

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!



Birds in the Southwest

Alan Ferg, Arizona State Museum

NATIVE AMERICAN GROUPS in the Southwest, past and present, preserved biological knowledge, conveyed hunting information, and perpetuated religious beliefs in many ways. In this issue of *Archaeology Southwest*, we examine the ways in which birds were used to accomplish these ends.

Although birds figure in the religion and origin stories of most Southwestern tribes, among Puebloan groups, bird imagery and use permeates many facets of traditional life (see page 14). Carvings of birds were made for religious and personal use (see page 12). However, with the rise of the katsina cult, birds, including turkeys, were mainly kept as a source of feathers for making prayer sticks and offerings to spirits, and the need was prodigious (see page 17). The week before Thanksgiving in 1939, archaeologist Neil Judd was asked by his Zuni workmen to send them turkey feathers from butcher shops. In 1924, Judd had presented a live macaw to the Macaw Clan at Zuni Pueblo so they would have their own source of feathers for ceremonial use; they said that a live macaw had not been seen at Zuni “within the memory of their oldest men,” and they had had to rely on trade with Santo Domingo Pueblo. Lieutenant John G. Bourke had seen macaws at Santo Domingo in 1881. The macaw at Zuni died in 1946, but had acquired a large Zuni vocabulary, and could identify several individuals by name.

Although the use of macaws and their imagery is less common in the desert Southwest, even there the birds were known prehistorically (occasional macaw

burials are found in Hohokam sites), and were incorporated into traditional Pima stories, though the birds are largely forgotten now. But as recently as 1716, Padre Luís Velarde noted that at San Xavier del Bac and neighboring rancherías near Tucson, “there are many macaws, which the Pimas [Tohono O’odham] raise because of the beautiful feathers of red and of other colors...which they strip from these birds in the spring.” Although Velarde thought that the feathers were used for “adornment,” it is more probable that there too, they were used on prayer sticks.

Sometimes we can infer that specific beliefs must have been associated with birds, but we are unable to recover the particulars of those beliefs (see pages 8, 9). In other instances, careful study and consideration leads to a fuller comprehension of the meaning or history underlying the bird imagery (see pages 7, 13). And then there are the aesthetic and spiritual aspects of birds: their colors, their flight, their songs, their be-



Small Sacaton Red-on-buff plate from the Escuela site, near Gila Bend, Arizona, dating to A.D. 950 to 1150.



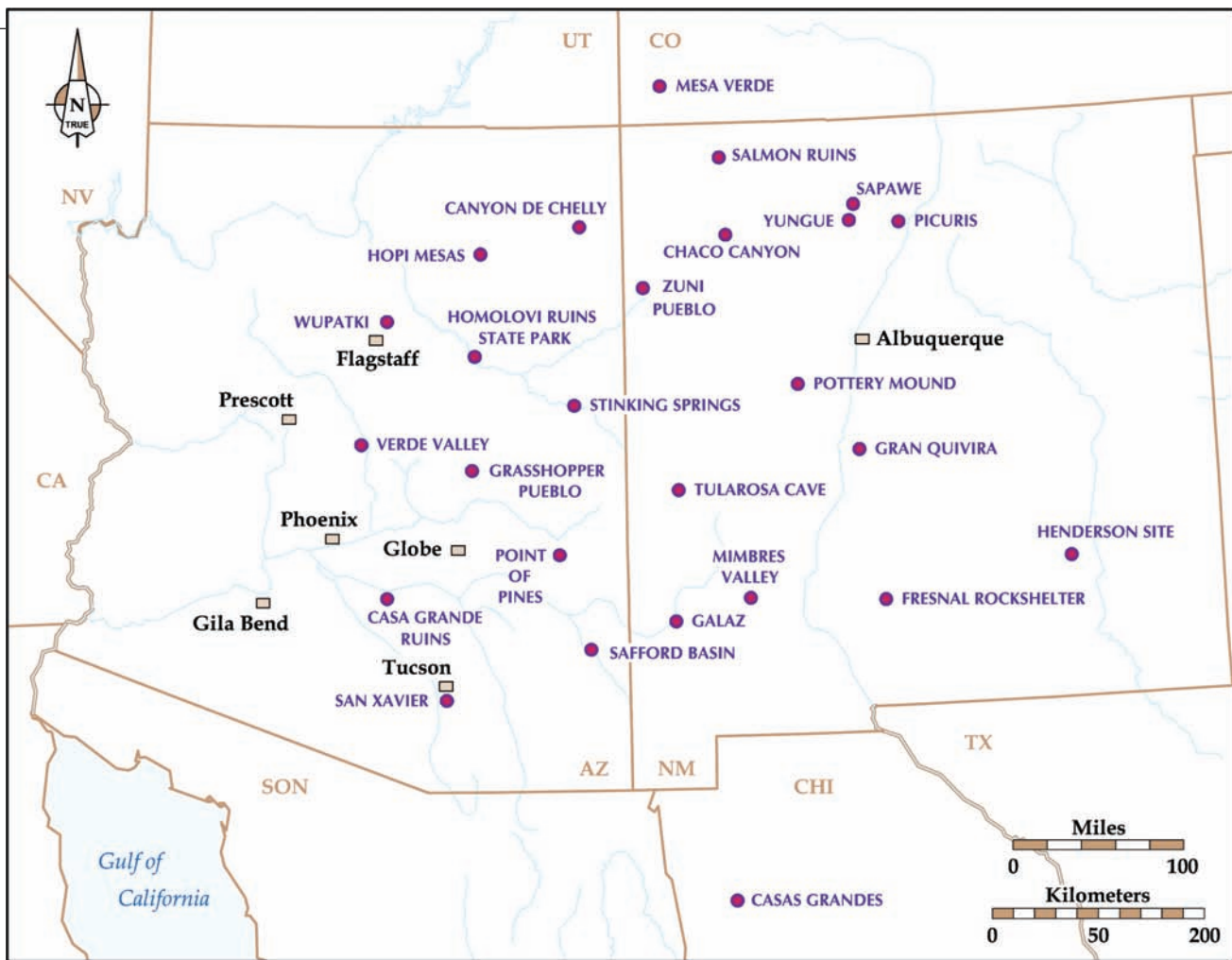
Macaw effigy jar made in 1988, by Wanda Aragon of Acoma Pueblo, New Mexico.

Jannelle Weakly, Norton Allen Collection, Arizona State Museum

Issue Editor: Alan Ferg

Archaeology Southwest
is a Quarterly
Publication of the
Center for Desert
Archaeology





The American Southwest and Mexican Northwest, with major sites mentioned in this issue of Archaeology Southwest highlighted.

haviors, and how these affect the way humans use birds (see pages 17, 18), and how birds use us (see page 19).

Archaeological excavations give us additional information about bird and human interactions through the centuries. A wide variety of evidence can be examined to shed light on questions related to prehistoric religion, as well as trade, migration, agricultural practices, and environment. Such inferences are usually based on identifications and analyses of bird bones (see page 6). However, they can often be usefully combined with information derived from architecture, feather and eggshell remains, and depictions in pottery, jewelry, rock art, and kiva murals. Architectural features in both the Ancestral Pueblo area and at Casas Grandes in Chihuahua were identified as turkey pens by the presence of not only turkey bones, but also eggshells, bones from immature birds, gizzard stones, and turkey droppings. A similar suite of clues revealed the scope of macaw aviculture at Casas Grandes (see pages 4, 5), while recent DNA studies of archaeological macaw bones indicate that the trade in macaws involved multiple sources for the original birds, and perhaps multiple trade routes as well (see page 6). Prehistoric movement of people can also be inferred using bird remains. Hawk burials in

kivas at sites along the San Pedro River in southern Arizona echo similar practices seen among Pueblo groups far to the north; when added to a list of other northern architectural and ceramic traits, the evidence suggests that the San Pedro sites were actually built by northern immigrants (see page 16).

The discovery of the bones or feathers of a bird species at a site outside the bird's natural modern distribution usually implies trade or habitat change. Macaws and their feathers are the most prominent examples of traded species. Amadeo Rea showed that the prehistoric distributions of Gambel's Quail and Scaled Quail that do not match modern ones are a good indication of the replacement of grasslands by the historic spread of mesquite and cactus in southern Arizona, and by other environmental changes in northern Arizona and the Four Corners area. But other cases are not so clearcut.

Unexpected diversity in the bird assemblages from New Mexico archaeological sites suggests that these "exotic" species may have been unintentionally attracted to the Puebloan agricultural fields and gardens by the relative abundance of water and the greater-than-natural diversity of vegetation (see page 11). Turkeys, on the other

hand, appear to represent an intentional introduction to the entire Southwest. One might assume that the turkeys found in archaeological sites there were domesticated in the Southwest. But intensive studies of bones and feathers indicate domestication in multiple regions outside the Southwest.

Some neotropical species that appear now to be expanding their permanent ranges northward through Arizona—javelinas, coati-mundis, Black Vultures, and Northern Cardinals—were not there prehistorically. To date, there has been only one unconfirmed discovery of a Black Vulture bone in a prehistoric site in the Papaguería. The four cardinals found (two at sites in the San Pedro Valley, one from Grasshopper Pueblo, and one from the Henderson site) are probably best interpreted as having been traded from Mexico (as either live birds or skins), and may well have been viewed as another bright red bird whose feathers were well suited for use on prayer sticks.

Thick-billed Parrots in the Southwest present archaeologists with a dilemma. These parrots reside in highland pine forests in the Sierra Madre Mountains in Mexico, but



Top: Ramos Polychrome duck effigy jar from near Rancho Corralitos, Chihuahua, dating to A.D. 1250 to 1450. Bottom: Large Gila Butte Red-on-buff bowl from La Ciudad, Phoenix, Arizona, dating to A.D. 775 to 900. (Both photographs by Jannelle Weakly, courtesy Arizona State Museum.)

were formerly also erratic winter visitors to mountain ranges in Arizona. Burials have been found at Wupatki and Pueblo Bonito, in Chaco Canyon. These birds could have been traded in from Mexico (like macaws), but it is not impossible that they were taken in Arizona or New Mexico. On May 5, 1583, Spanish explorers led by Antonio de Espejo reported parrots on what is probably Beaver Creek, near the Verde Valley. And winter invasions were reported as far north as the Pinaleno Mountains, near Safford between 1886 and 1936.

The articles in this issue look at birds from a variety of perspectives and disciplines, including those of archaeology, ethnology, ornithology, DNA analysis, material culture studies, iconographic analysis, and applied anthropology. Taken together, the articles presented here demonstrate that the relationships between birds and humans in the

Southwest have been longstanding and complex, with aspects both secular and ceremonial.

Photo citations can be found at www.cdarc.org/pages/library/

Ostriches in the Southwest

Alan Ferg, Arizona State Museum

OSTRICHES, though not native to the New World, deserve a brief mention. At around 8 feet tall and weighing 300 pounds, they are the largest birds in the Southwest since the skies were graced by Pleistocene teratorns, giant raptors with wingspans of 12 to 17 feet. At the end of the nineteenth century, the use of ostrich feathers in women's fashions created a demand so great that ostrich ranches in South Africa reaped huge profits. Mating pairs were exported to California in 1882, and in 1887, ostriches arrived in Phoenix. At one point there were seven major ostrich ranching companies in the Phoenix Basin raising over 8,000 birds. Silver was selling at \$8 a pound, while ostrich plumes sold for \$15 to \$30 per pound. At least one mating pair was sold to Pimas at the Sacaton Agency. A few were raised at the University of Arizona in Tucson. However, in 1913, a Tariff Act change depressed feather prices, and the final blow was struck in 1914, when World War I brought an abrupt end to frivolity in women's clothes and accessories, and ostrich ranching quickly declined. Even the needs of fan dancers in the Roaring Twenties couldn't revive the demand, and by then only a few ostriches remained as pets. The whole endeavor serves as an interesting object lesson for archaeologists in that, to my knowledge, not a single ostrich bone or eggshell has been recovered from any construction or archaeological project, as Phoenix and its surrounding communities continue to fill in the Salt-Gila Basin. Without the photographs, and occasional plumes and eggs preserved as curiosities in museum collections, one would be hard pressed to prove that there were ever ostriches in Arizona (before the most recent reintroduction in the 1980s), and they would reasonably be remembered as simply another mythic monster bird in the Southwest!

Domestic Turkeys at Casas Grandes

Charmion R. McKusick, Southwest Bird Laboratory



Illustration by Charmion R. McKusick

Turkey-feather cordage was made by inserting fresh body feathers into cordage and then wrapping them.

TURKEYS HAVE BEEN an important part of Native American village life for the last two millennia. Most often, they have been plucked for the production of feather cord robes. They also produced feathers for ceremonial paraphernalia. Turkeys of unusual coloration—dark melanistic, gray silver phase, white-spotted pied, and reddish erythristic—were maintained as separate strains from about A.D. 1100 to at least 1400. Turkeys have been used as birds of sacrifice from their earliest introduction.

It is important to note that no wild turkeylike fowl existed in the Southwest in post-Pleistocene times; thus, all turkeys at archaeological sites are either imported domestic breeds or are rare individuals hunted from domestic turkeys that became feral in areas adjacent to settlements.

In the mid-1960s, when the faunal collection from the Amerind Foundation's excavations at Casas Grandes arrived at the Southwest Archeological Center at Gila Pueblo, in Globe, Arizona, I was assisting Lyndon Hargrave (see page 10) with the identification of bird bones from several sites. The Casas Grandes collection took precedence and was processed on weekdays, whereas collections of lower priority, from sites such as Picuris, Pottery Mound, and Mesa Verde, were relegated to weekends. Remains from Casas Grandes were spread atop specimen cases while awaiting processing, while those from the weekend projects lay in trays on a shelf just above them.

It immediately became apparent that the turkey bones from Casas Grandes were not only unlike those from the other sites, but also displayed great variability within the Casas Grandes collection itself. They formed three groups: very small and gracile, medium-sized and more slender, and very large and rugged. These differences present a series of questions: When were turkeys domesticated? Where were they domesticated? From which wild subspecies were they domesticated? How did they enter the Southwest culture area? Who brought them, and why? Now it is established that Southwestern breeds were domesticated from the Eastern Wild Turkey (*Meleagris gallopavo silvestris*), but at different times and places, by different people, for different purposes.

The small turkeys were domesticated very early, apparently in southwestern Texas or northeastern Mexico. This dark-plumaged, feather-necked breed was very fragile and never went feral. It was apparently brought, along with new seed stocks, to the Southwest by people who camped at Fresnal Rockshelter. It arrived somewhat before A.D. 1, and was used for feather cordage and sacrifice. The Small Indian Domestic (*Meleagris gallopavo tularosa*) was the only turkey in the Southwest for 700 years, became a trade specialty at the Tompiro Pueblos in 1275, and disappeared after the destruction of Gran Quivira in 1672.

The most common turkey at Casas Grandes was the Large Indian Domestic, which entered the Southwest about A.D. 540 with Plains Woodland people who moved into Ancho Canyon in northeastern New Mexico. As a new domesticate, probably from Oklahoma, it went feral by the 600s. It was first used for sacrifice at Chaco Canyon. This hardy breed is found at most Southwestern sites from its introduction until 1723, when turkey herds were last recorded. Its feral descendants persist as Merriam's Wild Turkey (*Meleagris gallopavo merriami*).

The inhabitants of Point of Pines raised an enormous cross between Large Indian Domestic and Wild Turkeys, which became a late trade specialty.

No turkey bones were recovered from Casas Grandes pithouses, but one Large Indian Domestic was found in the later small pueblo. The early period of Casas Grandes, when Scarlet Macaws were much desired in the northern Southwest (see page 5), had only 16 turkeys. From about 1200 to 1275, there was a hiatus in the macaw trade, and turkeys increased to 175. Following the resumption in the macaw trade, turkeys declined to 100, in comparison to 303 macaws. The very large and very small trade specialty turkeys were imported during this period. Most turkeys at Casas Grandes were found as burials, and were associated with human mortuary contexts.



Helga Teiwes, Arizona State Museum

A Mimbres Black-on-white bowl possibly depicting three turkeys standing together.

Casas Grandes Macaws

Charmion R. McKusick, Southwest Bird Laboratory

THE AMERIND FOUNDATION'S excavations at Casas Grandes, in Chihuahua, conducted from 1959 to 1961, yielded about 500 macaws, which gave rise to the misconception among archaeologists that the place of origin of Southwest macaws had been found. However, macaws were never domesticated. They were wild birds that were taken from their nests in the humid tropical lowlands of Mexico at seven weeks of age, transported to an experienced aviculturalist, and hand-raised so that they would become manageable. In some cases, ancient and modern, they have been induced to breed in captivity, but the young must still be hand-raised.

Casas Grandes was located on an ancient trade route conveying luxury items like shell, copper bells, and macaws from the south into the northern Southwest in exchange for turkeys, buffalo hides, and turquoise. However, the few Scarlet Macaws (*Ara macao*) found at Hohokam sites from the A.D. 600s to the 900s may have come up a more westerly trail. Pithouses at Casas Grandes dating to the mid- to late 900s produced a few fragments of Scarlet Macaw bone. The small pueblo village that succeeded the pithouses at Casas Grandes contained another Scarlet Macaw and a Large Indian Domestic Turkey (see page 4). During this period, when Scarlet Macaws were popular trade items in the Southwest, they were only passing through Casas Grandes.

The first peak in macaw use occurred at Chaco Canyon sites. The Chacoans appear to have been receiving birds that were carried to the Mimbres Valley and raised there until fully fledged, when they were traded to the Northern Pueblos for use in the spring equinox sacrifice. Mimbres polychrome bowl designs depict traders with seven-week-old Scarlet Macaws riding on baskets and being delivered to both male and female avi-

culturalists. The Scarlet Macaw can be identified in Mimbres art by its white upper beak.

The second peak in macaw use occurred at Wupatki, which may have been supplied by the earliest residents of Casas Grandes. At this time, Casas Grandes had 175 macaws, compared to only 16 turkeys. Then there was a hiatus in the macaw trade from about 1200 to 1275; none have been found at sites from this time period in the northern Southwest, and at Casas Grandes, only five macaws were found, compared to 174 turkeys.

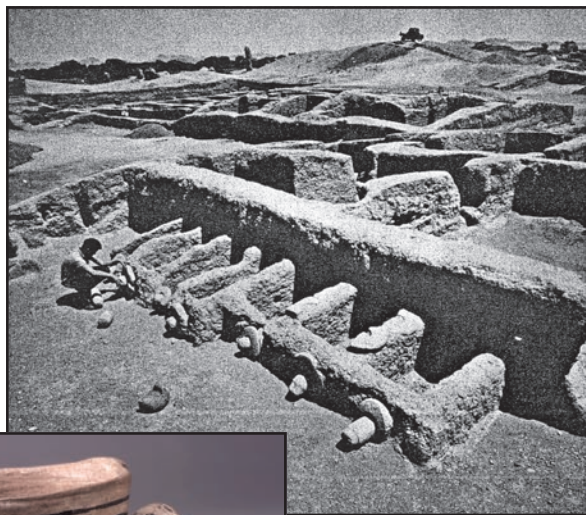
The third peak in the Scarlet Macaw trade, which coincided with the formation of large agglomerated pueblos and the development of the katsina cult, was reflected at Casas Grandes by an increase to 303 macaws versus 100 turkeys.

Compared to the Scarlet Macaw, the green Military Macaw (*Ara militaris*) was much less important in the Southwest. One Military Macaw was buried in a kiva at Galaz Ruin, and one feather was found at Tularosa Cave. Military Macaws constituted about 20 percent of macaws

raised, bred, and used locally at Casas Grandes. They were often sacrificed by smothering, plucked, and buried in cardinal positions, four Scarlet Macaws to one Military Macaw.



Mimbres Polychrome bowl that appears to depict a trader delivering juvenile macaws to an aviculturalist.



Amerind Foundation



Jannelle Weakly, Arizona State Museum

Top: Macaw pens at the prehistoric site of Casas Grandes, in Chihuahua. Note the cylindrical "plugs" in the doors of the pens. Left: Villa Ahumada Polychrome effigy of macaws peeking out of the doors of their pens.

Ancient DNA and Prehistoric Macaws

Peter Y. Bullock, White Sands Missile Range

MOST OF THE MACAW REMAINS found at prehistoric Puebloan sites have been identified as Scarlet Macaws, a tropical/subtropical bird found in the lowlands of eastern and southern Mexico, based on a number of specific skeletal measurements. Although this identification initially appeared straightforward, it seemed unrealistic to me because another macaw species, the Military Macaw, was native historically to within 30 miles of the Arizona–New Mexico border, and the range of this temperate mountain species may have once extended north to the Mogollon Rim.

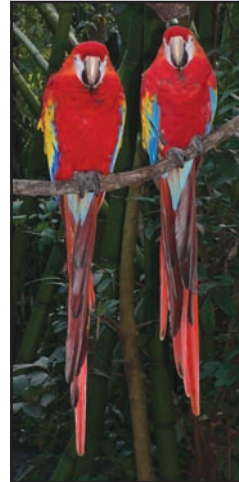
To find out if my inference was valid, I decided to go to the bird experts. The ornithologists I consulted stated that the skeletal remains of closely related species, of the same size, and differing only by plumage color, could not be identified at the species level. This suggested that I was right to be skeptical, but I wanted stronger evidence and decided to study the macaws' DNA.

The analysis of ancient DNA is an uncertain venture. Few laboratories will deal with old bone, the analysis is destructive (and thus anathema to many curators), and often the ancient DNA is no longer present. For this research, I was able to obtain samples of 13 prehistoric macaws from Arizona and New Mexico. Unfortunately, only five samples (from Grasshopper Pueblo, Cameron Creek in the Mimbres Valley, and Salmon Ruins) were found to still contain ancient DNA.

The results were a surprise to me. All the bone samples containing ancient DNA proved to be from Scarlet Macaws, and not the Military Macaws I had expected. This supports the macaw identification system in general use, and suggests that we can teach the ornithologists a thing or two about bird identification. But there was more!

In these results, Scarlet Macaws from both Cameron Creek and Grasshopper Pueblo were found to have come from the same area of Mexico. Based on the site dates, this suggests a trade continuum between these regions of more than 300 years. In contrast, the Salmon Ruins sample comes from a different source area in Mexico. Admittedly, this is a small sample, but the results are intriguing. Is this evidence of multiple points of contact, or trade routes, between the American Southwest and Mesoamerica? Could Scarlet Macaws (recorded along the Gulf Coast near the Rio Grande delta in the 1850s), have reached Ancestral Puebloans by way of the Rio Grande Valley?

The scientific method is based on questioning existing theories. In this case, the accepted methodology of macaw identification was proved to be valid. Unexpected additional results suggest that contacts between the Southwest and Mesoamerica were more complex than we have thought. Further study of ancient DNA may provide some answers, and it will definitely generate more questions.



Left: Scarlet Macaws. Above: Military Macaw (both courtesy of Wikimedia.org).

The FaunAZ Project

Barnet Pavao-Zuckerman, Arizona State Museum

IN 2004, three researchers at the Arizona State Museum (the author, Rich Lange, and Chuck Adams) were awarded a Heritage Grant from the Arizona Game and Fish Department to study the wildlife conservation applications of archaeological data. Part of the grant, under the direction of the author, funds the creation of a database of faunal remains from Arizona archaeological sites, named FaunAZ. The database is searchable through a mapping interface (GIS) and will include all mammal, bird, reptile, amphibian, and fish remains from known Arizona zooarchaeological assemblages, native or introduced, living or extinct. The database project has two primary audiences: wildlife managers and zooarchaeologists.

FaunAZ is under development in cooperation with AZSITE, the Arizona archaeological site files consortium. Although still under construction, FaunAZ can be accessed by current users of AZSITE. The database currently includes 440 sites, 5,400 individual faunal records, and approximately 180 species. About 60 species of birds are listed currently in FaunAZ.

Users will have the ability to search by taxonomic designation (from class to species), and by time period. A series of statewide archaeological species maps will be made available to the general public at www.azsite.arizona.edu/faunaz/. More specific and dynamic inquiries will be available to professional archaeologists and wildlife managers who use FaunAZ.

The Poorwill in Pima Oral Traditions

Amadeo M. Rea, University of San Diego

THE AKIMEL O'ODHAM (River Pimas) as well as the Tohono O'odham had an origin story that took four long winter nights, around the solstice, to narrate. Several nonnative authors had the foresight and patience to sit down with the native language storyteller and a bilingual translator and record the narrative in English or, in one case, both Pima and English.

Different storytellers had somewhat different variations, but all versions include a long section relating to the conquest of a pueblo-dwelling people (the Vipishad), by a different people (the Vupshkam), who emerged from the underworld and marched across what is now southern Arizona from the east or south (versions differ). One account, published by J. William Lloyd in 1911, relates: "So they went on, slowly, camping at one place, sometimes, for many days or several weeks, making their living by hunting game. And this went on for many years." One by one, the invaders conquered and destroyed the resident peoples living in the Big Houses along the middle Gila and lower Salt rivers.

The victories were not always easily won, and the invading Vupshkam often employed magical helpers to subdue the local inhabitants. These are said to be animals, but really are *nanamkam* ("meeters")—that is, shamans who have the power of certain animals, even to appear in the form of their animal helpers.

One version of the conquest was recorded by archaeologist Julian D. Hayden in 1935, at Snaketown, on the Gila River Indian Reservation, south of Phoenix. In this rendition a bird called the *koologam* is deployed to help at one Big House because its inhabitants were escaping. Neither Hayden nor his Pima consultants knew what to call *koologam* in English, but noted that it was "a bird, something like a nighthawk." The Vupshkam "sent him [*koologam*] over here. They did this because it was this bird's habit upon landing in winter to lay there all year without anything to eat or drink. So this bird came here among the people and they heard him singing this song at night. And when winter came he laid down. So it happened to these people—laying down seemed a great pleasure and all wanted to rest because the bird held down their strength." In their torpid state, the Vipishad at this site were overcome.

The bird in question is a Common (Nuttall's) Poorwill (*Phalaenoptilus nuttallii*), in the goatsucker family. According

to old-time Pimas, this bird hibernates in the winter. They would find the bird just lying on the

flats, seemingly dead, but alive when handled. Seemingly by magic, it had the capacity to induce sleep in the Vipishad. Various other tales that are still told about it relate to sleeping.

This seemingly quaint metaphor might have been overlooked were it not for the desert naturalist Edmund C. Jaeger. In the late 1940s, Jaeger discovered hibernating poorwills and reported the phenomenon in *National Geographic* and an ornithological journal. Piman folk science had long been aware of the poorwill's unique behavior, and had incorporated it into mythic metaphor.

As for the rest of the origin story in which this episode is embedded, elderly Pimas (of the generation born around 1910) could take me out and show me the actual sites (at least those not destroyed by development) where the various recorded conquest events took place. (Archaeologists call them Classic period Hohokam sites.) These elders maintained that

they, the Pima, were the Vupshkam, the Emergenti, just as their creation stories stated. The conquered people, the Vipishad, were of smaller stature, like the Hopi and other Puebloan peoples today.

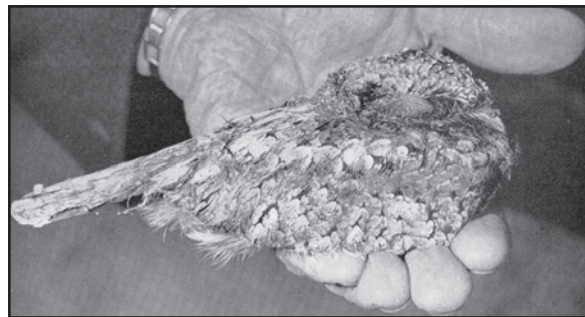
The old people I worked with invariably considered the Hohokam-Pima continuum hypothesis of archaeologists to be completely wrong, just as their ancestors had long maintained.

Newer generations, no longer hearing the four-night mid-winter recounting of their origins, have opted for revisionist history.

Ornithologists and physiologists have had to adjust their ideas on avian hibernation based on the poorwill. Archaeologists might profit from adopting new conceptual models to interpret Protohistoric southern Arizona sites. Folk history, like folk science, may not be "just myth." It may be a matter of interpreting the metaphors.



The poorwill, though infrequently seen, is often heard calling its name from rocky desert outcrops throughout the warm season.



Desert Magazine

In the fall, the poorwill feeds heavily, finds a sheltered place or stays in the open, and hibernates for extended periods—all winter, if necessary. In Pima stories, the poorwill is a metaphor for sleeping.

Birds and Serpents in Hohokam Art

Henry D. Wallace, *Desert Archaeology, Inc.*

ALTHOUGH MOST DEPICTIONS of animals and birds in Hohokam art are shown in static poses in isolation, there are several action themes that play a prominent role in the society and that are present on many types of Hohokam artifacts. One of these action themes is that of birds, sometimes whole flocks of them, attacking rattlesnakes. The theme is displayed on shell pendants, rings, and bracelets, on stone palettes, on pottery, and in rock art. The illustrations on this page, some never before published, provide a sample of the known specimens.

These avian attack scenes are more than reflections of the natural world. A variety of birds, ranging from what look like egrets or herons to songbirds, are represented, indicating that the artist was not concerned with the type of bird depicted. In fact, Hohokam artisans were not trying to illustrate a real-life event. In nature, some birds do attack and eat rattlesnakes—including roadrunners, raptors, owls, and water birds such as egrets and herons—but none of the birds depicted in the bird-snake images in Hohokam art resemble the most common avian snake predators in real life: raptors and owls. In nature, birds usually attack and eat snakes in isolation, not en masse in the manner seen on Hohokam pottery.

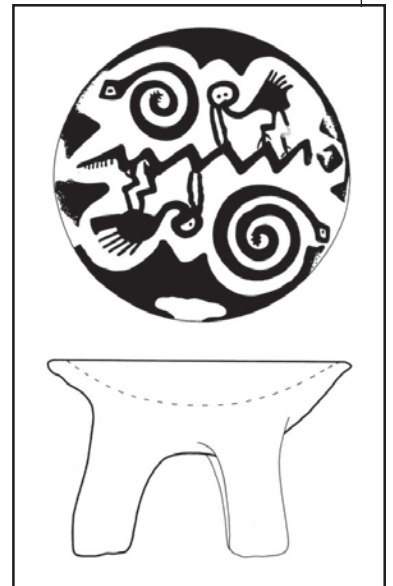
What do these extraordinary designs signify? It is likely that what the Hohokam depicted has little to do with real snakes and birds but has everything to do with what they symbolized in Hohokam society. Snakes are very commonly depicted in Hohokam art, particularly on palettes and censers, and they are common in Hohokam rock art. We have no direct knowledge of how the Hohokam viewed snakes, but we can make some educated guesses. In many cultures, snakes are viewed as creatures of the underworld, given their proclivity for inhabiting holes and crevices in the ground; in fact, they are shown issuing from rock cracks in Hohokam rock art depictions at a site in the Tortolita Mountains northwest of Tucson. Rattlesnakes, in particular, are often considered symbols of power. Snakes are also known for symbolizing renewal and healing, given their proclivity for shedding their skin periodically. Taken together, snakes may symbolize power, death, birth, healing, and renewal.

The most remarkable aspect of birds is, of course, that they can fly; flight is almost universally important in mythology. Flight commonly symbolizes aspects of the spirit world and rituals pertaining to it. Does the bird-attacking-snake imagery signify ascendancy over the underworld? There is no way to know for sure. What we can say is that the theme played a meaningful role in Hohokam culture from at least A.D. 800 to 1080, its meaning was probably recognized by all members of society, and it was probably a component of Hohokam mythology. In our society, the image of snakes twined around a cane makes us think of doctors, not snakes; similarly, the Hohokam probably did not think of snakes or birds when they viewed images of birds attacking snakes.

Tom Kolaz, Arizona State Museum



Top: Bowl found near the Punta de Agua site, south of Tucson, dating to A.D. 800 to 850. The large coiled snake is under attack from a flock of long-beaked birds. Bottom: Large bowl from house floor at La Villa, west of Phoenix, dating to A.D. 800 to 850 (illustration by Rob Ciaccio).



Tripod vessel from a large cache of artifacts at Snaketown, south of Phoenix, dating to A.D. 1020 to 1080 (illustration by Ron Beckwith).

Birds and Turquoise

Alan Ferg, Arizona State Museum

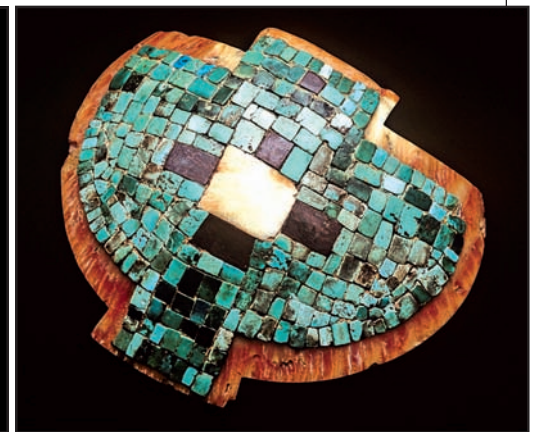
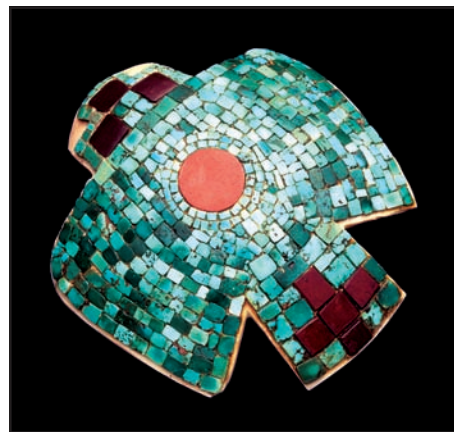
ALTHOUGH TURQUOISE TESSERAEE for mosaic overlay work have been recovered from very early Hohokam contexts, actual examples of such mosaic jewelry have been recovered primarily from late Hohokam, Sinagua, and Western Pueblo sites. With few exceptions, the forms consist of frogs (or toads), birds, paired circular earrings, and decoration on the heads of hairpins. All of these objects would have been considered valuable, by merit of the materials from which they are made, which include argillite, jet, and several types of shell. The turquoise mosaic frogs and birds are also thought to be indicative of some high status for their owners, but whether this status was economic, social, political, or religious is unclear. The creation of such mosaics in the form of only these two animals suggests the possibility of some clan or moiety association crosscutting the cultural groups that possessed them. The manufacture by the Hohokam of numerous plain shell frogs and a variety of bird forms has a long history, and some of the turquoise mosaic frogs and birds were probably made by them. However, the relatively large numbers of these mosaics from the Verde Valley suggest that the Sinagua were also making such items. Although tabulating proportions for objects as rare as these can be unreliable, about twice as many mosaic frogs have been discovered as birds (approximately 40 versus 16), but again, the significance of that disparity is unknown.

Frogs generally have symbolic associations with water, fertility, and transformation, as does turquoise in various Mesoamerican contexts. In 1901–1902 Pimas told anthropologist Frank Russell a traditional story about the people who had lived at the Casa Grande Ruins having lots of turquoise. An Earth Doctor (shaman) north of the nearby Picacho Mountains wanted some for his village. He made a green parrot and sent it to Casa Grande, where it ate only turquoise. When it was full, it returned to Picacho and vomited out enough turquoise for all the people there to have plenty. The story continues, relating the various repercussions of this theft, and subsequent supernatural events related to rainstorms, killing a monster, parrots hatching from eggs created from

the monster's blood, and the origin of tobacco. Charmion McKusick has noted the strong parallels between this story and those in Mesoamerica about Chalchihuitlicue, a water goddess associated with green jade and turquoise, who was a consort of Tlaloc, the rain god. Although the specific details are difficult to match, and whether the birds are parrots or raptors (as archaeologist David Wilcox suggests), the connections with ceremonialism, turquoise, rain, and tobacco are clear in both traditions. It seems likely that late prehistoric peoples in Arizona shared some of these associations, and the turquoise frogs and birds must have been important symbols for the Classic period Hohokam and Sinagua, probably on several levels. An inference of some underlying yin-and-yang sort of balance seems reasonable, with frogs related to wa-



A Spondylus shell bird pendant trimmed with turquoise, probably inspired by similar ornaments from the Casa Grande Ruins or the Ridge Ruin near Flagstaff, and made by Gallup jeweler John Hornbeck about 1980 (courtesy Florence Hawley Ellis Collection).



Two large Sinagua turquoise mosaic overlay birds, reportedly found together in a jar in the Verde Valley. The bird on the left features three jet tesserae on the head, an argillite disc on the back, and five argillite tesserae on the tail, and is 9.8 cm long. The bird on the right has a rectangular Spondylus tessera on the back flanked by four of jet, and a backing of Spondylus. Whether their immaculate condition is attributable to lucky preservation or substantial restoration is unknown. The circular argillite back tessera is currently unique (photographs by Robert K. Liu, Ornament Magazine, Dr. E. H. Parker Collection, courtesy Pomona College Museum of Art).

ter on the Earth, and birds related to water in the Heavens. Perhaps these animals were two aspects of the same reverence for, and interest in, life-sustaining moisture, rather than forces in opposition, as Henry Wallace (see page 8) has inferred for pre-Classic Hohokam bird-and-snake images.

Lyndon Lane Hargrave, 1896–1978

Steven D. Emslie, University of North Carolina Wilmington

ANYONE WHO has studied archaeological bird bones from the Southwest has almost certainly come across the name of Lyndon Lane Hargrave. Lyndon, or Lyn as he was known by his friends, was born in Georgia in 1896 and raised in North Carolina. Lyn's interest in birds began at an early age. When he was four, he saw a woodpecker nod at him and he nodded back. Thus began his lifelong interest in ornithology. His interests in archaeology trace back to his undergraduate years in Virginia, but flourished while he worked as a hydrographer at Roosevelt Dam, Arizona, in 1919. There he found pots washing out of sites on the lakeshore and in drainages, but he also kept careful records on each item he found. Later, when Byron Cummings, then chair of the Department of Archaeology at the University of Arizona, in Tucson, was visiting the area to conduct archaeological surveys, he convinced Lyn to donate his collections to the university. When Lyn drove to Tucson with his collection, his interest in higher learning was piqued, and he enrolled at the university in 1926 at the age of 30.

As he worked with Cummings, Lyn's knowledge of archaeology grew. In 1928, Lyn joined the second National Geographic beam expedition with dendrochronologist A. E. Douglass to recover old house beams for tree-ring analysis, a field of study in its infancy at that time. In 1929, Lyn began working at the newly founded Museum of Northern Arizona (MNA) and taught courses in anthropology at Northern Arizona University (then the Arizona State Teacher's College at Flagstaff) in 1930. His interests in ornithology had not waned, and he began finding bird bones at excavation sites around Flagstaff. While excavating a site in nearby Medicine Valley, Lyn realized there was something missing in our knowledge of prehistoric cultures. It suddenly occurred to him that biology had not been included in the data. This realization led to his well-known 1938 publication "A Plea for More Careful Preservation of All Biological Material from Prehistoric Sites" in *Southwestern Lore*. He also began to build a large comparative collection of bird skeletons and skins.

Lyn worked at MNA for a decade, and held the titles of Assistant Director, Curator of Archaeology, and Curator of Ornithology. It was also the most productive period of his career: he published 60 papers in ornithology, archaeology, and a combination of both. In 1939, he left MNA and set up a private business in Benson, Arizona, southeast of Tucson, which he ran for the next 16 years. Lyn continued to collect birds and make skins and skeletons

during this time, and in 1956 he was persuaded to join the Southwest Archeological Center at Gila Pueblo, in Globe, Arizona. He worked

at the center until 1967 and identified an estimated 75,000 bird bones from archaeological sites. It was also in Globe where he met Charmion McKusick, who became his assistant. Throughout these years, he amassed one of the finest skeletal collections of birds in North America, now housed at MNA.

In 1968, Lyn was invited to join the faculty at Prescott College, in Prescott, Arizona, where he remained for the rest of his career. There he continued his interdisciplinary research and taught courses in ethnobiology. I first learned about Lyn in 1975 while working on the Central Arizona Ecotone Project. I had just completed my undergraduate degree at the University of Colorado and was planning to study faunal remains from archaeological sites for my Master's research. I wrote to Lyn the next year to see if I could intern with him and did so for two weeks during my 1976 Christmas break. I will never forget our first meeting when he peppered me with questions to learn more about my background. At that time, I had no biological training and little knowledge of living birds. He was disappointed when I didn't even know what a flicker was, but immediately made me realize the importance of interdisciplinary study.

I returned in the fall of 1977, after graduating, to work with Lyn for a year under a grant from the Max C. Fleishmann Foundation. The most valuable lesson he taught me during this year was to be very thorough in my research. He also encouraged me to publish my first professional paper, which I did in 1978. I was his last student, however, as he passed away in Tucson in July 1978 at the age of 81. A few months before he died, he was honored at the First Annual Ethnobiology Conference in Prescott. Those of us who were present at that meeting will never forget the speech he gave after the banquet. This pioneering ethnobiologist summarized his life and career in the most clear and lucid manner I had ever heard, and brought tears to many eyes.



Lyn Hargrave being greeted by a banquet guest at the First Annual Conference on Ethnobiology, April 7, 1978.

Courtesy of Steven D. Emslie

Birds and Prehistoric Agriculture at Four New Mexico Pueblos

Steven D. Emslie, University of North Carolina Wilmington

IN 1981, I conducted a study of bird remains from four New Mexico Pueblo sites: Picuris (San Lorenzo), Sapawe, Yungue, and Pottery Mound. The remains I examined dated from A.D. 1250 to the present. The bird bones represented a variety of ecological situations, including grasslands, riparian communities, marshes, pinyon-juniper forests, and coniferous forests.

Prehistoric farmers at these sites appear to have maximized the advantages of increased agricultural production by hunting and trapping particular species attracted to their fields, thereby receiving the benefits of a more diverse diet as well as protecting their crops from damage or destruction by pests. This “garden hunting” concept was first proposed by Olga Linares in 1976 based on a large diversity of faunal remains from archaeological sites in Panama.

Although the species I examined currently inhabit a variety of ecological situations, several species were found at all four sites, including the Snow Goose, Mallard, Gadwall, Red-tailed Hawk, Golden Eagle, American Kestrel, Northern Harrier, turkey, Sandhill Crane, Great Horned Owl, and Common Raven. In addition, several unexpected species such as Boreal Owl, Band-tailed Pigeon, and the

There are numerous cranes, geese, crows and thrushes which feed on the planted fields.

—Pedro de Castañeda, chronicler of the Coronado Expedition, writing about the Tiguex Pueblos in 1540, near modern-day Albuquerque, New Mexico

rally occur in those areas. For example, as Amadeo Rea has discussed, the Pima have constructed extensive irrigation canals and living fencerows around their fields, which allows the growth of additional riparian habitat, thus creating a species diversity up to three times greater than the nearby unfarmed land. Gary Nabhan and Tom Sheridan have shown how living fencerows are essential in maintaining the environmental stability of floodplain farming in eastern Sonora, Mexico, by protecting fields from stream-side erosion and providing habitats for species that aid in pest control. Thus, the “garden hunting” concept remains a likely explanation for the avian diversity represented in the prehistoric puebloan record.

There are three ways in which an agricultural area increases bird species diversity. First, it creates an accessible, unrestricted, and uniform habitat in which insects can thrive—thereby attracting animals, such as birds, that eat the insects. Second, disturbed areas, like agricultural fields, allow intermixing of biotic communities and colonization by “weedy” species that also were consumed, thus increasing species diversity. And third, the creation of an ecotone effect at the edges of an agricultural field adds to species diversity. All these effects are greatly reduced in the large, monocultural industrial agricultural fields of today where constant use of pesticides reduces both plant and insect diversity.

These prehistoric methods probably helped to expand the distribution of many animals, facilitating food gathering by Pueblo Indians, and may account for the persistence of certain species in prehistoric Pueblo sites. In addition, irrigation canals allowed fingers of riparian habitat to extend from the river valleys across otherwise barren plains, linking the fields with this diverse community. This model may also be applicable to mammals, reptiles, and amphibians.

A modern example of this process is the Bosque del Apache National Wildlife Refuge on the Rio Grande in south-central New Mexico. Established in 1939 as a wintering area for migratory waterfowl, this refuge consists of nearly 58,000 acres, of which 1,500 are farmed on a cooperative basis to provide food for wildlife. This “artificial” agricultural field habitat has succeeded in restoring Sandhill Cranes and waterfowl to their former abundance in



Courtesy of Steven D. Emslie

This photograph, taken in 1979, shows a Zuni agricultural field. Pueblo groups in New Mexico were, and still are, agriculturalists. Corn, beans, squash, cotton, and tobacco have been cultivated for centuries, and irrigation canals have been constructed at various pueblos, including Zuni, Acoma, and Pecos.

extinct Passenger Pigeon were recovered from Picuris Pueblo.

Various ethnobiological and ecological studies have suggested that agricultural fields attract greater densities and diversities of plants and animals than would natu-

the Rio Grande Valley. A large variety of other birds are also found in this refuge, including the endangered Whooping Crane which, based on kiva murals at Pottery Mound, once migrated along the Rio Grande flyway and probably stopped in the prehistoric agricultural fields along the way.

The bird remains from the sites considered here also allow speculation about the possible prehistoric uses of birds by comparing them with the ways that they are used today. Hawks, falcons, and ravens may have been used for their feathers and complete wings in costumes and cer-



Irrigation canals, such as this one in the Verde Valley of central Arizona, not only convey water, but also extend the riparian habitat from the river to the agricultural fields.

Courtesy of Steven D. Ennsle

emonies, or for trade, as they are today, while geese, turkeys, cranes, and small birds, now killed for food as well as feathers, may have been used more completely. A Purple Martin and Mountain Bluebird were found with clay figurines in a small pit in the floor of a kiva at Picuris, suggesting that these species were important symbolically. With each new excavation of a prehistoric Pueblo site, we learn more about how

these prehistoric farmers made the most of their environment and encouraged biodiversity in their agricultural practices. Clearly, there's still much to learn from the past.

Bird Iconography in Pueblo Art

Mark Bahti, Bahti Indian Arts

PUEBLO PEOPLE are keen observers of birds—for example, the Hopi name 16 kinds of ducks—and in their art, they depict birds, or aspects of birds, using key identifiers. Because raptors frequently fold one wing over another when settling down, Pueblo artists create an “X” on the back of stone and wood carvings of hawks and eagles. The powerful beak and dramatic tail of the parrot distinguish it from all other birds, as do the feathers on a macaw’s head that rise when it is agitated or squawking; these also are used as identifiers in Pueblo art. Bird iconography can be quite abstract, such as the parallel marks on the cheeks of certain Hopi hunter or warrior katsinas that refer to similar marks found below the eyes of the American Kestrel.

In flight, raptors are generally seen looking down, scanning for prey, and so in carvings this is often accentuated with the back of the head falling within the same plane as the back, wings and tail, though the head made be canted to one side. Stone carvings of raptors made by the Zuni for wider intertribal usage often have an arrowpoint attached to the top or bottom, for reasons that vary between groups. These reasons range from indicating the raptor’s role as a guardian, to protecting or strengthening the object itself, to being a mark of a hunting or even warrior association.

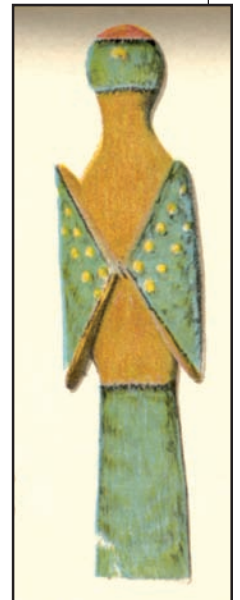
The parrot generally has a directional association (south) that includes a connection to rain. Eagles, because



they are able to fly into clouds and closer to the sun than other birds, may be given attributes of clouds or the sun. They are also connected to farming because they eat or drive away birds and rodents that attack the crops.

Less is known about the use of stone, wood, and shell carvings of birds. While there is some anecdotal information about use of eagle fetishes by Pueblo hunters, the use of painted wooden birds (including parrot carvings with tail feathers attached) is less clear. We know that they appear in the hands of participants in certain religious observances (much as they do in those illustrated in Pottery Mound murals), but we do not know why.

It was suggested to me some years ago, by a man from one of the Northern Pueblos, that the bird carvings are not there to “do” anything. Instead, as he said, “they are there because they are part of the story of what is happening.”



Top: Carved and painted wooden bird from Sunflower Cave, northeastern Arizona (Kidder and Guernsey 1919:Plate 6). Bottom: Zuni carved stone eagle (Cushing 1883:Plate 1, No. 5). Left: Carved hematite, turquoise, and shell bird from Pueblo Bonito, New Mexico (Pepper 1920:Figure 50).

Monster Birds

Barton Wright

BIRDS ARE INTEGRAL to Hopi culture. For example, many clans are named for birds, like the Eagle, Raven, Parrot, and Crane Clans. These names have been adopted by the clans because each bird has some advantageous aspect. Other birds may also be given form as katsinas (spirits impersonated by Hopi men), such as hummingbirds, wrens, quail, peacocks, and turkeys. In some ceremonies, small, painted wooden images of birds may be placed on the floor in front of altar screens, or puppets representing killdeer may be made to run across the tops of the screens. Everything about a bird has a use. Most often, the feathers are needed, but each bird also has ritual associations usually not apparent to a casual observer. Even bird tracks have significance for Hopis.

The identity of tracks that appear on some katsinas, and on dance kilts, is the subject of some difference of opinion. Katsinas that represent the Ogres, or punitive katsinas, are dangerous, and bear a three-toed track painted between their eyes. Harold Colton, founder of the Museum of Northern Arizona, referred to this as a turkey track. However, considering the role of turkeys and their feathers as purveyors of ritual good, it would be unusual to use turkey tracks in these contexts. Turkey feathers, like eagle feathers, when oriented with the tip down, are generally considered a visual prayer for rain, with white representing a cloud, and the dark tip the rain falling below. Turkey feathers have a host of other beneficial uses as well, all generally related to rain and prayers. The superficial appearance of the tracks on Ogres and kilts is that of a turkey. However, other significant birds make similar tracks.

Hamilton A. Tyler, in *Pueblo Birds and Myths*, speculated that the tracks on Ogre faces might be those of Sandhill Cranes, which are similar in shape and size to turkey tracks. But Tyler readily noted that cranes were clearly associated with seeds, fertility, and rainfall. Certainly the Crane Clan at Hopi does not have the necessary attributes related to danger or death to be connected with Ogres and the Two War Gods.

One other bird formerly known to the Hopis has a track that is the most similar in shape to those painted on the katsinas' faces, and, at 6 inches in length, is even larger and more im-



posing than those of either turkeys or cranes. The condor was known as a monster bird called *Kwaatoko* (Mountain Eagle). It preyed on humans, both living and dead, and was said to be able to carry away a man. *Kwaatoko* was associated with the Snake Society, and its track appears on the society's kilts with the double-bar symbol of the Two War Gods. A petroglyph of *Kwaatoko* also exists in a war shrine on First Mesa at Hopi. *Kwaatoko* was one of the monsters killed by the Two War Gods. Thus, the condor—related to the war-oriented Snake Society, and represented by its track with the Two War Gods symbol—seems more logically associated with the actions and nature of the Ogres than does either a turkey or crane track.

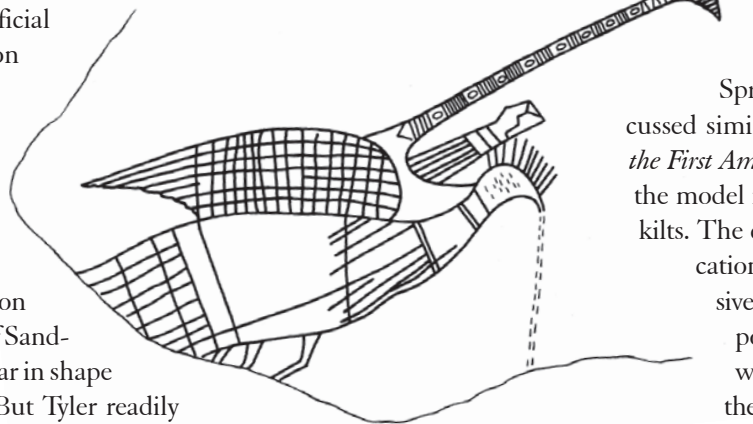
Finally, there are other three-toed birdlike tracks on the rocks scattered across northern Arizona that are even larger. But these 12- to 18-inch-long tracks were left by a Jurassic dinosaur, *Camptosaurus*. Tracks of this dinosaur are found at Moenave, at Moencopi, below the Hopi Mesas, and in many other places. When William Beeson was doing an archaeological survey

along the Little Colorado River between Hopi and Zuni, he came across a line of these fossil tracks almost 100 feet in length near Stinking

Springs. Adrienne Mayor has discussed similar tracks in *Fossil Legends of the First Americans*, and suggests they are the model for the tracks on katsinas and kilts. The condor and dinosaur identifications need not be mutually exclu-

sive: from a Native American viewpoint, the giant tracks in stone would reinforce the belief that the earthly world was formerly inhabited by monsters. These tracks could be those of *Kwaatoko*, made before it was

killed by the Two War Gods. And condors are simply the smaller relatives of *Kwaatoko*. This has a nice symmetry with Western beliefs that birds are descended from dinosaurs. Presumably both Native Americans and paleontologists would agree that the similarity between dinosaur and condor tracks is not a coincidence.



This Hopi engraving on sandstone of *Kwaatoko*, at First Mesa, is 5 feet long (redrawn by Ron Beckwith from Parsons 1936:Figure 499).

Hopi and Ancestral Hopi Bird Imagery

Kelley Hays-Gilpin, Northern Arizona University and Museum of Northern Arizona

ANCIENT PEOPLES of the Colorado Plateau depicted birds in pottery, baskets, and rock art beginning at least as early as A.D. 600, and some rock art depictions may be a thousand years older than that. A seventh-century red-and-black coiled basket from Broken Flute Cave, in northeastern Arizona, with a pattern of birds and crosses, contained turkey feathers. Basketmaker-era pictographs in Canyon de Chelly and along the San Juan River show humans wearing what appear to be ducks on their heads. Bird effigy vessels appear among the earliest pottery vessels, and reached florescence in the Pueblo III and IV periods. Pueblo IV pottery and murals present the most detailed and varied bird imagery. The cultural, environmental, and historic contexts of bird imagery help us to understand a range of possible symbolic meanings, ritual

uses, and histories of contacts and migrations over long distances and many centuries. Of the dozens of identifiable birds and feathers in ancestral Hopi art, this article will illustrate two of the most frequent—macaws and eagles—and one of the rarest, a jay.

Remains of tropical Scarlet Macaws from central Mexico appear in ancient Pueblo villages such as Pueblo Bonito, Wupatki, and Winona Village, near Flagstaff, in the eleventh through thirteenth centuries. They must have been carried by traders or pilgrims from their native area, perhaps through trade centers such as Casas Grandes, where ar-

chaeologist Charles Di Peso reported pens in which macaws were kept (see page 5). Images of macaws adorn Mesa Verde Black-on-white bowls, suggesting that even Northern Pueblo people had parrots, perhaps macaws, or at least knew about them. Ancestral Hopi, Zuni, and Rio Grande Pueblo potters also depicted macaws, and some even made macaw effigy jars. Spanish and Apache occupation of the intervening territory severed trade between north and south in the 1700s, but Pueblo people today still value macaws for their brightly colored feathers and their symbolic associations with the sun and the south, the direction of summer weather, rain, and abundant crops.

Scarlet Macaws also appeared in fifteenth- to sixteenth-century kiva murals at Awat'ovi, on the Hopi Mesas, and Pottery Mound, near Albuquerque.

Feathers of all kinds of birds carry Hopi prayers to the sun and sky. Prayer sticks and feathers can be offered for family members, rain, harvests, peach trees, horses, pilgrimages and other journeys, and for the health and well-being of everything in the world.

Pueblo people today associate eagles and hawks with the sun and the sky. Their strength and hunting skills are



A maiden holding Scarlet Macaws wears a tie-dyed dress in a panel from a twenty-first-century mural by Hopi artists Lomawyweša (Michael Kabotie) and Coochsiwuk'ioma (Delbrige Honanie), who were inspired by the Pottery Mound murals.

Kelley Hays-Gilpin



A petroglyph of a spread-winged bird at Lyman Lake State Park probably dates to the 1300s. Some say the Hopi Eagle Clan used to live in this area, near the Upper Colorado River.

carried by traders or pilgrims from their native area, perhaps through trade centers such as Casas Grandes, where ar-

Gene Balzer



Left: A Sikyatki Polychrome jar depicts a Stellar's Jay, whose blue plumage and home in the San Francisco Peaks associate this bird with the direction west. This jay sports a flower, which may refer to summer and portend rain and good harvests. Right: Awatovi Black-on-yellow ladle with four macaws or parrots (photo by Jannelle Weakly, courtesy Arizona State Museum).



The continuity of spread-winged birds in Hopi art can be illustrated by the development of the logo of the Museum of Northern Arizona (MNA) (far left), rendered on a silver bracelet by Paul Saufkie (middle left). Long-time MNA librarian Katharine Bartlett said the logo was based on a jar made by Nampeyo (middle right), acquired by Harold and Mary-Russell Ferrell Colton in 1912. Nampeyo's design was in turn inspired by fifteenth-century Sikyatki Polychrome pottery, such as the vessels excavated by Fewkes (1898:683) in the late nineteenth century (far right). (Two center photographs by Tony Marinella.)

particularly valued. Eagle tail feathers are one of the most important items in Pueblo ritual regalia, and they have been depicted on pottery and in kiva murals since the mid-1300s. Spread-winged birds in ancient art may represent eagles, hawks, or mythical thunderbirds, such as the giant bird the Zuni call Knife Wing, and the Hopi call *Kwaatoko*.

Birds and feathers are the most frequent motif in Sikyatki-style paintings on pottery and kiva walls. Anthropologist Jesse Walter Fewkes showed that Sikyatki birds are often so abstracted that we cannot recognize them as birds without arranging many examples in a sequence from more to less naturalistic. Cubist painters would have recognized that Sikyatki birds are often fragmented and rearranged with heads, wings, and tails viewed from different perspectives simultaneously. Only the distinctive black-tipped tail feathers, strong curved beaks, and talons indicate that many are eagles. Macaw beaks and sweeping tail feathers can sometimes be discerned. Sometimes bird figures seem to combine features of different bird species, or

different animals altogether, such as birds and snakes, and felines with eagle feather tails.

Birds brighten the Pueblo world today as they have done for millennia. Hopi, Zuni, and Rio Grande Pueblo descendants of ancient artists continue to celebrate a wide variety of birds in traditional and contemporary artworks. Members of the Hopi Parrot and Eagle Clans look for petroglyphs on the landscape marking the migrations of their ancestors; they create artworks that proudly display their clan namesakes. Some katsinas that dance in the plazas represent the crow, eagle, hawk, roadrunner, owl, and many other birds, and almost all katsinas wear feathers. Hopi katsina carvers and easel artists record those moments to help others learn about these benevolent spiritual beings. Feather depictions in jewelry, paintings, and pottery remind us of prayers that bring rain and other good things. Macaws, songbirds, and jays carry those prayers to the four directions and through the seasons. Eagles take prayers to the zenith, and waterbirds carry them to the world below.

Birds as Pets

Alan Ferg, Arizona State Museum

MOST CAPTIVE BIRDS were kept by Southwestern tribes as renewable sources of feathers to be plucked periodically and, sometimes, the birds were also ceremonially sacrificed. Small birds were also kept temporarily in cages before being eaten. However, in the 1800s, before the Apache Wars, Western Apache groups—Northern Tonto, White Mountain, and San Carlos—sometimes kept birds as pets.

In the 1930s, Anna Price, an elderly Eastern White Mountain Band head woman, talked about Apaches having kept quail, bandtailed pigeons, and kingbirds as pets, and mockingbirds and doves as caged songbirds. A specific type of basketry cage was made to hold these birds.

Anna Price also recalled, “When I was a little girl I had four pet turkeys...caught when they were little...our people used to catch young turkeys and raise them...We used to take these turkeys over to the Zuni and trade them for striped blankets.” At Zuni, the birds were doubtless used for their feathers.



Western Apache beargrass bird cage, woven in the 1930s; 35 cm tall with a 9-cm-square door in the side.

Helga Teiwes, Arizona State Museum

Ritual Use of Birds as a Marker of Ancient Immigrants

Patrick D. Lyons, Arizona State Museum and Center for Desert Archaeology

ARCHAEOLOGISTS HAVE LONG USED patterns in the distribution of different types of village spatial organization, architectural technology, domestic features such as hearths, ceremonial structures such as kivas, ceramic vessel forms, and pottery design styles to reconstruct ancient population movements. An underappreciated avenue of inquiry is the comparative study of ritual uses of different bird species by ancient social groups.

Bird feathers, skins, wings, skulls, beaks, and feet have been and continue to be used by the native peoples of the Southwest as components of prayer sticks, ceremonial costumes, standards, fans, and other objects used

in religious contexts. Preferences for particular species and patterns of bird element use, as well as an unusual method of disposal compared to what is common in an area, may signal the presence of immigrants. Among the Hopi, for example, the feathers and bones of eagles and Red-tailed Hawks are used to produce items used in rituals. As a result, the remains of these birds are interred in special cemeteries or in other sacred spaces. During the A.D. 1200s and 1300s, Ancestral Hopi groups in northern Arizona buried eagles and hawks in decommissioned kivas.

Charmion McKusick, based on an exhaustive review of Southwestern archaeological reports and her own analyses of bird remains, notes that avian species, especially eagles and hawks, are much more common in archaeological assemblages from the northern Southwest than the

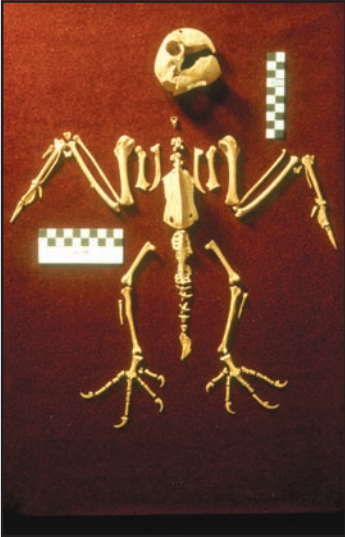
southern Southwest. She has highlighted consistent practices of ritual discard associated with hawks, eagles, falcons, ravens, macaws, and other birds. She also indicates that assemblages in the southern Southwest became more similar to those in the northern Southwest late in the pre-Hispanic sequence, beginning in the late A.D. 1200s or the early 1300s—about the same time that groups native to northern Arizona and southern Utah began to establish themselves in central and southern Arizona, southwestern New Mexico, and northern Mexico.

Many of the same sites in the southern Southwest that have yielded ceramic and architectural traces of immigrants from the north have also produced avian assemblages that reflect the presence of Puebloan groups. These include the Davis Ranch site, Reeve Ruin, José Solas Ruin, and the Bayless Ranch site, in the San Pedro Valley; University Indian Ruin and the Zanardelli site, in the Tucson Basin; and the Curtis site, in the Safford Basin.

At José Solas Ruin, in a feature that may be a kiva, a small pit yielded more than 100 raptor bones, including elements comprising 15 wings from a minimum of nine different individuals. At least five species were represented, including the Red-tailed Hawk, Swainson's Hawk, Northern Goshawk, Northern Harrier, and American Kestrel.

Archaeologists continue to seek new ways to track ancient immigrants and to explore the ways these groups interacted with locals. Additional research on the ritual use of animals promises to yield important insights.

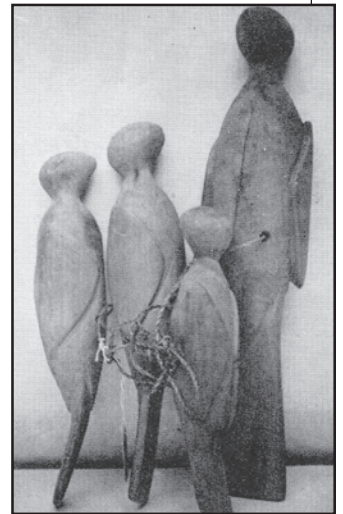
Richard W. Lord



A macaw burial from Homol'ovi III, in northern Arizona, near Winslow.



The kiva at Davis Ranch, excavated in 1957, contained elements from at least three hawks, including Red-tailed and Swainson's. These were buried together and may represent worn-out ritual objects disposed of in a prescribed manner.



Carved wooden birds from a cache of ceremonial paraphernalia, from the Kayenta area (Cummings 1953:209).

Amerind Foundation

Zuni Prayer Sticks: Research by Edmund J. Ladd

Tobi Taylor, Center for Desert Archaeology

EDMUND J. LADD (1926–1999), a member of the Zuni tribe, published extensively on Zuni ethnography, and wrote a Master's thesis on the ethno-ornithology of the Zuni. He summarized his research in a chapter in a 1998 book, *Stars Above, Earth Below: American Indians and Nature*, edited by Marsha C. Bol, from which the quotations used in this article are taken.

According to Ladd, 73 bird species can be found on the Zuni reservation, of which 66 are used by the Zuni, 3 are taboo, and 16 are used by religious elders. At a young age, Zuni men learn to recognize various species of birds so that they can give the correct species to the correct elders.

Ladd wrote that “the general patterns of bird and feather usage among the Zuni extend through a wide range of rituals and ceremonies. The feathers of exotic or introduced birds such as macaw, peacock, pheasant, guinea hen, and domestic chickens may decorate masks or other paraphernalia but are not used in ritual offerings (prayer sticks) only because they are not native species and thus were not traditionally used.

Native species such as raven, crow, owl, and Turkey Vulture are not used because they are carrion eaters and associated with winter, but, like the exotic species, their feathers may appear as mask decorations. Birds such as the Horned Lark, dove, quail, Pinyon Jay, Rock Wren, House Sparrow, House Finch, junco, and gnatcatcher are not used ritually because they are winter birds and have other, associated taboos. Many of the dance masks, however, are decorated with large ruffs made from raven, crow, and vulture feathers. It takes fifteen to twenty birds to make one ruff. A mask decorated with owl feathers requires two or three birds.”

Ladd notes that members of the community “plant” from 16 to 80 prayer sticks between 4 and 20 times a year.

“To start the construction process the appropriate number and kind of feathers for each member of the household for whom the prayer sticks are being made are laid out in their proper order. The first must be a turkey feather, the second an eagle feather, the third position must be a duck

feather; the three positions on the stick are fixed by tradition. After the duck feather come any number of the summer birds: Red-shafted Flicker, jay, nighthawk, warbler, and/or bluebird. The usual number is four or six of the summer birds, depending on what is available in the feather box. For each adult female there are two turkey feathers for the ancestors: one downy feather from a turkey, and a downy feather from an eagle for the Moon. For the initiated males there are generally four turkey feathers: two for the ancestors, and two for the *kokko* (masked gods). The prayer stick for the *kokko* is identified by the last feather in each series — a duck body feather facing backward. A downy feather from an eagle in the first position for the Sun completes the set. For all other members of the family, male and female, there are two turkey feathers.”



Prayer stick planted by the Zuni Great Fire Fraternity at winter solstice. From The Zuni Indians, by Matilda Coxe Stevenson, Twenty-third Annual Report of the Bureau of American Ethnology, 1904.

Ladd provides an example of the vast amount of feathers needed by a family for a year: “A man with a wife, one daughter, a son, and a ceremonially adopted child must provide seventeen prayer sticks for the summer solstice and seventeen for the winter solstice. These thirty-four prayer sticks require a maximum of 350 or a minimum of 250 feathers annually, not counting the monthly offerings for members of the esoteric societies, the winter dance series, or those offerings made when a family member dies.” Today, one way for Zuni families to acquire such an enormous amount of feathers is through the Feather Redistribution Project, discussed by Jonathan Reyman (see page 18).

The Feather Distribution Project

Jonathan E. Reyman, Illinois State Museum

TRADE BETWEEN MESOAMERICA AND THE SOUTHWEST for macaw feathers and other precious materials is noted in early Spanish records, and the ceremonial use of macaw feathers continues today among the Pueblo Indians of Arizona and New Mexico. Indeed, it was the 1970 request for macaw feathers by the late Fred Cordero of Cochiti Pueblo that eventually led to the creation in 1982 of the Feather Distribution Project.

Our project has two main goals: (1) to provide macaw, parrot, and wild turkey feathers to Pueblo Indians to help them maintain their traditional cultural practices so as to ensure their First Amendment rights under the United States Constitution (Native American Church members also receive feathers for ritual use); and (2) to eliminate, if possible, the smuggling of endangered and threatened species of macaws and parrots, which, in turn, lessens the destruction of native bird populations and habitats in Latin America. We do not distribute eagle or other raptor feathers. Eligible Indians may acquire these from the National Eagle Repository in Denver, Colorado.

Now 25 years old, the Feather Distribution Project has provided some 7,500,000 feathers free of charge to 29 of the 31 Pueblo villages. Only Hano and Nambé do not directly receive feathers; no one from either village has requested them.

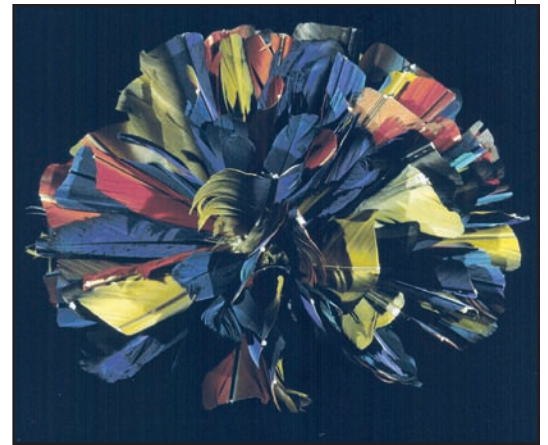
The feathers are a gift. Nothing is asked in return. The project neither buys nor sells feathers. No macaws or parrots are killed to provide them; all feathers are molted. Zoos, bird owners, bird clubs, breeders, and rescue and rehabilitation facilities donate feathers. Hunters donate wild turkey feathers, recycling a resource they would otherwise discard. Volunteers help sort feathers for distribution. Even broken and damaged feathers are used, because all feathers are precious. Conservation is a key element in the project.

Indians apply to the project and receive forms to request feathers. As more Pueblo people become adept at using the Internet, the project's web page (www.wingwise.com/feather.htm) is often the initial point of contact; modern technology serves an ancient need.

No one lives forever, nor do we have unlimited time, energy, and funds. It is time for the Pueblos to take over the project and operate it themselves. It is their future. Negotiations are underway to transfer the project to Pueblo control, but there is a problem: feathers are valuable. The feathers that we have distributed without charge would have brought several millions of dollars on the open market. Unfortunately, some Indians received feathers as a gift and then sold them. These individuals no longer receive feathers, but those who assume responsibility for the project must operate it transparently to prevent this. The 25 years of trust and confidence in the Feather Distribution Project could evaporate quickly if those who take over its operation compromise the integrity of the program. This could undo a quarter-century of hard work and accomplishments and could threaten the existence of the project. We are working very hard to ensure that this transition is a success.



Jasmine Gonzales, age 5 (2001), San Ildefonso Pueblo (photograph by Aaron Gonzales).



Top: Sandia man's head decoration made from cut and broken feathers (photograph by Gary Andrashko). Bottom: Hopi woman's dance wands decorated with wild turkey feathers (photograph by Jonathan E. Reyman).

The Great Mesa Verde Turkey Experiment

Tobi Taylor, Center for Desert Archaeology

JEAN M. PINKLEY (1910–1969) was an archaeologist who worked mainly at Mesa Verde National Park in Colorado. In 1965, she published an article in *American Antiquity* titled “The Pueblos and the Turkey: Who Domesticated Whom?” that discussed the reintroduction of turkeys to Mesa Verde.

Turkeys went extinct in the Mesa Verde area in historic times. National Park Service (NPS) policy was to reintroduce species into areas they were known to have inhabited. Turkeys were released in 1955 near the Chapin Mesa NPS headquarters. The area was seeded with corn in order to attract jays, thus helping the turkeys become established: “When jays sight food, they announce the discovery in a series of loud shrieks and squawks, [and] turkeys...quickly get the message.”

Once the turkeys were established, they began to overrun the place: “It was not long before they paid little or no attention to humans, cars, or racket.” Turkeys stood in the roads, “finally moving aside with bitter complaints when nudged by bumpers.” They slept on porches and roofs, and even entered NPS employees’ houses: “There is nothing quite so disconcerting as to discover a full-grown turkey investigating your living room.” Furthermore, “old gobblers would stretch and flap their wings in a belligerent manner and would even make short rushes at people, especially children.”

Finally, the NPS employees had had enough, and decided to try to drive the turkeys into the wilderness by shooting over the flocks, throwing cherry bombs over their

heads, spraying them with water, and even chasing them in patrol cars with the sirens going. Nothing worked. As Pinkley remarked, “The more we persisted, the more the turkeys enjoyed it. To them it was quite a game. We gave up.”

Pinkley’s experience with the reintroduction of turkeys gave her some empathy for the prehistoric inhabitants of the area. “When the Pueblos started farming in Basketmaker II, they must have soon found that...until the crops were harvested. . . the Indians had a battle on their hands to keep the turkeys out of the fields.” In the Basketmaker III period, when the Ancestral Puebloans lived in relatively permanent pithouse villages, turkeys undoubtedly took advantage of the situation. “There were food scraps to be garnered from garbage piles, cracked corn to be found in and around grinding bins, food to be snatched from the hands of toddlers, and nice warm roofs to roost on in winter and take advantage of after snow storms. What more could a turkey desire?”

Pinkley concluded that it was this intransigent behavior on the part of the turkeys that led the Ancestral Puebloans to “corral them at night and herd them during the day.” Last, she noted, “knowing how these birds take full advantage of man, how impossible it is to discourage their depredations, how rapidly they can drive people to distraction, I marvel that the Indians did not systematically kill them off before they realized to what use their feathers and later their flesh and bones could be put. My sympathies lie with the Indians.”

See the Center for Desert Archaeology website for more information: <<http://www.cdarc.org>>

THE CENTER FOR DESERT ARCHAEOLOGY, a private, nonprofit organization, promotes stewardship of archaeological and historical resources through active research, preservation, and public outreach. The Center is a 501(c)(3) organization and is supported through donations, memberships, and grants from individuals, foundations, and corporations. Center members receive an annual subscription to *Archaeology Southwest*, substantial discounts on other Center publications, opportunities to participate in archaeological projects, and invitations to special lectures and events. For more information or to join, contact Linda Pierce, Programs Manager, at 520.882.6946, or lpierce@cdarc.org.

Board of Directors: William H. Doelle, Ph.D. (President and CEO), Al Arpad (Vice President), Peter Boyle (Treasurer), Bernard Siquieros (Secretary), and Diana Hadley (member-at-large). **Advisory Board:** Hester A. Davis (Arkansas Archaeological Survey, retired), Don D. Fowler (University of Nevada, Reno), William D. Lipe (Washington State University), Margaret Nelson (Arizona State University), William J. Robinson (University of Arizona, retired), James E. Snead (George Mason University), and María Elisa Villalpando (Centro Instituto Nacional de Antropología e Historia Sonora, Hermosillo, Sonora, Mexico).

Administrative and Program Staff: Linda J. Pierce (Programs Manager), Debra Lee (Office Manager), Linda Marie Golier (Heritage Programs Coordinator), and Tobi Taylor (Content Editor, *Archaeology Southwest*). **Preservation Archaeologists:** Jeffery J. Clark, Ph.D.; Jacquie M. Dale, M.A.; Douglas W. Gann, Ph.D.; J. Brett Hill, Ph.D.; and Paul F. Reed, M.A. **Preservation Fellows:** James M. Vint, M.A. and Aaron Wright, M.A.

Archaeology Southwest (ISSN 1523-0546) is published quarterly by the Center for Desert Archaeology. Copyright 2007 by the Center for Desert Archaeology. All rights reserved; no part of this issue may be reproduced by any means without written permission of the publisher. Subscription inquiries: 520.882.6946.

Back Sight

AVIAN LUMINARY ROGER TORY PETERSON, author of numerous identification guides to birds, notes simply: “birds have wings, and they do things.” The articles in this issue of *Archaeology Southwest* establish that the feathers on those wings, the colors and behaviors of the birds, and the meat on birds’ bones led the human residents of the Southwest to develop a diverse array of representations and interactions with birds over many millennia.

Birds have meanings tied to today’s culture and concerns as well. For example, Steve Emslie’s report of Passenger Pigeon bones from a Pueblo site in New Mexico (page 11) reminded me of the iconic status of this extinct bird species. They illustrate, dramatically, our human propensity to overexploit even an abundant resource. In the early 1800s an ornithologist observer along the Ohio River was “suddenly struck with astonishment at a loud rushing roar, succeeded by instant darkness.” For the next five hours he watched a single Passenger Pigeon flock continue to pass overhead—and ultimately he calculated that the flock was 240 miles long. Nevertheless, new technologies and intensive human exploitation of this hyperabundant species had dire and dramatic consequences. The species went from billions of birds in the 1870s to just dozens in the 1890s. The last bird in the wild died in 1900.

Looking at the landscapes of the Southwest today, some observers might think of open space as an abundant resource. But Arizona is now the fastest-growing state in the nation, and urban development continues to sprawl outward and consume open space. A special place known for its broad unspoiled vistas, the integrity of its rich cultural and natural landscapes, and a place where the Center has major research and preservation commitments is threatened by a new transportation concept. The San Pedro Valley is a potential route for a truck bypass to reduce traffic on the interstate through Tucson. While such a road would threaten many sites in its direct path, it is the inevitable land speculation, growth, and development that could truly spell destruction for the San Pedro Valley.

The iconic Passenger Pigeon should be a reminder of how rapidly even an abundant resource can disappear if its consumption rate is excessive. The open space in the San Pedro Valley could be lost in just a few decades if strong conservation measures are not taken. To avoid the loss of the rich landscapes of the prehistoric and historic past will require vigilance by Center members and staff.

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 the Center for Desert Archaeology’s mission.



Passenger Pigeons once constituted 25 to 40 percent of the bird population of the United States. Their tragic extinction bears lessons for the modern American Southwest.

A handwritten signature in black ink that reads "William H. Doelle".

*William H. Doelle, President & CEO
Center for Desert Archaeology*

Center for Desert Archaeology
Archaeology Southwest
300 E. University Blvd., Suite 230
Tucson, AZ 85705

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