

For the intellectual challenge it presented and what was learned in response, the Mogollon pithouse site stands as a cornerstone of Southwestern archaeology. Reid and Whittlesey's book *Prehistory, Personality, and Place* (2010) provides a more complete discussion of the controversy, the archaeology, and the people involved. Visit www.archaeologysouthwest.org/asw27-4 for more information about the book and for additional references to works cited in this article.

Paul Sidney Martin's Research at Early Settlements in Arizona, 1956–1972

STEPHEN E. NASH
DENVER MUSEUM OF NATURE & SCIENCE

Paul Sidney Martin (1898–1974) was a pillar in the development of North American archaeological knowledge, method, and theory. During his forty-three-year-long career at Chicago's Field Museum of Natural History, Martin excavated more than seventy archaeological sites, supervised six major archaeological surveys, and amassed a collection of 585,000 objects.

In 1955, Martin packed up his field camp near Reserve, New Mexico, where he and his team had been helping define the Mogollon culture (see pages 7–9), and moved to Vernon, Arizona, ostensibly following the precontact inhabitants of the region, whom he believed had moved northwest in the mid-1400s. For the next five years, Martin focused on the Little Colorado River drainage near Springerville and St. Johns (see map on page 4). He then turned his attention west to the Hay Hollow Valley and the area around Snowflake, Arizona.

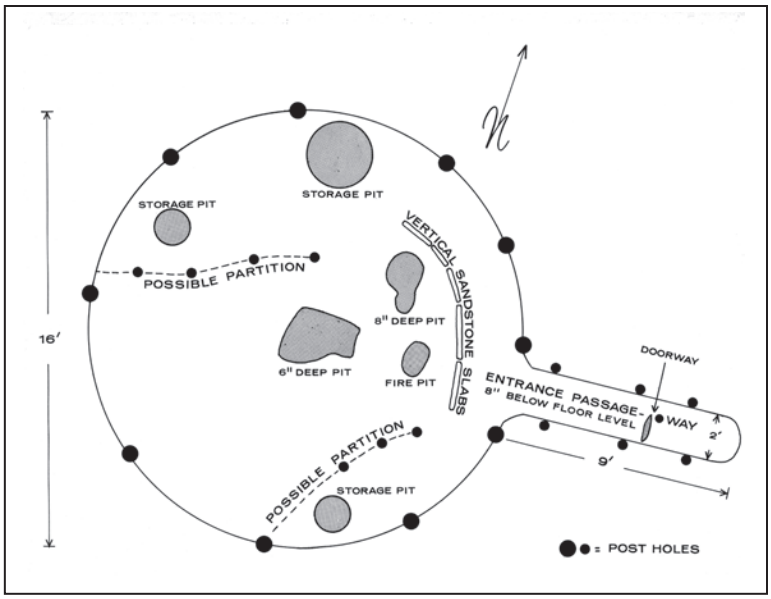
Lasting more than a decade, the research program in the Hay Hollow Valley effectively serves today as a history of the New Archaeology, later also known as "Processual Archaeology." The latter was a paradigm shift in archaeological thinking that began around 1958 (see page 5). Excavations at Carter Ranch Pueblo, Broken K Pueblo, and the Joint site are commonly cited among the projects that contributed to New Archaeology's development. Although excavations at earlier locations such as the County Road site, Hay Hollow site, and Gurley site have garnered less attention, they are equally important—methodologically, theoretically, and substantively.

Top: Paul S. Martin at the head of the Vernon field school's breakfast table, 1966. PHOTO: JAMES BALLARD. REPRODUCED FROM THE BULLETIN OF THE FIELD MUSEUM OF NATURAL HISTORY 37(10), OCTOBER 1966, WITH PERMISSION.
Bottom: Paul S. Martin, field crew and staff, and former student visitors in 1965. Several people in this photograph were on their way to becoming eminent scholars. Back row, left to right: Martin, Fred Bloom, William Englebrecht, George Zarins, Norman Yoffee, Scott Ryerson, Martha Perry, William Longacre. Front row, left to right: James Van Arsdell, Jeff Brown, Charles Peters, James Hill, Mark Winter, John Zilen, John Fritz (see page 11), Kubet Luchterhand, Mark Leone. PHOTO: ©THE FIELD MUSEUM, NO. A103029

County Road Site

Excavated in 1964, the County Road site is a small settlement consisting of ten round jacal (mud and stick construction, pronounced "hah-call") structures dating between 1000 B.C. and 300 B.C.; Martin believed them to be some of the earliest in the area. They were large—each about fifteen feet in diameter—with a covered east entrance (see illustration opposite). People situated these dwellings in an oval pattern around a central work area. Based on ethnographic analogy, Martin believed that a single nuclear family lived in each.

Records on file at the Field Museum indicate that Martin's team, led by Chris White, laid a grid over the site and used a random number generator to select excavation units. All told, White collected 2,419 objects and samples, including one stone anvil, two bowls, 1,939 pieces of flaked stone, fifty-seven flaked stone tools, 156 clay fragments (including floor plaster), one core, twenty hammerstones, sixteen manos, nine projectile points, forty-two sediment samples, and numerous other objects.



Plan view of architectural features of House B at the County Road site, circa 1000 B.C. ©THE FIELD MUSEUM, NO. A100576

Hay Hollow Site

The Hay Hollow site consists of three pithouse clusters, each containing up to three structures. John Fritz (see photo on opposite page) directed excavations in 1965 and 1966, justifying the research firmly in the logic of the New Archaeology, which held that human behavior is patterned and that, with appropriate sampling strategies, archaeologists can excavate the structural remains of those fossilized behavioral patterns. By then, Martin had recognized two distinct sociocultural systems in the Hay Hollow Valley between 3000 B.C. and A.D. 700: a "Desert Culture" (Concho Complex) based on intensive collecting and some hunting, and a "post-Desert Culture—pithouse—incipient Pueblo" stage at which time agriculture slowly supplanted food gathering. The Hay Hollow site dates between 200 B.C. and A.D. 200, typifying the latter.

Records indicate that Fritz laid a grid over the site, assigned each square a number, and used a random number generator to select excavation units. He then excavated 60 percent of the units. Unfortunately for today's researchers, to whom the information appears cryptic, the provenience data recorded in the field say more about the excavation strategy than they do about archaeological features and structures present at the site. The Hay Hollow site collection consists of nearly 72,000 objects, including 1,287 tree-ring specimens. Although analysts examined the latter in 1999, they were unable to date any of the specimens.

Gurley Site

Excavated in 1968, the Gurley site should really be the "Gurley sites," for it covers eighteen acres and includes many pithouses dating circa A.D. 500–700. Martin's team used regression analysis (a statistical process for estimating the relationships among variables) on survey data to identify locations likely to contain pithouses. They excavated those areas to a depth of six inches, curiously combining English and metric measurement units in the process. They employed a backhoe to cut random (or perhaps arbitrary) trenches across the site and to scrape topsoil in a search for features located between the surface scatters. Ultimately, they found five pithouses in three clusters, four of which were completely excavated. Additionally, they excavated 50 percent of the 2- by 2-meter squares immediately surrounding each pithouse, 25 percent of a second tier of squares around each house, and 10 percent of a third tier. All told, they excavated 225 2- by 2-meter squares.

This remarkably extensive excavation program again led to the use of obscure provenience referents, such as "Area X 12B 22-23 P–Q Bench." These enigmatic sequences impede reconstruction of an actual location in space. The Gurley site collection comprises 19,220 objects, including 389 pieces of adobe, 8,976 pieces of flaked stone, forty-four faunal remains, five pieces of petrified wood, eight pots, twenty projectile points, thirteen sediment samples, thirty shells, 9,487 sherds, and thirteen worked sherds.

A Challenge Awaits

The artifact collections resulting from Martin's excavations at early settlements in the Hay Hollow Valley are analytically underutilized. To make matters worse, the original researchers never published or incompletely published their fieldwork at these sites. Together with the use of recording strategies that are not intuitive, this makes for a significant investigative challenge going forward. Nevertheless, hundreds of thousands of artifacts from early settlements in the Hay Hollow Valley reside in Chicago, fully catalogued, awaiting the intrepid archaeologists who will help us understand changing lifeways in this fascinating region.

An Early Village in the Hay Hollow Valley

A. E. ROGGE
URS CORPORATION

If I could travel back in time, I would take census forms, because demography—the study of the size, density, distribution, and other facets of human populations, and the ways populations change over time—is crucial for understanding how societies are organized and transform. Although each of the many methods used by archaeologists to estimate the size of precontact populations (people living in a region before written records) is fraught with ambiguity, the results commonly indicate that small populations in any given area of the Southwest grew rapidly in concert with increasing reliance on village-based subsistence farming (see page 6). Populations then peaked and ultimately declined—a pattern often interpreted as a sign of collapse.

Aerial view, showing a modern household residing on the Connie site, high atop Point of the Mountain mesa. PHOTO: HENRY D. WALLACE

Surveys conducted by the Vernon Field School, where Paul Martin (see pages 10–11) nurtured so many "New Archaeologists," recorded more than 600 sites in the Hay Hollow Valley (see map on page 4). In the late 1960s, Fred Plog used that inventory to develop a population curve that was similar to many others, but—surprisingly—indicated there had been an earlier cycle of population growth that peaked around A.D. 400–500. Population then declined, remained low for about three centuries, and again grew rapidly, leading to the building (and eventual abandonment) of several large pueblos, including such well-known sites as Carter Ranch, Broken K Pueblo, and the Joint site (see map on page 4).

The Connie Site

The early population peak stemmed primarily from a pair of large pithouse sites situated on opposite ends of Point of the Mountain, a steep mesa that rises about 425 feet above the floor of Hay Hollow Valley. After Paul Martin passed away in 1974, John Fritz directed the Vernon Field School for one more year, and I had the opportunity to lead students in an investigation of the Connie site, one of the two large pithouse sites. We sought to determine whether the site represented a sizeable village, or was instead an accumulation of pithouses inhabited and abandoned by small groups over a long period.

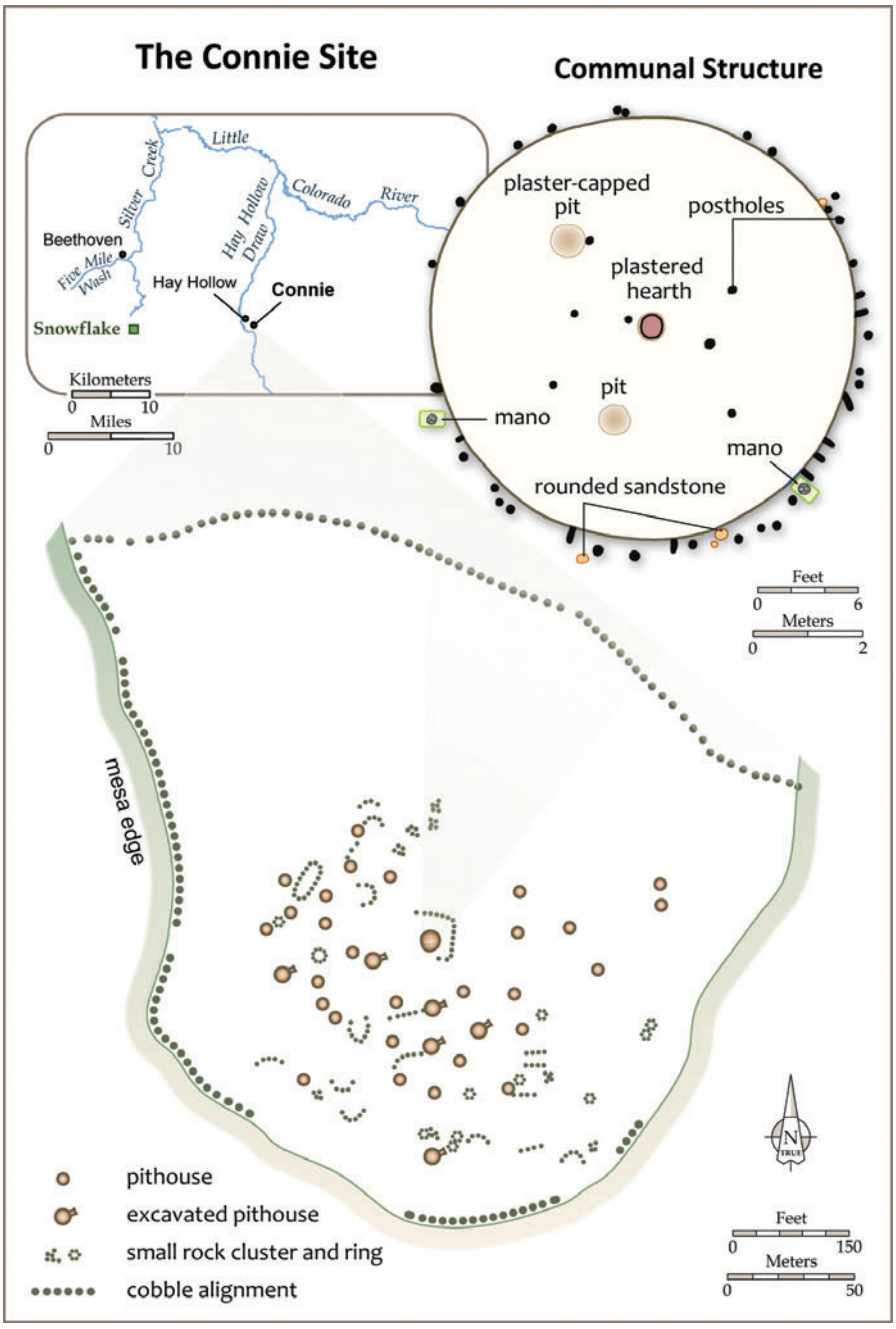
We mapped seventy-two features defined by various kinds of rock alignments, including thirty-four rock rings that quite clearly appeared to be pithouses (see graphic opposite). We completely excavated six of the houses and partially excavated another ten. The excavated houses were about a foot deep and ranged from twelve to twenty-one feet in diameter. Each had a northeastern lateral entryway, a large vertical deflector slab positioned between the entryway and central fire basin, and one or two floor pits. All the houses burned intensely with useful tools left inside, suggesting the burning was unexpected. Excavations typically found at least one or two metates and several manos, a few flaked stone tools and flakes, and crushed pottery vessels on the floors of the burned houses.

Most of the vessels were large seed jars of a type (Adamana Brown, approximately A.D. 200–700) first found in 1934 at the Flattop site and at other sites in the Petrified Forest National Park (see map on page 4). Previously, this period was thought to predate the use of pottery. Intriguingly, Adamana Brown potters used a paddle-and-anvil technique common to the southern Arizona deserts, rather than the coil-and-scrape technique typical of the Colorado Plateau (see pages 26–27 and *Archaeology Southwest Magazine* 27:2).

We also excavated a kiva-like structure (see plan, right) where members of the community probably met, and perhaps conducted ceremonies. This structure was larger (twenty-six feet in diameter) and deeper (a little more than two feet) than the houses, and people apparently entered through the roof. One excavated rock ring was a bit smaller than the houses, and lacked both an entryway and floor features. It and twelve smaller rock rings might have been storage facilities. We classified sixteen other ambiguous features as cobble alignments, and we described eight features as rock clusters. Some of those might have been pithouses, but most probably represent other types of activity areas. Other rock alignments formed a wall around the site. Although that wall was not substantial, in conjunction with the mesa-top setting, its presence suggested a defensive purpose.

The nature of the settlement would have been obvious to a time-traveling census taker, but I am left with less-certain inferences. The seemingly planned layout of pithouses around a community structure, the lack of overlapping structures, and the lack of extensive middens of discarded trash and artifacts suggest to me that the Connie site represents a village inhabited by 100 or more people for a few years, or a few decades at most. Disappointingly, many of the tree-ring and archaeomagnetic samples we recovered failed to yield chronological evidence to date the features; however, three charred seeds from the Connie site recently yielded tightly clustered radiocarbon dates indicating, with a 95 percent probability, that people lived in the village sometime between A.D. 400 and 570.

Charred plant parts and the numbers and types of ground stone tools indicate that maize was likely a substantial part of the diet of the village residents, but the mesa top on which the village was located is an unlikely setting for farming. Jutting out into grasslands from higher elevations to the south, the mesa supports a juniper woodland. Because the Connie site was at the lowest elevation where firewood could have been easily gathered, I speculate it was a winter village, and many, if not all, families left the mesa-top village during warmer weather to plant and tend maize and perhaps other crops in fields dispersed across the valley floors of the surrounding landscape.



Plan view of the Connie site and its central communal structure. GRAPHIC: CATHERINE GILMAN

Learning from the Beethoven Site

SARAH A. HERR, DESERT ARCHAEOLOGY, INC.
MAREN HOPKINS, ANTHROPOLOGICAL RESEARCH, LLC
T. J. FERGUSON, UNIVERSITY OF ARIZONA

Archaeology is a pathway to multiple conversations about the past—some among archaeologists, and others with members of descendant communities. For archaeologists, our excavations at the Beethoven site—conducted in advance of Arizona Department of Transportation construction work along State Route 77 (see page 16)—contribute to an understanding of why and how people established the first villages on the southern Colorado Plateau. For Pueblo people, the Beethoven site is a place that groups of their ancestors inhabited at numerous times between A.D. 650 and 850, and a place replete with messages from those ancestors.

People lived at the site in a time and place of many transitions. Long-standing trails crossing the southern Colorado Plateau would have been in use (see pages 20–21). Our research questions, therefore, focused on understanding social and spatial organization at the site. How many episodes of habitation were there? Did people live in all or most of the structures at the same time? Did the structures and artifacts look more like those below the Mogollon Rim, or more like settlements along the Puerco River and areas to the north? Moreover, because the Beethoven site is not unique, we knew that the data we recovered would inform inferences about other, similar sites that are protected and can remain unexcavated.

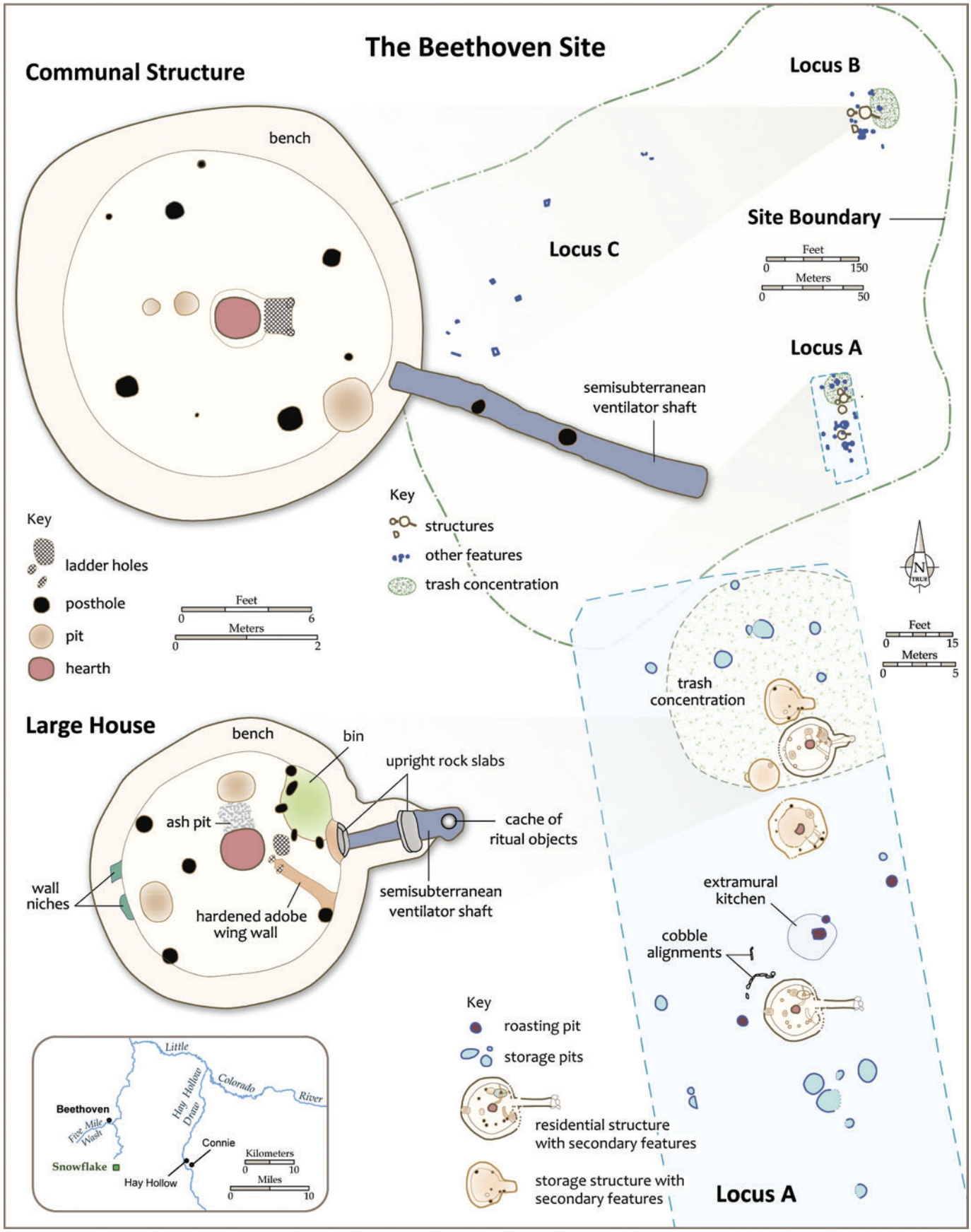
People lived in the eastern cluster of houses at the Beethoven site between A.D. 800 and 850. We found two residential structures here, along with one communal structure. One of the houses (pictured here) had burned with objects still on the floor, including a metate on a trivet with its mano lying on top, a bowl and a jar on a piece of matting, two axes, a polisher, and a pipe in the process of manufacture. PHOTO: SARAH A. HERR

The Beethoven site comprises a vast artifact scatter sprawled across at least three areas of settlement on the ridgetops and slopes near Silver Creek Canyon. We completely excavated the area on the west side of the road, and we excavated less than half of the area on the east side of the road. A private landowner allowed us to examine artifacts from the third area, which lies just outside our project area. We found that the site represents a series of small settlements, rather than one large village.

Archaeology tells a story of small groups of people, perhaps three families at a time, settling down to live in a place year-round. They organized their space in ways that suggest they intended to stay awhile. Shallow residential structures were separate from deeper contemporaneous structures used for storage or workspace, but there were few deep, concealable pits of the kind that suggest people were absent from the site for several months each year (see page 25). The large structure in the area east of the road may have been a leader's house or a gathering place, though it was unique only in its size and depth, not in internal features or artifacts. Many of these structures had caches of broken vessels, ground stone, or tools buried in the ventilators or entries.

Of necessity, right-of-way fences determined our archaeological focus. To understand the broader context of the settlement, we invited Hopi and Zuni cultural advisory teams to the Beethoven site for place-based interviews. We shared the

Opposite: Plan view of excavations in the area west of the road at the Beethoven site. People built residential, storage, and communal structures in this area, where they lived for a few decades between A.D. 650 and 800. GRAPHIC: CATHERINE GILMAN


The Beethoven Site
Communal Structure
bench
Key
ladder holes
posthole
pit
hearth
Feet
0
6
Meters
0
2
Locus B
Locus C
Site Boundary
Feet
0
150
Meters
0
50
Locus A
semisubterranean
ventilator shaft
Key
structures
other features
trash concentration
N
TRUE
Feet
0
15
Meters
0
5
trash
concentration
Large House
bench
bin
upright rock slabs
ash pit
cache of
ritual objects
wall
niches
hardened adobe
wing wall
semisubterranean
ventilator shaft
extramural
kitchen
cobble
alignments
Key
roasting pit
storage pits
residential structure
with secondary features
storage structure with
secondary features
Locus A
Little
Colorado
River
Hay Hollow
Draw
Beethoven
First Mile
Wash
Connie
Snowflake
Hay Hollow
Kilometers
0
10
Miles
0
10

questions and development plans that had led us to excavate the site and described how the site reflects specific archaeological patterns. In turn, our advisors spoke about how they understand this place in Pueblo history, using a historical metaphor of "footprints" to describe the archaeological remains of their ancestors.

For example, Zuni advisor Octavius Seowtewa explained that the stones in the shallow, sand-filled pit of one house might indicate that a healer had lived there. He said that although people would have used rocks to heat the house, such rocks also could have served as tools for curing pain, birthing, and bonesetting. A conversation about the objects in the ventilator shafts led to an explanation that houses breathe through these shafts. The passage of air over an object might represent a prayer for those who used the structure. Advisors also commented that the relatively short term of residence at the Beethoven site was probably because it was a time of migrations, when people were first learning about the land.

Despite our archaeological focus on houses, residents of the Beethoven site spent most of their time outdoors. This is an extramural surface with burned slab-lined pits we called "the kitchen." PHOTO: SARAH A. HERR

Thus, layers of knowledge—from excavation, to artifact analyses, to conversations with cultural advisors—connect this small settlement to a larger landscape, a deeper history, and the many people who have travelled through the area, stopping for a short while, leaving these settlements as a sign of their passing.

A Project of Opportunities

A significant portion of the funding for the recent excavation of the Beethoven site (see pages 14–16) came from an Arizona Department of Transportation (ADOT) initiative known as the Project of Opportunity program. This program utilized a fixed amount of funds set aside from the State's Transportation Enhancement program funding. Under the program, up to $300,000 was available to address emergent opportunities in a highway project if eligibility requirements were met. Approved uses of the money included archaeological planning and research, wildlife studies and protection, and historic preservation, as well as the provision of pedestrian amenities and beautification to open and public spaces adjacent to highway projects. Although the program has been discontinued, the current highway program, MAP-21, has similar flexibility.

Initially, archaeologists confined investigation to two areas that would be impacted by the extension of culverts. Normally, it would have been a small project, but exploratory work revealed a more extensive and significant site than archaeologists had anticipated. Two factors led to the expanded excavations. First, there were plans to construct passing lanes in the area, and it was more economical to undertake the additional archaeological work sooner rather than later. Second—and perhaps more compellingly—highway and culvert maintenance operations were likely to disturb significant archaeological remains. Thus, Project of Opportunity funds, augmented by funds from the Federal Highway Administration and allocated at the discretion of the ADOT Environmental Planning Group, enabled exploration of 100 percent of the site within the right-of-way.

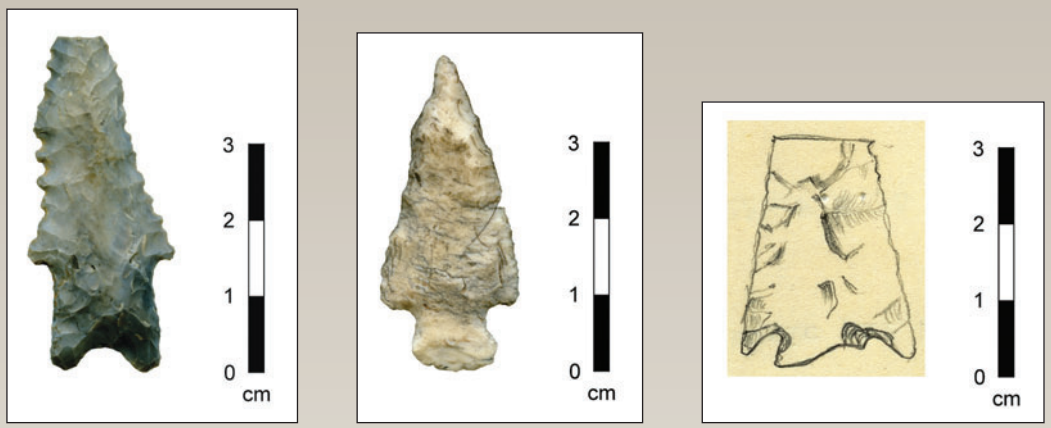
Project of Opportunity funds created an exceptional opportunity for archaeological research, while also supporting collaboration with tribal members and public outreach. At our invitation, Hopi and Zuni tribal members toured the excavations and provided comments about site features and artifacts. An ADOT blog records this visit. (Visit archaeologysouthwest.org/asw27-4 for a link to those videos.) In addition, local Boy Scouts and their parents toured the site for an inside look at what archaeologists do and why they do it. We hope that their visit helps these young community members become respectful stewards of the past.

— David Zimmerman, Arizona Department of Transportation

Some Projectile Points from the Connie and Beethoven Sites

Projectile points from the Connie site (see pages 12–13) the and Beethoven site (see pages 14–16) reflect the designs that were in widespread use on the Colorado Plateau and the ways in which they changed through time across the overall region.

—R. Jane Sliva, Desert Archaeology, Inc.



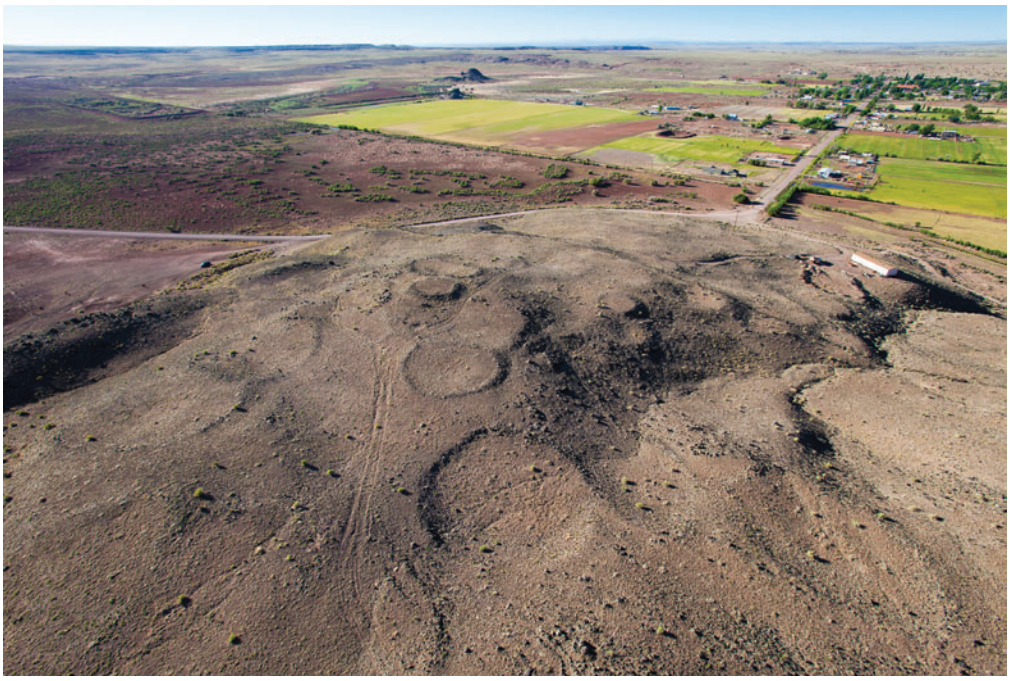
People living at the Connie site (A.D. 400–570) used contemporary points they manufactured or acquired through trade, as well as ancient points they collected from earlier sites. These scavenged earlier points include (left) a Middle Archaic period Pinto point (3500–2100 B.C. in the Southwest) and two different Basketmaker II (pre-500 B.C.–A.D. 500) points. The Basketmaker point with large and open corner notches, horizontal shoulders, and a slightly expanding stem and rounded base (center) would not be out of place in the Basin-and-Range province to the south, whereas the point with a wide blade and deep, narrow corner notches (right) is a standard Colorado Plateau design. These relatively large, heavy points tipped darts that people propelled with atlatls—hooked throwing sticks that allowed people to propel spears with much greater power than if they threw them by hand alone. Because archaeologists did not find small identifiable arrow points at the Connie site, we can infer that people lived there at the earlier end of the postulated date range, before bow-and-arrow technology was fully adopted on the Colorado Plateau (circa A.D. 500). ARTIFACT SCANS: R. JANE SLIVA; ARIZONA STATE MUSEUM ACCESSION NO. 74-14. CATALOG NOS, FROM LEFT TO RIGHT, DAI 1961, DAI 1959, DAI 1990

Later in time, the Beethoven site (A.D. 650–850) contained points that reflect the transition from Basketmaker III (A.D. 500–720) to Pueblo I (A.D. 720–920). Four small Basketmaker III corner-notched points, including one unfinished specimen (group at left), match contemporaneous examples known from the Colorado Plateau. The longer Pueblo I stemmed point (right) is similar to one known from the Chevelon area (see map on page 4). All of these are arrow points, which—despite their small size relative to the earlier dart points—were entirely effective in bringing down large mammalian prey. ARTIFACT SCANS: R. JANE SLIVA; UNIVERSITY OF ARIZONA, ARIZONA STATE MUSEUM ACCESSION NO. 2009-26. CATALOG NOS, FROM LEFT TO RIGHT, 33, 19, 16, 28, 26

A New Look at Pithouse Settlements in the Petrified Forest

GREGSON SCHACHNER, UNIVERSITY OF CALIFORNIA, LOS ANGELES
WILLIAM REITZE, PETRIFIED FOREST NATIONAL PARK

To many people's surprise, Arizona's Petrified Forest region contains one of the largest concentrations of pithouse-period sites in the northern Southwest. Most of these sites date to two distinct phases, one from 200 B.C. to A.D. 400, and the other from A.D. 700 to 900. Although H. P. Mera, Fred Wendorf, Walter Hough, and other archaeologists recorded many important sites decades ago—Woodruff Butte, Sivu'ovi, Flattop, and Twin Butte, for example (see map on page 4)—these settlements still present a puzzle. How do we interpret the presence of dozens of pithouses, as well as other features of unknown date, scattered over areas of a few to as many as forty acres?



Between about A.D. 500 and 550, peoples of the Little Colorado River Valley extensively modified the southern flanks of Woodruff Butte, clearing basalt cobbles and boulders from more than forty circular areas in which they built their pithouses and constructing thirteen terraces and basins for dwellings and gardens. Although early twentieth-century archaeologists Jesse Walter Fewkes and Walter Hough explored Woodruff Butte, no one has scientifically excavated the site, which is threatened by mining. TEXT: DENNIS GILPIN; PHOTO: HENRY D. WALLACE

One possibility is that most structures at each site were contemporary with one another, making these settlements among the largest on the southern Colorado Plateau at the time people were living in them. An alternative interpretation is that small groups of people lived in these locations repeatedly and intermittently over long periods of time, yielding lots of structures, but few that were inhabited contemporaneously. How we interpret these sites and their roles in the settlement systems of which they were a part hinges on our ability to accurately date structures and identify their surface remains. Recent research by archaeologists from the University of California, Los Angeles (UCLA), the National Park Service (NPS), and Archaeology Southwest has attempted to address these questions at two of the largest sites in the region, Sivu'ovi (sih-VOO-oh-vee), which dates to the earlier phase (200 B.C.–A.D. 400), and Twin Butte, which dates to the later phase (A.D. 700–900).

Sivu'ovi

In recent decades, NPS archaeologists have conducted a number of projects at Sivu'ovi, identifying more than forty pithouses at the site. The overall scale of Sivu'ovi has been difficult to estimate, however, because most houses are not visible on the surface, except where exposed by erosion. To better estimate the size of the site, as well as inform its preservation plan, archaeologists from NPS, Archaeology Southwest, and CyArk (see archive.cyark.org/sivuovi-intro) used geophysical survey methods, including magnetometry and electrical resistivity (see *Archaeology Southwest Magazine* 26:1), to identify

subsurface structures. LiDAR surface mapping helped us document currently exposed structures and surface topography. This effort identified thirty-three additional potential pit structures beyond the forty previously recorded, and it also indicated that pit structures occur over a smaller area than some had previously thought.

Given previous work at Sivu'ovi and other contemporaneous sites, such as Flattop, it seems more likely that large concentrations of pit structures dating to this earlier phase formed through repeated, short-term stays over long periods of time. Archaeologists have documented many other small sites of this period in the region, and future work may address how these sites may have formed a coherent settlement system.

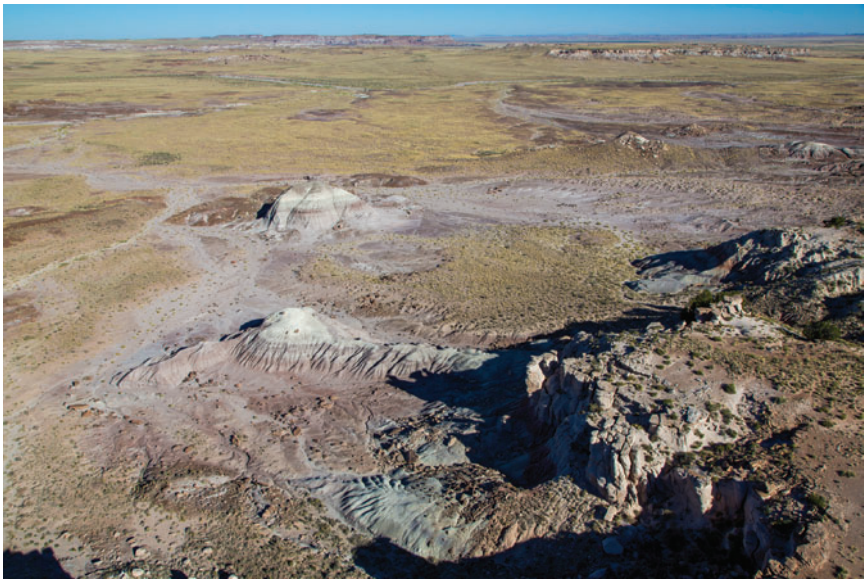
Twin Butte

At Twin Butte, our field crews updated Fred Wendorf's 1950s-era map of the site using total stations and aerial balloon photography. Our work shows that the site is even larger than Wendorf estimated, and that a few dozen households were living there. Here, people resided in pithouses and used small surface pueblos for storage. We also submitted samples of maize from Wendorf's excavations for radiocarbon dating.

These dates suggest people lived at most of Twin Butte for a few generations in the A.D. 700s. Although these dates do not allow us to definitively address whether the site formed during a single period of habitation or through repeated small-scale use, they span a shorter period of time than we expected. Thus, the former possibility—a very large village of contemporaneous dwellings—might be more likely than we had originally thought. A larger number of dates, or the ability to employ a more precise dating method, such as tree-ring dating, would improve our chances of answering this question.

Future Research

The Petrified Forest holds many other sites dating to these periods, a number of which were discovered during survey projects on lands recently acquired by the park. Continued study of these newfound sites, as well as reanalysis of data from older projects, is producing a picture of a much more dynamic and populous past for the Petrified Forest than archaeologists surmised even a few decades ago.



Top: One of the challenges of working at Sivu'ovi has been the constant battle with erosion, which has exposed and destroyed an unknown number of structures along the edge of the mesa upon which the site sits. This arc of upright slabs is all that remains of an excavated pit structure. These slabs were part of a stone facing that supported the lower walls of the subterranean structure. The floor surface has been eroded away as well. Fortunately, NPS archaeologists excavated some of these houses prior to their complete loss, yielding six radiocarbon dates, ranging from 400 B.C. to A.D. 250. Bottom: Aerial view of Twin Butte. Our work also revealed much earlier, previously unknown human activity at Twin Butte, with one maize cob dating to the early half of the first millennium B.C. This is the earliest date on maize from the Petrified Forest, further documenting the long-term importance of this area for ancestral Pueblo farmers.
PHOTOS: TOP: STUART HOLMES; BOTTOM: HENRY D. WALLACE

Early Rock Art of the Middle Little Colorado Region

HENRY D. WALLACE
DESERT ARCHAEOLOGY, INC.

Rock art gives us insights into the ways that ancient residents of the southern Colorado Plateau connected to people in other regions of the Southwest, and it provides a small window into their conceptual worlds. This region is home to *Palavayu* rock art, a series of styles found primarily in the canyons south of the middle portion of the Little Colorado River, including along Silver Creek and the Puerco River.

Palavayu is a Hopi term meaning "red river," and researchers apply the name to several style designations, including the Linear and Majestic styles dating before A.D. 900. It shares some attributes with other portions of the Colorado Plateau and areas in southern Utah, and even areas as distant as the Lower Pecos in Texas. People living in Pueblo II times (A.D. 920–1150) sometimes copied Palavayu figures in their rock art, but by then—and certainly by Pueblo III—anthropomorphic figures became less surreal and more concrete. Changes in rock art reflect other transformations that accompany the rise of sedentism in the region.

For additional images and commentary, visit archaeologysouthwest.org/asw27-4.

Western Archaic Tradition petroglyphs comprise the most ancient rock art of the Little Colorado region, dating to, perhaps, as early as 9,000 years B.C., based on dated sites elsewhere in the western United States. This style is nearly universal in distribution, and its designs are probably rooted in the biology of our brains. It is much less common than its more recent counterparts in the Silver Creek region.

Pair of Palavayu Linear Style anthropomorphic figures rising out of a small tributary canyon along Silver Creek. Many of the shamanic figures of the Palavayu Linear Style give the illusion of flight and upward movement—perhaps none so clearly as these.

"Walk this way." Sometimes, the function of petroglyphs in the Middle Little Colorado River region is completely clear. This panel, with a well-pecked Palavayu-style footprint and attached squiggly line, shows exactly where to climb the canyon wall to readily leave a steep-walled canyon tributary of Silver Creek. Such access points are rare, and almost all are marked by rock art ranging from footprints like these to depictions of lines of deer.

Top: Extraordinary panel with dozens of Palavayu Linear anthropomorphic skeletal figures along a rarely visited portion of Silver Creek. Differences in design patination are at least partly a function of different exposures along the large rock face. Palavayu anthropomorphic figures commonly have skeletal bodies and heads, they are often missing legs and sometimes arms, and they commonly depict "antennae" rising from the heads. The skeletal form suggests a depiction of death, whereas the illusion of flight or rising suggests rebirth or shamanic flight. Because shamans typically experience "death" during their ceremonies, some researchers consider these figures to be shamanic in origin.

Middle: Ghostly Palavayu Linear Style anthropomorphic figures watch over a deer passing along Silver Creek. Seen particularly clearly in the left-most figure, these Palavayu figures are closely related to the Glen Canyon Linear Style (also known as Glen Canyon Style 5), which is thought to date between 3000 and 400 B.C.

Bottom: Palavayu Linear Style birds on a panel along Silver Creek. The figure on the right has extraordinary elongated legs. Palavayu Linear Style displays a host of different zoomorphic and reptilian figures, including birds, deer, snakes, and owls. Also visible on this panel are at least eleven bullet impact spalls, one of which affects the tail of the bird on the right. Such vandalism is common in the region.

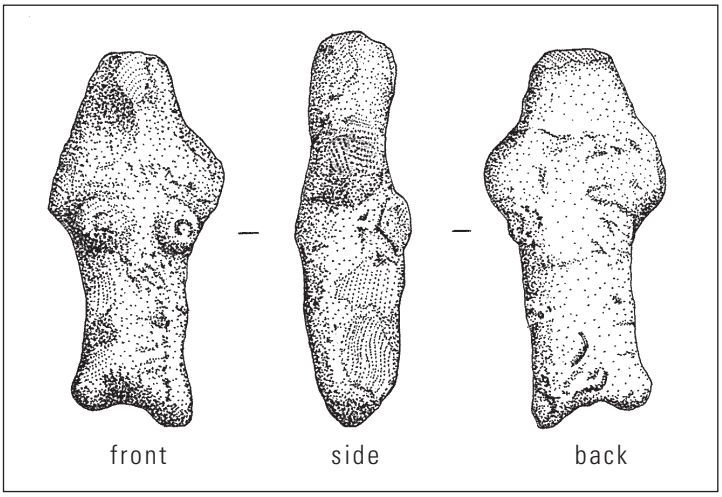
Picturing People in Early Villages

KELLEY HAYS-GILPIN
NORTHERN ARIZONA UNIVERSITY

Depictions of human forms in rock art, pottery, and figurines give us brief glimpses into ancient lives. In the Little Colorado River drainage, Archaic (7000–1500 B.C.) and Basketmaker (1500 B.C. to A.D. 700) petroglyphs (see pages 20–21) emphasize imposing human bodies bristling with ornaments and weapons. Rock art researchers often interpret these figures as shamans and their spirit helpers, devoted to channeling supernatural power to healing and hunting. In contrast, human representations in early village settings are rare and comparatively simple.

Although we do not know what these images meant to their makers and users, we can make a few guesses. First, unlike earlier rock art and later figurines, these early village images do not depict facial features and detailed adornments, thereby emphasizing gender but not individual identities. Second, male and female figures, paired in size and style, suggest gender complementarity. Sexual features are subtle, not exaggerated, so they may not be about "fertility"—a popular but rarely well-supported interpretation of female figurines across the world.

Finally, scenes of groups of people holding hands on decorated pottery (see photo of partial bowl on page 23, facing) suggest an emphasis on community social and ceremonial activities rather than individual leaders, supernatural beings, or relationships between hunters and prey. The imagery is that of village dwellers who gathered in great kivas and came together for planting, harvesting, and communal hunting activities.



Artifacts from the Connie site (see pages 12–13) are the only human depictions recovered from the sites described in this issue, as far as we know. A brown ware pottery figurine (top) has breasts but no other distinguishing features. She closely resembles figurines from slightly later pithouse villages to the north in the Four Corners region, where female figurines co-occur with effigies of conical burden baskets. Early twentieth-century archaeologists working in the area interpreted these figurines as evidence for ritual concern with female and plant fertility. A pair of figures (front and back) carved of mammal bone and carefully polished have holes where faces should be (bottom). They appear to represent a male-female pair. One has an incised string apron, suggesting typical female clothing of this and earlier times; the other has three small dots in the genital area, subtly suggesting a penis and testicles. Each has three small dots for breasts and navel. Were these ornaments worn as pendants, earrings, or tinklers sewn to clothing? TOP: ILLUSTRATION BY ALLEN DENOYER, ARIZONA STATE MUSEUM ACCESSION NO. 74-14, DAI NO. 1964. BOTTOM: ARTIFACT SCANS BY R. JANE SLIVA, ARIZONA STATE MUSEUM ACCESSION NO. 74-14, DAI NO. 1967.

Early Communal Architecture on the Southern Colorado Plateau

DENNIS GILPIN
PALEOWEST ARCHAEOLOGY

The earliest village-farmers in the upper Little Colorado River basin and along the Mogollon Rim built large, circular, semi-subterranean ceremonial chambers that archaeologists call great kivas. Thirty to fifty feet in diameter, and at least partially roofed, these structures were the most permanent and labor-intensive community ritual spaces, which also included circular, slab-lined, open-air dance courts and dance circles, as well as oversized pithouses. Great kivas were ritual structures that helped to create and define communities: they required communal efforts to build and they accommodated most community members.

What types of ceremonies required the use of great kivas? We have two lines of evidence. First, at least six painted pottery vessels of the type known as White Mound Black-on-white (A.D. 700–900) depict circles of people holding hands (see image at right). In most cases, the people holding hands alternate between women with butterfly hair whorls and men with a single feather. At Hopi today, the butterfly hair arrangement signifies that a young woman is of marriageable age, so these pottery vessels may depict round dances associated with coming-of-age ceremonies. A second line of evidence comes from rock art panels depicting processions of figures converging on circles thought to represent great kivas, suggesting that processions were part of great kiva ritual.

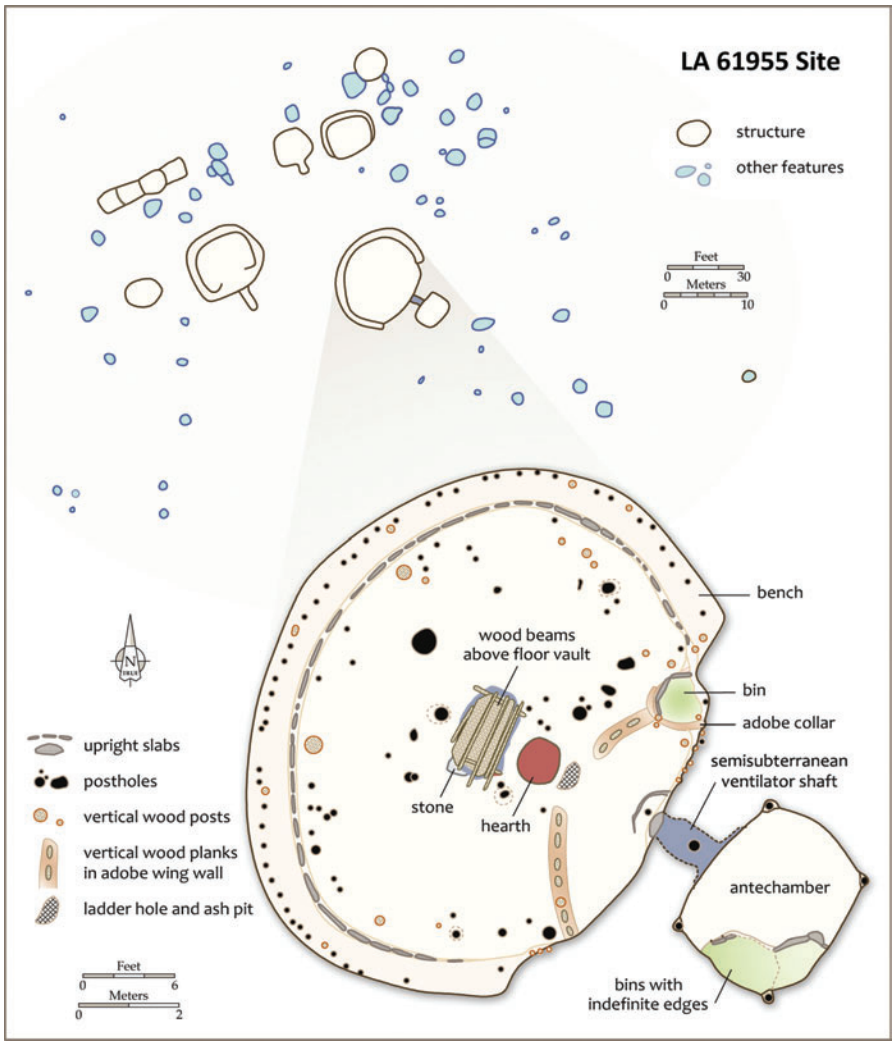
A fragment of a painted pottery bowl from a pithouse near Houck (see map on page 4) appears to depict male-female pairs. George Gumerman III, a Museum of Northern Arizona archaeologist, excavated this artifact from an eighth-century structure. Alternating figures have butterfly hair whorls and a single line that may represent a headdress, such as a single feather or horn. Though sex is not indicated, we can infer that the figures with hair whorls are female. Hair whorls appear around A.D. 300 in rock paintings not far to the north in Canyon de Chelly. This hairstyle is still worn by Hopi and other Pueblo women to mark their status as marriageable females who have completed their puberty ceremony. We can guess that the alternating figures might then represent young men. This motif appears in painted pottery as far north as Durango, Colorado, and in Chaco Canyon petroglyphs. The Houck bowl fragment is the southernmost example of this imagery. TEXT AND PHOTO: KELLEY HAYS-GILPIN, PHOTO ©MUSEUM OF NORTHERN ARIZONA, NA8939. PH3.3.

What did great kivas and related ceremonies achieve for these early communities? Consider that early settlements were characterized by semipermanent houses, substantial storage capacity (but not enough for year-round habitation), and multiple households (but not enough to support reproductively self-sustaining populations). Most pithouse dwellers worldwide have had a biannual settlement pattern, living part of the year in one place and the rest of the year in another place, and this was probably true in the Southwest. Consider, too, that historically, the Hopi required twenty to twenty-four bushels of shelled maize per person per year. Storage facilities in most pithouse settlements (see page 25) did not have enough capacity to supply residents with enough food for year-round habitation. Significantly, early settlements with great kivas (such as LA 61955, illustrated on the following page) tend to have greater storage capacity than sites lacking great kivas. Such settlements would have supported a larger population for more of the year than sites without great kivas, but they probably did not support a reproductively self-sustaining population for an entire year. Perhaps part of the population lived at the site year-round, whereas everyone else moved seasonally.

Demographic studies have suggested that approximately 175 to 250 people are needed to form a reproductively self-sustaining population in which any individual can find an unrelated marriage partner of suitable age. Great kiva sites were often larger than other sites in the area, but even when considered together with contemporaneous settlements within a day's walk, these dispersed communities lacked enough habitation rooms to house a reproductively self-sustaining population. Thus, an individual or household may

have participated in ceremonies at multiple great kiva sites over the course of one or more years to find a mate, in addition to partaking of the ceremonies, festivities, and information sharing that would have occurred.

Great kivas apparently originated in the Mogollon Highlands (see map on page 4). One of the earliest known great kivas is at Bluff Village in the Forestdale Valley (see page 9). It dates to A.D. 238–322. By the 500s, people were building great kivas at settlements in the Chaco Canyon region (29SJ 423 and Shabik'eschee Village; see map on page 4). Great kivas and dance circles in the Mesa Verde area date to 650 or later, but these community structures were gradually replaced by other forms of ritual architecture as villages grew and matured after 800. As the social and ritual landscape changed and diversified, people built a wider variety of ritual spaces, including pithouses twenty to twenty-five feet in diameter with ritual features and artifacts. South of the San Juan River and as far south as the Mogollon Rim, dance circles and great kivas continued to shelter communal rituals of dispersed communities until such settlements were incorporated into Chacoan communities after about 900. South of the Mogollon Rim, people continued to use great kivas into the 1400s. The form of these structures became rectangular after about 600. After 1250, people incorporated great kivas into very large aboveground pueblos.



Plan of excavated portions of site LA 61955 and its community ritual structure, A.D. 500–900. GRAPHIC: CATHERINE GILMAN, ADAPTED FROM PLANS PUBLISHED BY THE ZUNI ARCHAEOLOGY PROGRAM. SEE ARCHAEOLOGYSOUTHWEST.ORG/ASW27-4 FOR REFERENCES

William Longacre and Beethoven

While a graduate student at the University of Chicago, William A. (Bill) Longacre (also pictured on page 10) conducted a sample survey of the area between Show Low, Springerville, St. Johns, and Snowflake, Arizona. He was the first to formally record the Beethoven site. Based on information collected from site surfaces, as well as data from the long-term excavation program of his mentor, Paul Martin (see pages 10–11), Longacre compiled the first chronology of the region. His description of settlement changes through time remains a solid foundation for archaeological work in the area. His subsequent application of social anthropological theory to the interpretation of the eleventh- and twelfth-century Carter Ranch site (see map on page 4) inspired decades of ethnoarchaeological work that has helped us understand the relationship between people and the material patterns created by their activities. Dr. Longacre famously and proudly shares a birthday with Ludwig van Beethoven.

— Sarah A. Herr, Desert Archaeology, Inc.

Bill Longacre at the UA's Grasshopper Field School, 1978. HELGA TEIWES; COURTESY OF THE ARIZONA STATE MUSEUM, UNIVERSITY OF ARIZONA, NO. 55606

Food Storage in Early Settlements

LISA C. YOUNG
UNIVERSITY OF MICHIGAN AND UNIVERSITY OF ARIZONA

For farmers, the ability to store crops for several months or even years is essential. Farmers in the past chose facilities that minimized loss while also allowing access to stored foods as needed. The longer food was stored, the greater the chance of loss due to the growth of mold and other microorganisms or damage by insects and animals.

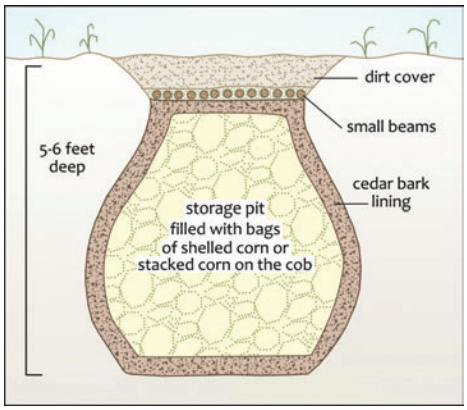
In northeastern Arizona, the types of long-term storage facilities built by people changed over time. During the seventh and eighth centuries (A.D. 600–700), households in the Petrified Forest and Homol'ovi areas stored their food in huge underground pits. By the 800s, people preferred to store food in rooms. What were the advantages and disadvantages of storing food in pits or rooms? What do these storage facilities tell us about the choices ancient people made to minimize food loss?

Like contemporary root cellars, subterranean pits made excellent long-term storage facilities, as long as the food remained dry. Pits maintained relatively cool temperatures and consistent humidity levels. When a storage pit was properly sealed, an anaerobic environment was created inside. This atmosphere helped prevent the growth of mold and bacteria, as long as the seal remained unbroken. Pit covers and pit depth also discouraged rodents or squirrels from pilfering the stored food.

Another advantage of underground storage pits was concealment. People could hide pits by camouflaging the openings to make them look like the surrounding dirt. Among ethnographically documented Southwestern groups who seasonally left their farming settlements to hunt and gather, large underground pits were the preferred long-term food-storage method.

A major disadvantage of underground pits was ease of access to the stored foods. Many of the large storage pits at early settlements in the Homol'ovi area and in the Petrified Forest are more than three feet deep, and were probably filled with great quantities of carefully stacked food. To access this food, a woman would have needed help retrieving items from the pit, especially from the lower levels. Although aboveground storage rooms did not maintain temperature and humidity levels as consistently as pits, they allowed easy access through openings in the walls.

The shift from underground pits to aboveground rooms indicates a change in the characteristics that families preferred for their storage facilities. During the 800s, households chose facilities that were easy to access over the ability to conceal them. This change in storage occurred as people became increasingly dependent on agriculture and less reliant on seasonal moves that took them away from their farming settlements for extended periods.



A composite example of a food storage pit in the Southwest. A Western Apache prayer said while closing a storage pit speaks to the importance of hiding stored food. The prayer asks that no one—human or animal—bother the corn buried in the pit. For the Western Apache, hiding their stored crops was critical, because several months could pass before they returned. GRAPHIC: LISA C. YOUNG AND CATHERINE GILMAN

What is happening here? What should we do about it?

Read *Back Sight* (see page 28) to find out.

PHOTO: WILLIAM H. DOELLE

A Short History of Early Cooking Vessels in the Southwest

ERIC BLINMAN AND C. DEAN WILSON
DEPARTMENT OF CULTURAL AFFAIRS, MUSEUM OF NEW MEXICO

Cooking jar sherds are ubiquitous in Southwestern pottery collections. This is a measure of their importance in daily life and proof of their fragility. Yet cooking jars generally receive a disproportionately small share of attention during archaeological analysis and interpretation. This is understandable, given the complex roles that other kinds of vessels play in the web of social and economic relationships that interest archaeologists (see, for example, *Archaeology Southwest Magazine* 27:2). Still, cooking jar history *is* fascinating.

Southwestern pots that might have been used for cooking are known as early as A.D. 50 from small agricultural villages in the Sonoran Desert of southern Arizona and northwestern Mexico. Archaeologists refer to these distinct forms as seed jars or *tecomates*: spherical vessels without necks, but with orifices large enough to enable a person to put a hand in and grasp the contents. In studying these Sonoran Desert examples, ceramics expert James Heidke and others have found that although the pots are well designed for storage, they do not bear evidence of use for cooking.

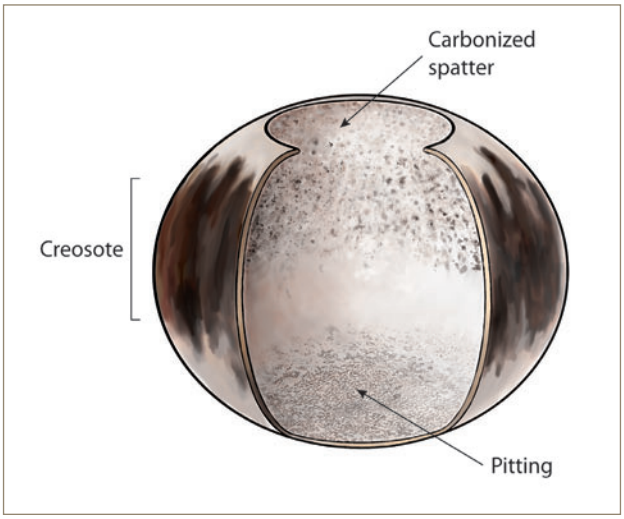
By A.D. 200, pottery technology appears to the north in Mogollon and southern Colorado Plateau sites, and seed jars again are the dominant form. In these instances, however, expert James Skibo and others have confidently identified use for cooking and storage, even though the shape of seed jars is not well suited to cooking.

By A.D. 500, in the Sonoran Desert and on the Colorado Plateau, potters were making vessels with necks for water storage (narrow necks) and for cooking and food storage (wide necks). At this time, even the northern people began to use seed jars solely for storage. After A.D. 700, potters made smaller seed jars and, over time, they were more likely to paint or decorate these jars. Such decorated "seed" jars probably held nonfood materials of great value.

The next change in Mogollon and Colorado Plateau cooking jars is the appearance of neckbanding (see example in image at right, on facing page 27). Ancestral Pueblo potters built vessels with coils of clay, smearing over junctures in order to weld the adjacent coils and create plain surfaces. In the late eighth century, potters made some necked cooking jars without smearing the neck coil junctures. Called neckbands or neck fillets, the banded appearance was intentional, contrasting with the plain surfaces of the rest of the container. Through the ninth century, coils became narrower (smaller in diameter) and the overlap between adjacent coils became greater. By A.D. 900, neckbands in these regions were very narrow and, to our modern eyes, they look like clapboard siding on a house. Rhythmic indention (corrugation) appears on neckbands by the mid-tenth century, and by A.D. 1000, potters used corrugation over the entire surface of cooking jars.

For a long time, archaeologists interpreted cooking jar neckbands as "style" and used the progressive changes to define pottery types for ceramic dating. But, in the 1990s, Christopher Pierce examined neckbanding as part of an investigation into the purpose of corrugation. What he discovered was elegant: neckbands reduce the likelihood of boilover during cooking. The bands increase surface area, cool the neck, and deflate growing bubbles. Narrower and clapboarded neckbands were more effective than fillets, and indented bands were even better. Because women were the potters and cooks, the innovation spread rapidly across Mogollon and Colorado Plateau communities.

The strong functional implications of these design changes raise an interesting question for future study: Why did potters in some neighboring regions not embrace these innovations?



Cross section of a typical cooking jar of the "seed jar" form, showing where we find evidence of use for cooking. GRAPHIC: ROBERT B. CIACCIO

How Do We Know People Used a Vessel for Cooking?

This is an important question, even though ceramics experts take it for granted for most of the pottery we examine. Vessel forms and functions are expressions of engineering principles developed over generations through trial and error. The potter consciously builds a vessel for a particular use, considering raw materials (especially tempering material and size), scale (volume), access (orifice characteristics), stability (center of gravity when filled), leverage requirements (handles for overcoming stability), security (content retention), and many other design dimensions.

For example, a personal "canteen" (see inset image below) is small in volume, has a very narrow orifice on a short neck to facilitate securing and dispensing contents, often has attachment lugs for handles or slings that maintain its levelness and stability when suspended, and is strong and impermeable (high firing temperature). Cultural and historical preferences influence these functional considerations, but the plasticity of clay encourages the potter to look for solutions to problems and inefficiencies encountered as vessels are used.

Shelf of ancestral Pueblo and Tewa cooking and storage vessels from northeastern Arizona and north-central New Mexico, A.D. 575–1500, on exhibit at the Arizona State Museum. From left to right: unusually shaped Mudware bowl (A.D. 575–700) in front of Obelisk Gray seed jar (A.D. 450–800); Tusayan Corrugated vessel (A.D. 950–1300); Lino Gray seed jar (A.D. 575–875); Kana'a Gray pitcher with clapboard-style neckbanding (A.D. 760–900); Little Colorado patterned corrugated jar (A.D. 1080–1275). The sooting and ash on the Tusayan Corrugated vessel suggest it was used for cooking. When it developed a crack, someone repaired it with a juniper-bark base and yucca harness, and the vessel continued on as a storage jar. (Information provided by G. M. Jacobs, Arizona State Museum.) Inset: Potsuwi'i Incised canteen (GP6108) on a shelf behind corrugated vessels in main view, A.D. 1450–1500. IMAGES: JANNELLE WEAKLY; COURTESY OF THE ARIZONA STATE MUSEUM, UNIVERSITY OF ARIZONA. VISIT ARCHAEOLOGYSOUTHWEST.ORG/ASW27-4 FOR A LINK TO MORE INFORMATION ABOUT THESE VESSELS.

Although it can appear that a potter designed a vessel for a particular function, this does not necessarily mean people used it for that purpose. Wear traces provide clues as to how people actually used a vessel. A "sooty" appearance is more ambiguous than one might think. Darkening of a vessel surface can occur during firing and after discard, as when people discard sherds in a fire or when a burning home collapses and crushes a vessel.

A better indicator of cooking use is an accumulation of creosote, tar gasses that are given off as wood burns (see image on page 26). When unburned gasses from cooking fuel condense on the cooler upper surfaces of the vessel exterior, creosote accumulates. Weathering can physically remove the creosote crust, but when sherds are protected by burial, the insoluble and inert substance is commonly preserved, especially in surface crevasses and defects.

Evidence of cooking can also appear as cumulative pitting of interior vessel surfaces opposite where heat is applied. The outside of the vessel wall is exposed to temperatures of 400–800°C (about 750°–1475°F), whereas the contents rarely reach more than 100°C (212°F, the boiling point of water). If moisture from the food soaks into the vessel wall, it converts to steam, causing micro-cracks and micro-spalls (pitting) in the interior vessel surface. Isolated pits accumulate until the entire interior surface comes off, and eventually the cooking jar wall thins to the point of weakness.

Other evidence of cooking comprises residues, especially those that occur when an inattentive cook allows heat to get out of control. Spatter from boiling stew can carbonize on interior surfaces above the water line if the vessel is overheated, and the food itself can be burned on the lower surfaces as water evaporates. Analysts can detect chemical traces of foods within sherds, but chemical residues alone do not necessarily differentiate between cooking and serving use.

— Eric Blinman and C. Dean Wilson

Archaeology Southwest
300 North Ash Alley Tucson, Arizona 85701

NONPROFIT
ORGANIZATION
U.S. POSTAGE PAID
TUCSON, AZ
Permit No. 878

back sight

As a Preservation Archaeologist, I frequently advocate that the best protection for archaeological sites is an intact cover of soil and natural vegetation. Although the effects of rodents, moisture, frost, and other factors that degrade archaeological deposits do not cease altogether under a blanket of soil and plants, they generally slow substantially. Under such conditions, "preservation in place" is an appropriate strategy for ensuring that a site will be available well into the future.

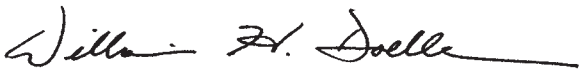
Unfortunately, these conditions do not hold at Sivu'ovi (see pages 18–19). Last fall, I joined three archaeologists from Archaeology Southwest and Desert Archaeology and assisted in recording current conditions at this remarkable early settlement in Petrified Forest National Park (PEFO). In addition to carefully mapping the site, we assessed erosion's impact on the many pithouses and associated features along nearly a mile of the site's perimeter.

The jumbled archaeological "mess" left behind by erosion along the margins of the Basketmaker II site of Sivu'ovi is difficult to witness. Our proposed response is an ongoing program of monitoring, combined with limited excavation, focused on areas threatened by erosion. PHOTO: WILLIAM H. DOELLE

The National Park Service's (NPS) concerns prompted our fieldwork, and our original goal was to develop intervention recommendations that would help preserve Sivu'ovi in place. As we evaluated the erosion, it became clear that these natural processes were more powerful—and inevitable—than we had anticipated. I found it incredibly frustrating that conditions at Sivu'ovi, a well-protected place, forced us to say to NPS, "Dig it or lose it."

Still, the site's location within PEFO does provide some important opportunities. Erosion will not destroy the entire site immediately. Thus, unlike at a construction site, where archaeologists might need to excavate an entire site to offset the impacts of heavy equipment, in a national park, there is time to develop a long-term program of regular, small-scale excavations. Fieldwork can focus on portions of the site that are most threatened. In fact, if we can measure erosion rates along the edge, we should be able to predict when an area will become threatened, and plan fieldwork accordingly.

When preservation in place is just not viable, even in a national park, then we must preserve information from threatened areas. From Sivu'ovi and some other threatened early settlements just beyond the park boundaries, a gradual flow of new information from such sites could contribute greatly to the research issues highlighted in this issue. The other challenge is finding sustainable funding to implement this information-preservation strategy.



back sight (băk sīt) n. 1. a reading used by surveyors to check the accuracy of their work. 2. an opportunity to reflect on and evaluate Archaeology Southwest's mission.