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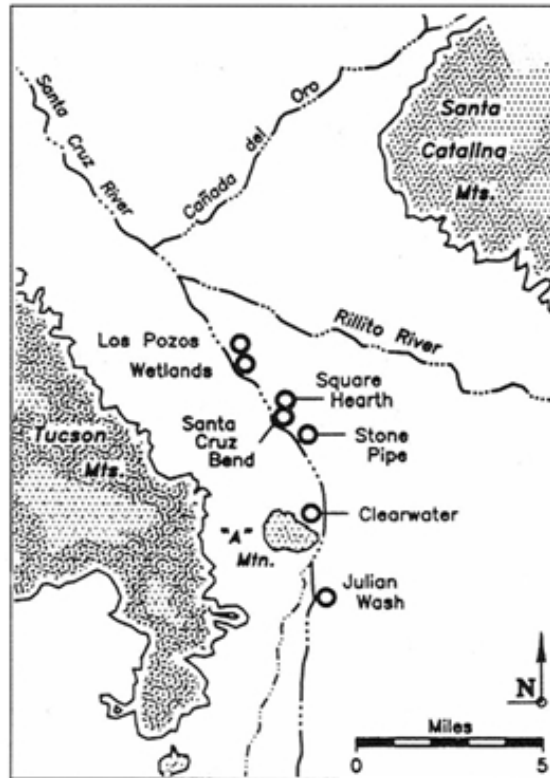
Rewriting Prehistory: Recent Discoveries at Cienega Phase Sites in the Santa Cruz Floodplain

Jonathan B. Mabry, Ph.D., Center for Desert Archaeology

Prior to 1993, little archaeological work had been done in the floodplain of the Santa Cruz River in Tucson. Although largely *terra incognita* to archaeologists, it was generally assumed to have been an "empty niche" during much of prehistory. Recently, the pace of fieldwork in the floodplain has increased dramatically, and our views are changing equally fast. Since 1993, Desert Archaeology, Inc. (DAI) has carried out a series of archaeological projects within the right-of-way of the Arizona Department of Transportation's improvements of the Interstate 10 corridor through Tucson. During this period, projects were also conducted by DAI in the floodplain outside of the I-10 corridor, including City of Tucson projects at the foot of A-Mountain and near the county wastewater treatment plant, and a private project near the confluence of the Santa Cruz and Rillito rivers. Archaeologists from Statistical Research, Inc. and SWCA, Inc. also excavated in the floodplain north of the Canada del Oro.

Among the many important finds during this recent burst of fieldwork, discoveries at deeply buried sites dating to the Early Agricultural period (ca. 1200 B.C.-A.D. 150) have forced archaeologists to revise much of what they knew about the transition to farming-based village life. This special issue of *Archaeology in Tucson* summarizes some of the discoveries at sites (shown above) occupied during the Cienega phase, the second of two local phases of the "Early Agricultural period," a term originally proposed in the 1950s, and recently reintroduced by Dr. Bruce Huckell to replace the term "Late Archaic period."

Evidence from other Early Agricultural period sites in the Tucson Basin suggests that agriculture arrived in the Southwest from Mexico between about 1200 and 800 B.C., called the San Pedro phase in southeastern Arizona. Maize, beans, squash, and possibly tobacco and cotton, may have been adopted together as a crop complex. These tropical crops were initially cultivated



Locations of some Cienega phase sites in the Santa Cruz River floodplain recently excavated by Desert Archaeology, Inc. (figure by Catherine Gilman).

in well-watered alluvial settings such as the Santa Cruz Valley with floodwater farming methods, including use of simple ditches. With more efficient ground stone milling tools and bell-shaped pits for processing and storing crop surpluses, agriculture quickly became a significant part of subsistence, and a trend toward longer occupation of settlements began.

During the Cienega phase (ca. 800 B.C.-A.D. 150), many settlements were established in the Santa Cruz floodplain. Santa Cruz Bend was a large Cienega phase settlement with several house groups, storehouses, communal structures, a plaza, and burials. A formal cemetery of this phase was found at the Wetlands site. Grave offerings and ritual treatments of bodies and offerings were not uncommon. The bow-and-arrow, a significant improvement in hunting technology and weaponry, may have been used alongside the atlatl-and-

dart. Fired-clay figurines were already made during the San Pedro phase, and fired-clay beads and small, crude pots were made during the Cienega phase. These first pots-like the earlier figurines-may have been used in rituals.

Flaked stone tools did not become cruder and more "expedient" during the transition to sedentary life, but were increasingly conserved to extend their use-lives, and included some well-made, formal tools made of high-quality materials. Obsidian, sea shells, and rare minerals were obtained from distant sources through trade networks. A variety of jewelry was made from shell, stone, and minerals, and pigments were processed from hematite and other minerals.

Today we know that the Cienega phase people of southeastern Arizona developed an incipient village culture several centuries before the distinctive Mogollon, Anasazi, and Hohokam cultures emerged, and were probably among their ancestors. Perhaps this is the most significant discovery.

New Details of Cienega Phase Architecture

David A. Gregory
Center for Desert Archaeology

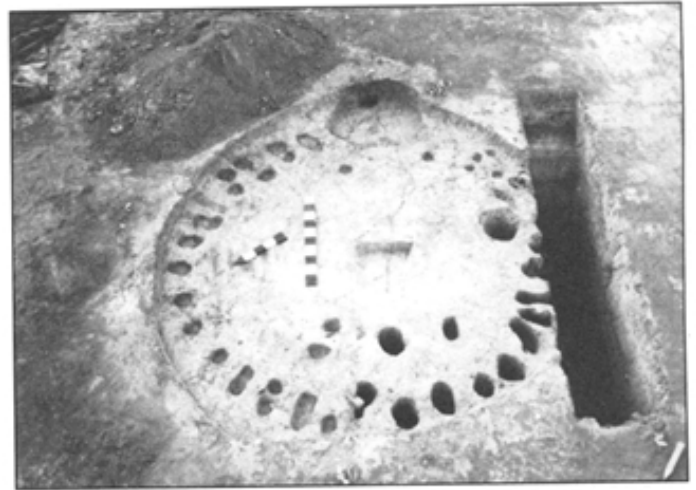
A number of extremely well-preserved structures discovered at the Cienega phase settlement of Los Pozos provide new and interesting details about the round pit structures built by these early farmers.

Construction began with excavation of a circular pit, most commonly between 3 and 4 m in diameter and between 30 cm and 40 cm deep. A series of evenly spaced postholes was then excavated along the interior margin of the pit to accommodate the poles that formed the principal structural elements of the walls. The number of wall poles was determined by the diameter of the structure, and most structures had approximately 40 such poles. Burned poles found in place show that flexible saplings of willow or cottonwood were used for this purpose.

Once the poles were in place, they were connected and stabilized by means of horizontal stringers lashed to them, with the wall poles bent and drawn toward the center of the structure in the process. These stringers were also willow or cottonwood saplings having the necessary flexibility to be bent around the emerging frame.

The wall frame was then covered with sheaves or bunches of thatching, placed in a series of overlapping layers from the bottom of the wall upward. The grass probably grew in abundance near the settlement. Overlap of the grass layers would have helped shed water, in much the same way that modern shingle or shiplap construction does. The grass thatching was held in place by yet another series of horizontal cottonwood or willow stringers lashed over the grass on the outside. It is probable that an embankment of earth was emplaced around the outside base of the wall, to keep water from draining into the semi-subterranean structures.

Construction of the walls left a round opening at the top. The small, flat roofs that covered this opening at the top of the dome-shaped structure consisted of two layers of closely spaced

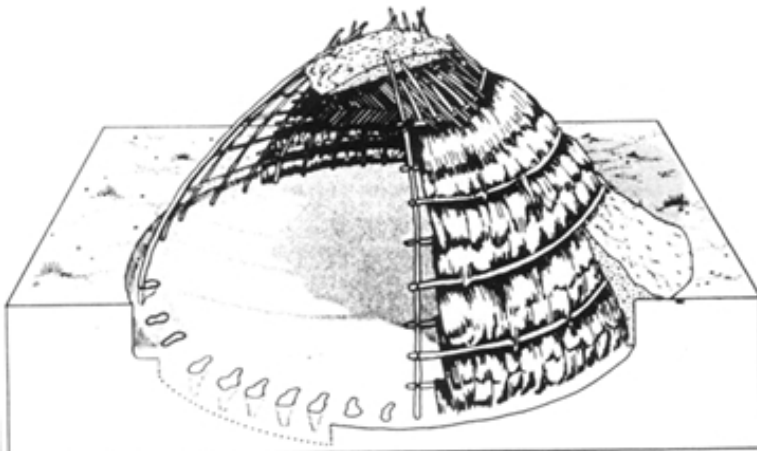


A typical pit structure from Los Pozos, showing the line of postholes around the inner margin of the pit. The small pit at the top of the photograph was cut into the structure after it was abandoned (photo by David Gregory).

parallel poles of cottonwood, willow, or (occasionally) saguaro ribs, somewhat smaller in diameter than poles used in the walls. Brush or grass was then placed atop this layer, and the brush was covered with a layer of earth. In some structures, there is evidence for four or five interior roof support poles. In these cases, cross pieces connected the tops of the upright interior support poles, and the wall poles were bent over and tied directly to these cross pieces. The flat roof was constructed in the same way described above.

No evidence was found of any kind of formal entryway. However, in many cases there is a larger-than-usual gap in the ring of wall support poles, and it is probable that entries were simply unhatched gaps left in the walls. These gaps may have been reinforced with additional poles bent over and tied to form a doorjam. No evidence of plastering or the use of daub in construction of walls and roofs was found, and the earth placed on the roofs and around the bases of the structures was probably dry when put in place. Floors were not formally prepared, and appear to have been created in large part by people walking over the sometimes damp natural deposits into which the structures were excavated.

These Cienega phase dwellings were not substantial constructions and probably were not used for very long, perhaps two or three years. Over this interval, the thatch would have dried, become brittle, and begun to "shed," and the structures would have become infested with termites and other vermin. The short use-life of the structures may be one reason why so many of them are found at sites like Los Pozos, Santa Cruz Bend, and Stone Pipe.



Artist's reconstruction of a Cienega phase pit structure, based on data recovered from Los Pozos (illustration by Robert Ciaccio).

Animal Uses: Faunal Bone from Cienega Phase Sites

Helga Wöcherl and Jennifer A. Waters
Center for Desert Archaeology

Excavations at five Cienega phase sites along the Santa Cruz River have produced large numbers of faunal bones, indicating that people hunted many types of animals and used them for many purposes. Artiodactyls (deer, bighorn sheep, and pronghorn antelope) provided most of the dietary meat, perhaps 70 to 90 percent, with deer providing the most. However, bones from lagomorphs (cottontails and jackrabbits) were the most commonly recovered. These were probably hunted in nearby agricultural fields and in the thick vegetation along the river. In contrast to later Hohokam sites, rodents played a minor role in the diet. Aquatic species such as fish, duck, and turtle occasionally augmented the diet.

A dog burial from Santa Cruz Bend suggests that domesticated dogs lived there. At that site, a burial of a juvenile black bear was also found and, along with the presence of bighorn sheep remains from several sites, indicates that inhabitants were venturing into the surrounding mountain ranges to find food. Other animals, such as bobcats and hawks, were only occasionally captured. Like the bear, they were probably not eaten, perhaps because of their ritual significance.

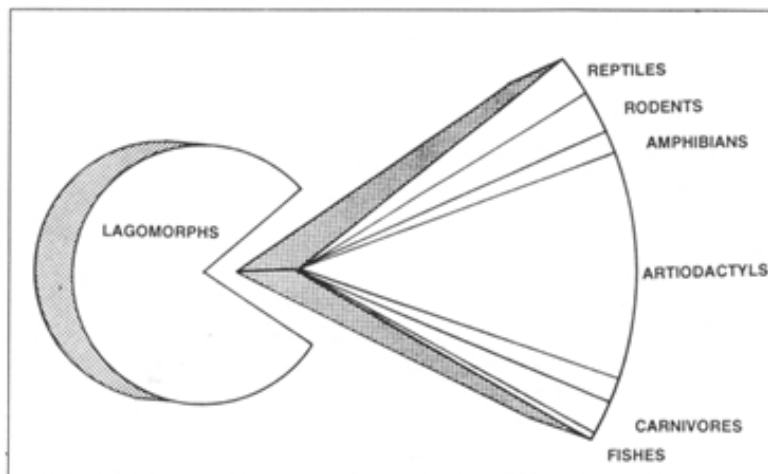
Bone artifacts comprised a small proportion of the animal bone recovered from the Cienega phase sites. Two categories of bone artifacts—tools and ornaments—were identified. Awls, needles, spatulas, and worked antler were used in hide working, basketry, and flaked-stone tool manufacture. Ornaments included tubes, beads, pendants, and worked turtle shell.

Awl-like implements, the most common type of bone artifact recovered from all five sites, were used for punching holes through hides and for weaving baskets. Two toothed combs manufactured from artiodactyl scapulae, and probably used to separate agave fibers, were recovered from Santa Cruz Bend. Sixteen artiodactyl femur heads were collected from several features at Los Pozos. The function of these is unknown, but some were ground, polished, and stained with red pigment. A number were found in postholes, their placement perhaps indicating a ritual meaning.

The animal bone suggests that the basic hunting patterns of the Hohokam, who also focused on lagomorphs and artiodactyls, developed during the Early Agricultural period. Many of the tools are also similar, although some forms, such as rasps and femur heads, do not appear at later sites.



Above: Two examples of awls recovered from the Cienega phase Wetlands site. Right: Proportions of identifiable faunal bone from Cienega phase sites. Lagomorphs (cottontails and jackrabbits) were most common, but probably provided less meat than artiodactyls (deer, bighorn sheep, and pronghorn antelope) (illustrations by Robert Ciaccio).



Animal Taxa Found at Cienega Phase Sites along the Santa Cruz River

Fish

Frog/toad
Sonoran mud turtle
Desert tortoise
Lizard
Rattlesnake

Duck
Sharp-skinned hawk
Other large hawk
Gambel's quail
Roadrunner
Owl
Goatsucker
Blackbird/Oriole
Raven/Crow

Desert cottontail
Black-tailed jackrabbit
Antelope Jackrabbit

Harris' antelope ground squirrel
Round-tailed ground squirrel
Pocket gopher
Kangaroo rat
Pocket mice
Cotton rat
White-throated Woodrat
Muskrat

Dog/coyote
Dog
Kit fox
Gray fox
Black bear
Ringtail
Badger
Skunk
Bobcat

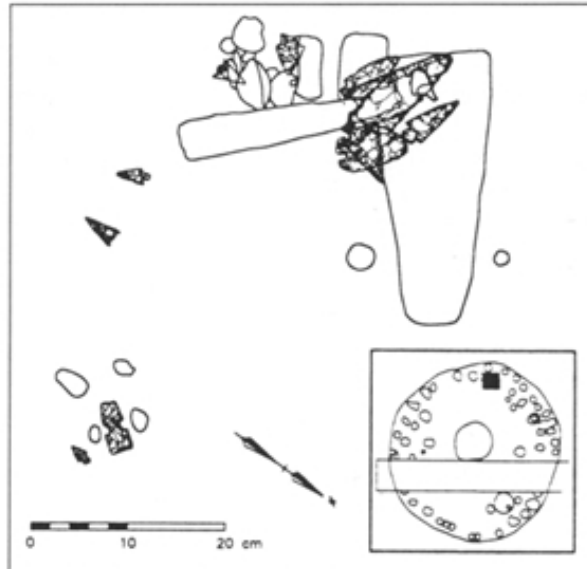
Mule deer
White-tailed deer
Pronghorn antelope
Bighorn sheep

A Ritual Array of Artifacts from a Cienega Phase Pit Structure

David A. Gregory, Center for Desert Archaeology

During recent excavations at the extensive Cienega phase settlement of Los Pozos, a remarkable array of artifacts was found on the floor of an otherwise typical pit structure. The array was composed of 33 objects, including both artifacts and unusual natural items, purposefully arranged near the west wall of the structure.

The objects themselves attest to the special nature of the array: 13 projectile points, several of them well beyond the usual size for Cienega phase points; 3 unmodified stone flakes; 2 pieces of basalt, both minimally shaped but apparently not designed for any other use; a fossil horse tooth and an unfossilized partial vertebra from a mammoth or mastodon; a beautifully polished football-shaped object of translucent red-orange chalcedony; an oblong object shaped from red quartzite; 5 round pebbles, 4 of which may have had some perishable cord wrapped around them; and other natural items, including an Apache tear (obsidian), 4 geodes, and a small hematite concretion. The football-shaped object and the oblong object of red quartzite are similar to objects found lashed to atlatls recovered from Basketmaker caves, and may have been atlatl weights.



Drawing of Los Pozos floor array (figure by Geo-Map, Inc.).

A number of these items came from distant sources. X-ray fluorescence analyses reveal that an obsidian projectile point was made of material from Cow Canyon in western New Mexico, while the Apache tear originated in the Saucedo Mountains of

southwestern Arizona. Another of the projectile points has been identified as an Andice point, an Archaic type common in west Texas. The chert from which this point was made appears to be non-local and the point may well have been manufactured in Texas and carried to the Tucson Basin.

The manner in which the objects were arranged with respect to one another also attests to the special character of the array. The seven largest points form a size-graded series, and were stacked upon one another in a formal arrangement: each level in the stack was oriented in the opposite direction of the ones immediately above. Four of the five round pebbles occurred in two pairs, with one larger and one smaller object

in each pair. The two pebbles in each of these pairs were positioned opposite each other and on either side of the larger piece of basalt and a deeply notched, broken lanceolate projectile point.

Clues as to what this remarkable array might represent come from an unexpected source—rock art. The items included and the manner of their arrangement show similarities to items and arrangements depicted in petroglyphs and pictographs of the same approximate age. These include: wideshouldered anthropomorphic (human-shaped) figures, often shown with a larger figure paired with or attached to a smaller



Thirteen projectile points (left) from the floor array. The Andice point from Texas is at left in the middle row. Length of point at top left is 13.5 cm (5.2 in) (illustrations by Jane Sliva). Unusual natural items in the array (right) include parts of four geodes, a partial mastodon or mammoth vertebra, a fossil horse tooth, and a beautifully shaped and polished football-shaped object of a red-orange, translucent cryptocrystalline silicate, probably chalcedony. The geode at top left is 5.9 cm across/wide (photo by Jonathan Mabry).



one; round objects held by such figures, which have been interpreted as trophy heads or medicine pouches; atlatls (dart throwers) held by figures or shown unattached but nearby; and projectile points, which occur as separate elements or variably attached to the heads or hands of anthropomorphic figures.

Based on comparisons with these rock art elements and motifs, the Los Pozos array may be interpreted as a construction designed to represent two wide-shouldered anthropomorphic figures, a larger one in the form of the large piece of basalt and a smaller one represented by the deeply sidenotched projectile point fragment. Each of the figures is flanked by two round objects, one on each side, and these objects may have been attached directly to the figures by means of arms made of perishable material. The placement of these round pebbles shows formal asymmetry, with the larger of the two being to the left of the larger figure and to the right of the smaller one. The other piece of basalt appears to be an extension of the larger figure, and could represent an atlatl, with the stack of seven projectile points positioned at one end and two other points near the other end. Each of the two figures also has a cluster of items positioned nearby, in each case including projectile points and unusual natural items.

Some of the anthropomorphic rock art figures pictured here have been interpreted as representing shamans with special powers associated with hunting, and panels showing projectile points, atlatls, and animal figures have been interpreted as hunting shrines. Many of the items in the Los Pozos array suggest hunting or animal imagery, and faunal remains from the site show that hunting of deer and rabbits especially remained important subsistence pursuits for these early farmers. Similarly, the floor array suggests that rituals and beliefs associated with animals and hunting were important aspects of their cosmology and world view.

These rock art motifs occur widely across the American Southwest and even into Mexico and California, with examples illustrated here from Chihuahua, the Big Bend area of Texas,

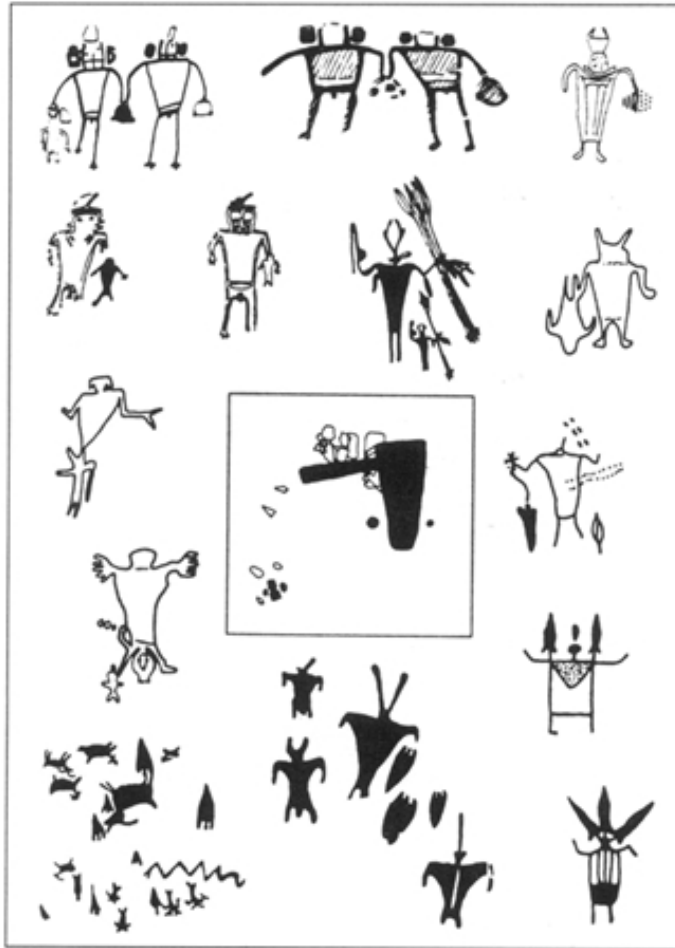
the Great Basin, the Colorado Plateau, and southern California. However, the wide-shouldered figures and most of the other motifs are lacking in the Archaic rock art of southern Arizona. The closest known similar images are of projectile points and atlatls, depicted at a site on the eastern side of the Chiricahua Mountains in southeastern Arizona. Of interest in this regard is the Andice point from Texas and the discovery of three points from nearby structures that are the same style as Basketmaker

points from northern Arizona. These artifacts suggest links between Los Pozos and several distant areas. If the interpretation offered here is correct, the array combines elements or motifs that occur over an extremely large geographic area, suggesting a certain degree of continuity in cosmology and world view during the Cienega phase. Why similar rock art motifs are absent in southern Arizona deserts remains an interesting mystery.

We can only speculate about how this array functioned after it was put in place, and we cannot say whether it was a one-time, occasional, or permanent feature. We do not know if it was created and meant to be seen by only one person or by a group of people (the size of the structure would suggest that if a group of people was involved, it must have been a relatively small group). The structure burned and collapsed directly upon the array, and perhaps the burning was an intentional event. Was it a kind of altar, created by and the responsibility of a single person, perhaps a shaman performing his role as a conduit to unseen worlds? Was it prepared in a ritual of sympathetic magic, to bring success to a party about to

depart for the nearby mountains in pursuit of deer or mountain sheep? Was it created to commemorate the death of a shaman, whose house was intentionally burned after the array was created?

Whatever its specific purpose and meaning, it is clear that the Los Pozos floor array provides a unique and intriguing window into Cienega phase ritual behavior—a small piece of a slowly emerging and fascinating picture.



Rock arts motifs possibly duplicated in the Los Pozos floor array include wide-shouldered anthropomorphic figures, often occurring in pairs with one larger and one smaller figure; round objects (trophy heads or medicine pouches?) and atlatls (dart throwers) held by such figures; and projectile points. Several objects in the array are highlighted to emphasize similarities to the illustrated rock art motifs (illustration by Robert Ciaccio).

The Structure of A Cienega Phase Settlement

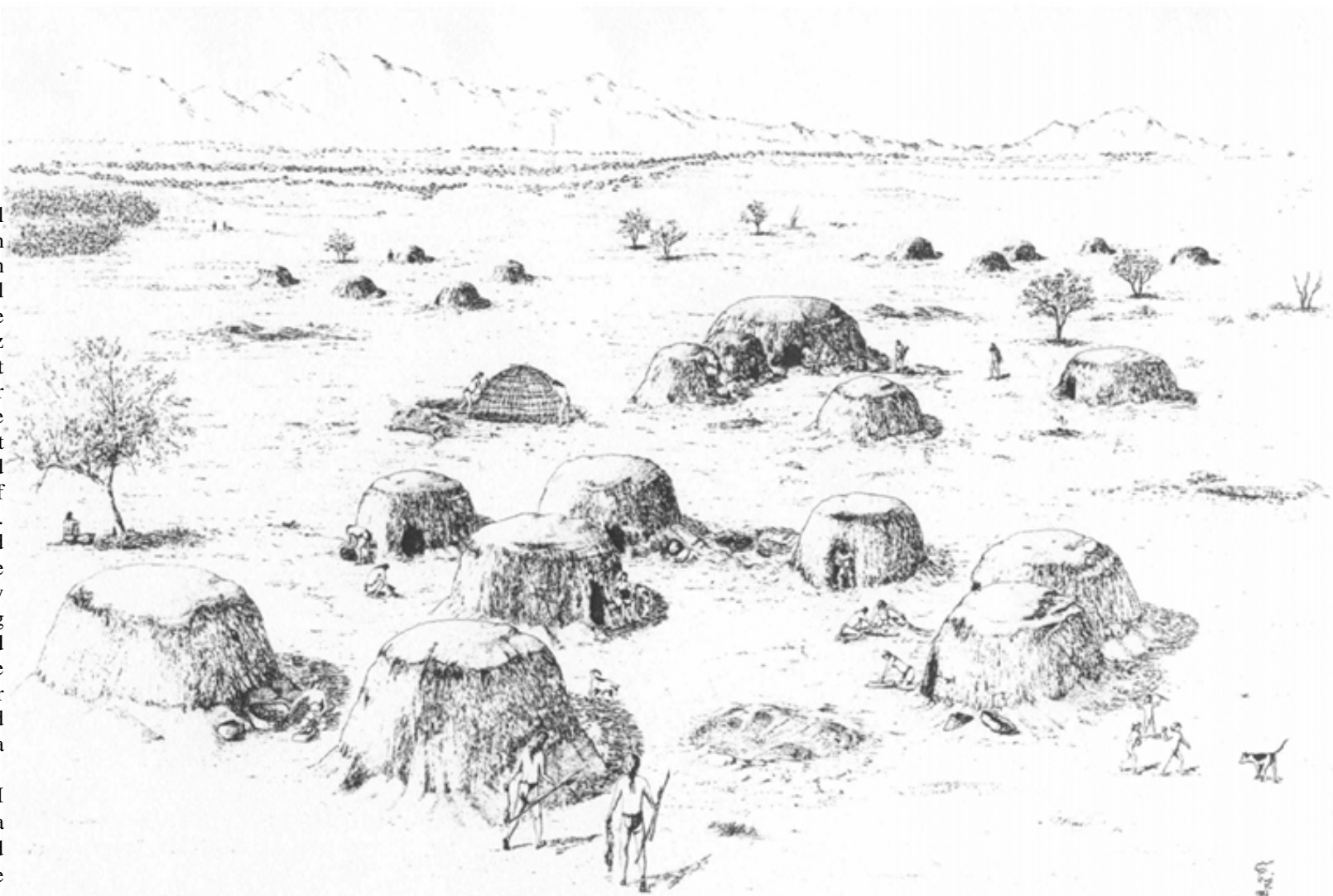
Johnathan B. Mabry, Ph.D.
Center for Desert Archaeology

Previously, only small portions of early settlements in the Southwest have been exposed by archaeological investigations. Even the work at the Santa Cruz Bend site, where 183 pit structures and 547 other prehistoric features were found within an area of about 1 hectare (2.2 acres), exposed only about 15 percent of this huge Cienega phase site. Still, this exposure provided the most complete view of the structure of an early Southwestern farming settlement to date, and showed that many of the basic components of later prehistoric villages appeared in southeastern Arizona during the Cienega phase.

Working with DAI archaeologists, artist Ziba Ghassemi has reconstructed what the Cienega phase settlement at the Santa Cruz Bend site looked like. The

“Big House,” shown in the background, appears to have been the central focus of the settlement at about 300 B.C. To the east of the Big House was a large open area that may have been a plaza; meetings and ceremonies that integrated the entire community were probably carried out in these “public” facilities.

Circular house groups such as shown in the foreground, probably occupied by extended families, shared courtyards and storehouses. It is likely that houses were used for only a couple of years and, after wall posts were scavenged for reuse, trash was disposed in the pits of abandoned structures. Outdoor pits were used for cooking, storage, processing materials, and, ultimately, trash disposal. The dead were buried in pits on the edges of the habitation area, and crops were grown in the low-lying, flood-prone areas along the Santa Cruz River.



Cienega Phase Rare Artifacts: Finding Their Place in Prehistory

Alan Ferg, Arizona State Museum

The following photographs and descriptions provide a glimpse at some intriguing artifact types found in Cienega phase contexts at one or more of the sites along the Santa Cruz River recently excavated by DAI. As more sites of this age have been investigated, it has become clear that these "exotics," although rare, are in fact consistent members of what is now recognized as an amazingly diverse material culture assemblage. Although we can now say with confidence that some of these artifact types are significantly older than previously thought, the precise functions of several are still unclear, and we have only postponed, rather than answered, questions about their exact time, place, and culture of origin. We know that their high qualities and striking appearances impressed later prehistoric peoples, who sometimes found and reused them, or were inspired to revive their manufacture. We are also making progress toward finding their original place in prehistory.

Cruciforms

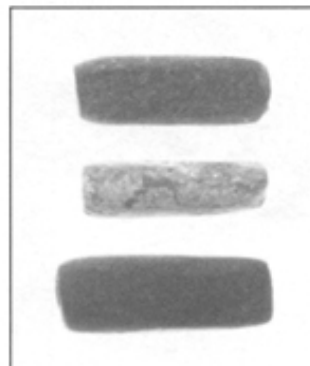
Previously thought to date to the Hohokam era, four cruciforms (left) from the Santa Cruz Bend and Los Pozos sites helped confirm suspicions that the majority of these beautifully ground objects of jaspers, cherts and obsidians were actually made during the Cienega phase. However, their use is still a mystery. Numerous possible functions have been suggested, but the only example found in original context to date was a pair excavated by William



Neil Smith on Tiburón Island off the coast of Sonora. Positioned on either side of the skull, they may have been ear ornaments, like the Archaic ear spools of California and Mesoamerica. *Photo by Jonathan Mabry.*

Nose Plugs

Three small ground stone cylinders were found at the Santa Cruz Bend and Stone Pipe sites, one each of black slate, red siltstone, and a green-and-white copper mineral. All are about 1 cm in diameter, and 2.5-3.0 cm long. Their size and shape suggest they were probably the type of simple nose plugs worn by many historic Native American tribes. It had



been proposed that nose plugs were a trait introduced into the Southwest from Mesoamerica by Hohokam immigrants, but these Cienega phase finds make it clear that this type of jewelry, possibly connoting some special status, predates the arrival of the Hohokam, and may have originated in southern Arizona. *Photo by Helga Teiwes.*

Atlatl Finger-Loops

Perforated, C-shaped shell and stone objects (below) have previously been identified as pendants or earrings. However, examples found bound in place on Aztec atlatls demonstrate that their original use was as finger-loops on atlatls. Known Southwestern atlatls all have leather loops, but broken stone loops found at the La Playa site in Sonora suggest that this more Mesoamerican trait may one day be encountered in Cienega phase sites in southern Arizona. *Photo by Helga Teiwes.*



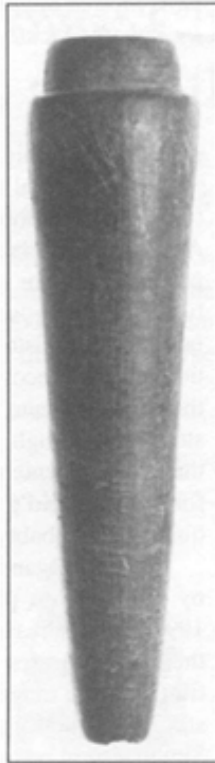
Knobbed Stone Trays

Expertly made, flat stone bowls or trays with knobs at the corners have been found repeatedly in prehistoric pueblos in the Point of Pines and Safford areas. But fragments found at Santa Cruz Bend and at the Cienega Phase Donaldson site in the Cienega Valley southeast of Tucson, prove that such trays were first made at least 1,000 years earlier. The design shown at right, on the bottom of a complete specimen from Altar, Sonora (in the private Norton Allen Collection), and a ladder-like design on the bottom of the Donaldson site fragment, can both be found in Western Archaic rock art. The function of these trays is uncertain, but their careful manufacture and elaborate decoration suggest a special, possibly ritual, purpose. *Photo by Helga Teiwes.*



Stone Pipes

A tubular ground stone pipe, shown at right, was found at (you guessed it) the Stone Pipe site. Historically, various plant materials were smoked in pipes, but the native tobacco seeds found near this pipe clearly indicate that tobacco was being smoked by the Cienega phase. Stone pipes are known from other Cienega phase sites, and an older, Middle Archaic fragment was found at Ventana Cave in southwestern Arizona. At least as old, and far more numerous, are stone pipes from northern California, suggesting that area as a possible source for the origin of this artifact type. That smoking was a ceremonial act in Cienega times is a reasonable inference based on this type of use in historical times. *Photo by Helga Teiwes.*



Clay Figurines

The modeling and firing of clay beads and anthropomorphic figurines predated the manufacture of even the most rudimentary pottery containers in the Southwest. The earliest figurines in southern Arizona were found at the San Pedro phase Milagro site. By Cienega phase times they became exceedingly sophisticated, the most elaborate one found to date being from the Wetlands site,

shown below. That such figurines were somehow used ceremonially is generally believed, but difficult to demonstrate with the few Early Agricultural period examples known. *Photo by Jonathan Mabry.*

The Earliest Tucson Basin Pottery

James M. Heidke

Center for Desert Archaeology

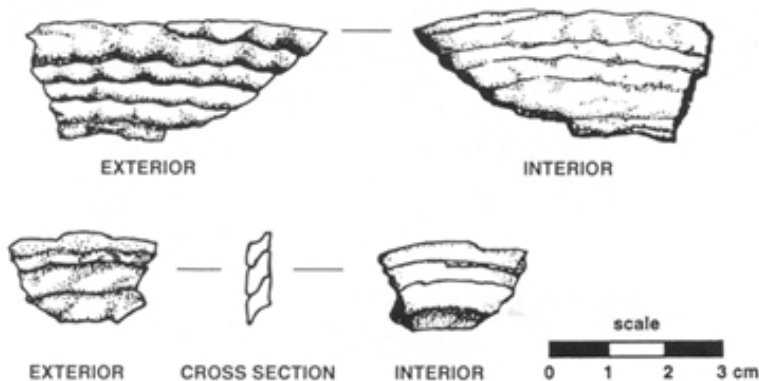
Until quite recently, Archaic period sites in the American Southwest were "preceramic" by definition. The pottery discussed here indicates that this definition must be revised. We now have overwhelming evidence of pottery production in the middle and lower Santa Cruz Valley during the Cienega phase which can be divided into early (ca. 800-400 B.C.) and late (400 B.C.-A.D. 150) parts. Currently, this is the earliest well-dated pottery in the Southwest.

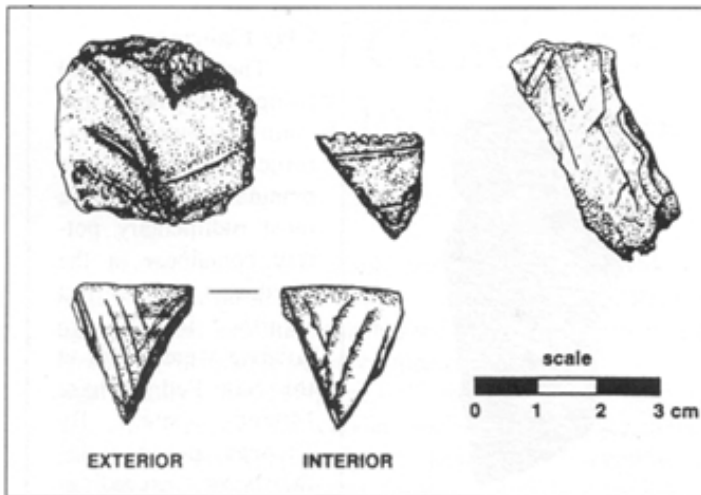
Cienega phase pottery was first recovered during the 1987-1988 excavation by Northland Research, Inc. at the Coffee Camp site, located northwest of Tucson. To date, only plain wares have been recovered from unmixed Cienega phase contexts, even though significant quantities of red ochre (which was used by later potters for red slips and paint) have been recovered from some of the early pottery-bearing sites.

These pots are at the beginning of the regional ceramic sequence, and they do not resemble later Tucson Basin plain wares. Thus, we refer to them as "incipient plain ware." Four distinct varieties of incipient plain ware have been identified, based on differences in the primary forming technique and surface treatment used by the potter. We refer to these varieties as coiled, bumpy, incised, and impressed.

So far, sherds of 84 incipient plain ware vessels have been recovered from two early Cienega phase sites (Clearwater and Wetlands) and three late Cienega phase sites (Coffee Camp, Los Pozos, and Santa Cruz Bend). Other late Cienega phase sites, such as the Donaldson and

Coiled incipient plain ware from the Wetlands site (illustration by Robert Ciaccio).





Left: Incised incipient plain ware from Los Pozos (illustration by Robert Ciaccio).

portions of a liquid, such as saguaro wine, or holding offerings.

Raw material selection, primary forming technique, vessel form, and function all changed dramatically by the following Agua Caliente phase (ca. AD. 150-550). Potters focused their production on jar vessel forms with simple contours, especially the neckless "seed jar" form. Comparison of seed jar proportions with historic Native American vessels of known function, and the recovery of jar lids and vessels with abrasion at their lips, indicate that these vessels were used principally for storage. Although pottery took on new utilitarian functions in the Agua Caliente phase, we estimate that the replacement rate for a household's ceramic assemblage at this time was still quite low, probably no more than one vessel each year.

Potters began to produce red wares as well as plain wares by the Tortolita phase (ca. AD. 550-650) (see *AIT*, Spring 1997). The increased diversity of vessel forms that occurred at this time indicates that pottery containers finally began to fulfill the entire range of food preparation, cooking, serving, and storage functions usually associated with prehistoric Southwestern pottery. However, the new information reviewed here indicates that somewhere between 1,000 and 1,500 years of ceramic production took place before the Tucson Basin's prehistoric residents became dependent on pottery for regular daily use.

Stone Pipe sites, have not produced sherds. The coiled variety has only been recovered from early Cienega phase sites. We feel that the replacement of a perishable container technology (basketry) with a ceramic substitute is a particularly satisfying explanation for this early variety, which resembles a "clay basket."

The origins of the other incipient plain ware varieties are more problematic, but the bumpy and incised varieties may have replaced another type of perishable container, made from gourds. In southern Arizona, squash and wild gourds produce round, baseball-sized fruits. The average opening of the bumpy and incised bowls is 6.3 cm, slightly smaller than the diameter of a baseball. Native gourds could have been used as containers, although they do not make good tools because their thin rinds are easily broken. A ceramic container would, therefore, have made a less fragile substitute. The straight, curved, wavy, and parallel line incised motifs present on the incised variety are shared with the Western Archaic rock art tradition, dated between about 8000 B.C. and A.D. 800. It is possible that these design elements may also have been used to decorate less durable media, such as gourds.

Almost one-half of these early pottery sherds have been recovered from features interpreted as having a ceremonial, ritual, or integrative function, rather than a domestic function. Foremost among these are the "Big Houses" found at some Cienega phase sites. Overall, these integrative structures contain approximately 16 times more incipient plain wares than the other structures. The small bowls that make up the majority of incipient plain ware vessels are well suited to the task of serving individual



Reconstructed Agua Caliente phase plain ware seed jar and worked sherd pot lid from Stone Pipe site (photo by Helga Teiwes).

Atlatls to Arrows: Changes in Stone-Tipped Projectiles along the Santa Cruz River

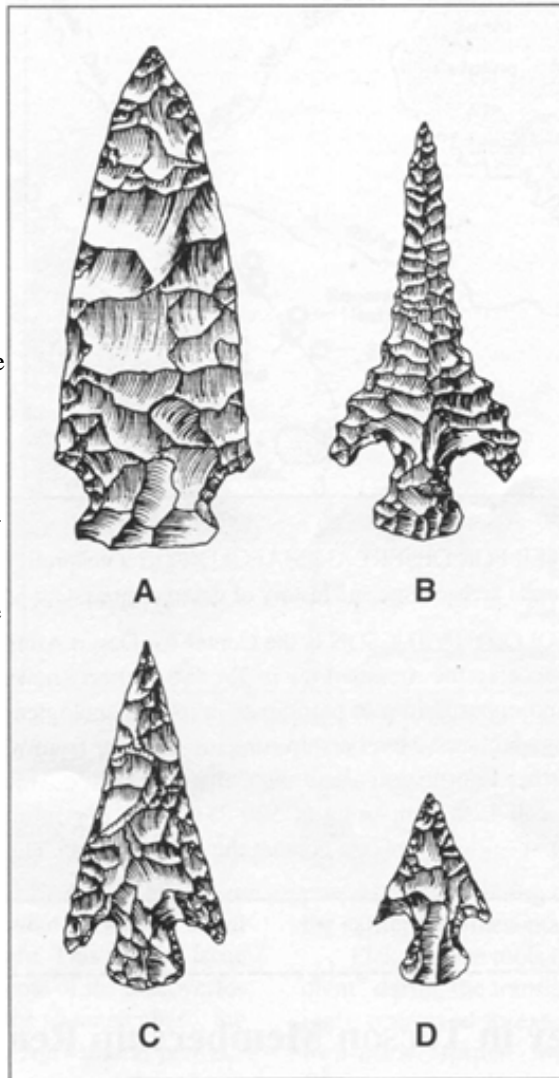
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Sharp points made from flaked stone were used to tip two different types of projectiles in the prehistoric Southwest: the dart, which was thrown with the aid of a device known as an "atlatl," rather than thrust or thrown with the bare hand like a spear; and the more familiar arrow, which was shot from a bow. Darts were the only stone-tipped projectiles used during most of North American prehistory, and were largely replaced by bow-and-arrow technology only fairly recently. The timing of this shift has long been debated, with some researchers arguing for arrows appearing as recently as A.D. 500, while others place their adoption as early as Paleoindian times (10,500 B.C.). The introduction of bow-and-arrow technology in the Southwest, however, is generally assumed to coincide with the rise of the Hohokam and Puebloan cultures (ca. A.D. 650-750).

Recent research by DAI at sites along the Santa Cruz River raises the possibility that this development occurred in southern Arizona well before the Hohokam era, perhaps as early as the Cienega phase. Ballistic studies indicate that a point which tips an arrow must be lighter and thinner than a point tipping a dart. It is thus possible to determine the function of a projectile point based on its dimensions. David Hurst Thomas developed a set of classification equations for differentiating unbroken dart and arrow points nearly two decades ago. New research by Michael J. Shott has expanded upon Thomas' original discriminant analysis, resulting in more reliable equations that can be applied to a much wider range of points, including fragmentary ones. Two general projectile point styles are represented at the Cienega phase Santa Cruz River sites: San Pedro corner/side-notched and Cienega corner-notched. When the classification equations are applied, San

Pedro points are uniformly classified as dart points. Cienega points, however, are divided among dart and arrow points. These divisions largely follow the stylistic differences present within the overall Cienega group, with Cienega 1a points uniformly classified as darts, and Cienega 3 uniformly classified as arrows. The Cienega 2 style, which encompasses the greatest range in sizes, includes both darts and arrows.

The known timespans of these point styles indicate that San Pedro points were used throughout the Early Agricultural period, while the different Cienega subtypes can be correlated with more finely resolved spans of time. Interestingly, the Cienega 3 arrow points occur most frequently in the early Cienega phase (ca. 800-400 B.C.), while the large Cienega 1 dart points do not appear until the later portion of the phase (ca. 400 B.C.-A.D. 150). Preserved wooden artifacts, such as bows or arrow shafts, are lacking in the floodplain environment, but the characteristics of the points themselves provide strong evidence for the possibility that bow-and-arrow technology was being experimented with along the Santa Cruz River during the Cienega phase. The bow and arrow certainly represented an addition to the atlatl-and-dart repertoire, rather than a wholesale replacement of the existing technology with a new one, since dart points continued to be made in significant numbers through at least the Agua Caliente phase (A.D. 150-550) of the Early Ceramic period. If arrows were introduced during the early Cienega phase, they would have provided increases in projectile accuracy and velocity, and also would have been better suited to



Above: A. San Pedro-dart; B. Cienega 1a-dart; C. Cienega 3-arrow; D. Cienega 2-dart/arrow (illustration by Jane Sliva, actual size).

striking from a concealed position, characteristics that would have made both hunting and combat more efficient for the early villagers along the Santa Cruz.

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Excavations at Cienega phase sites along the Santa Cruz have produced many unusual artifacts (see page 4). Photo by Homer Thiel.

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