



# Parrot Bones Speak

## Ancient Macaw Breeding in the Deserts of Chihuahua

By Andrew D. Somerville

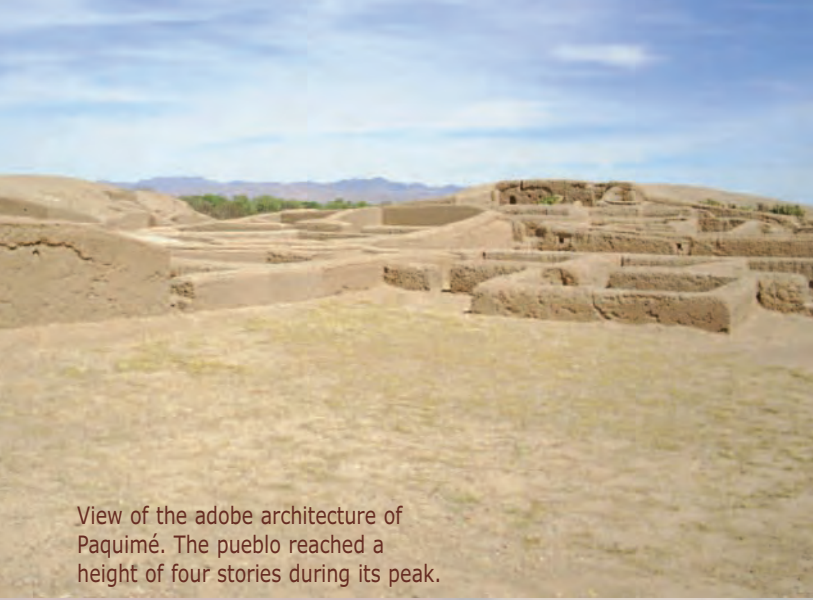
*Imagine you're a trader* and you've spent the past two weeks traveling on foot from the Pacific Coast deep into the Chihuahuan Desert of Northwest Mexico. The time period is 700 years before the present day, you've never seen a horse or a donkey, and your pack is loaded with goods to trade at distant communities. At a distance you begin to make out the outline of a great adobe pueblo – four stories high and catching the light of the setting sun. All traffic seems focused on this bustling center of activity. Smoke from countless hearths rises to the sky and you detect the aroma of roasting maize.

As you arrive at the edge of town you hear a strange noise emanating from the pueblo, something you've never heard before – the squawking of a hundred parrots as they settle for the evening. As you enter the last stretch of the journey you see them: bright red and green macaws perched on pueblo rooftops, nesting in adobe cages, and flapping their wings in the fading light. The pueblo is the ancient town of Paquimé, and, unbeknownst to you, you've just arrived at the last and greatest pueblo of the Southwest cultural region, and the center of a nearly industrial program of ancient macaw keeping and trading.

The Chihuahuan Desert of Northwest Mexico seems an unlikely place for the large-scale care of tropical birds. Indeed, during the dry season, the rolling hills - covered in desert grass and yucca cacti – resemble a desolate moonscape rather than a backdrop for colorful parrots. Yet, hundreds of years before Columbus set foot in the Americas, the people who inhabited this arid region successfully maintained a vast colony of both Scarlet (*Ara macao*) and Military Macaws (*Ara militaris*). The foreign sounds and the sight of their iridescent red and green feathers against the natural browns of the desert must have presented a startling and alien scene for visitors to the region.

Scarlet Macaws were particularly prized among pueblo cultures that maintained a flourishing industry of macaw keeping and trading in northern Mexico dating back 700 years.





View of the adobe architecture of Paquimé. The pueblo reached a height of four stories during its peak.



Macaw nesting pens made of adobe with "donut" entrance stones are found on the Paquimé site.



Evidence from macaw breeding pens, artwork, feathers and bone chemistry paints a fascinating picture of macaw keeping centuries ago.

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During the 1960s archaeologists excavated a third of this pre-Hispanic settlement, located just south of the New Mexico/Chihuahua border, and, to their surprise, discovered the remains of over 500 macaw skeletons buried throughout the site. Some of these were Military Macaws, which are known to have a range that extends near Paquimé, but at least 322 of the skeletons were Scarlet Macaws, which are found naturally only in tropical lowland forests. The nearest such habitat is in southern Tamaulipas, Mexico – more than 500km (310mi) south of the dusty desert center of Paquimé.

It's not a huge stretch to say that the ancient Paquimeños were obsessed with Scarlet Macaws. Local potters created ceramic vessels in macaw effigy shapes, they painted stylized macaw heads on other pots, and their feathers were used for headdresses and in other adornments. The colorful feathers of Scarlet Macaws would have been important items for rituals associated with the sun, fertility, and for bringing about the rainy season, as well as for economic and political purposes. Indeed, today macaw feathers are still important to modern pueblo groups of Arizona and New Mexico (see *PsittaScene* 21.4, Nov 2009).

For decades researchers have wondered whether the presence of these parrots at Paquimé indicated that the ancient Paquimeños were engaged in constant long-distance trade with southern Mesoamerican groups, such as the Toltecs, to acquire these highly prized birds, or whether they had actually developed the methods to maintain a breeding population of Scarlet Macaws in their new desert home. A recent study by myself and two anthropologists from Arizona State University, Ben Nelson and Kelly Knudson, has shed new light on this question. But before I discuss our findings, it is worth saying a few more words about the ancient settlement of Paquimé.

Paquimé has confounded archaeologists for generations. The settlement, which reached its apex between the years 1250-1450 A.D., consists of a giant adobe pueblo, making it closely resemble the famous pueblo cultures of the North American Southwest, such as Hopi and Zuni. However, several features of the site make it unique. Firstly, the site is gigantic. With over 1,000 rooms and reaching four stories in height, Paquimé was one of the largest pueblos of the entire Southwest cultural area. But its uniqueness doesn't stop there. Excavations at Paquimé unearthed several additional artifacts and architecture that appeared to indicate its connection with complex, urban societies to the south in Mesoamerica (e.g. the Toltecs). For example, Paquimé had at least two ballcourts constructed in the Mesoamerican style, which were used to play an ancient sport (probably something like a cross between American soccer and basketball); it had modest pyramid mounds surrounding the pueblo, and many Mesoamerican-style artifacts were found throughout the site, including copper bells, marine shells, and, of course, Scarlet Macaws. Additionally, several of the Mesoamerican gods, such as the feathered serpent Quetzalcoatl, were found painted on colorful ceramic pots. Was Paquimé an outpost of a distant Mesoamerican empire? Perhaps intentionally settled as a trading post in the region? Or was it a



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Southwestern pueblo that appropriated Mesoamerican styles and objects (like macaws) into its cultural repertoire?

TO INVESTIGATE THESE QUESTIONS we sought to determine whether the Scarlet Macaws were actually bred and raised at Paquimé or whether they were constantly being imported from Mesoamerican centers to the south. If the birds were in fact bred in the deserts of Chihuahua, you could surmise that Paquimé was a Southwestern pueblo with a Mesoamerican style. If they were not bred but imported, it would indicate that the site had close ties to distant Mesoamerican polities.

Everybody knows that “you are what you eat”. But you may not realize that the same adage applies to animals. The bones of mammals and birds are constructed of elements, such as carbon and oxygen, acquired from their food and drinking water. By analyzing the chemistry of their bones we can determine certain details about the diet and environment of the animals during their lives.


As it turns out, maize (corn; *Zea mays*) is a chemically unique plant to the area and birds or humans that ate it exhibit a characteristic carbon isotope signature in their bones. Since Scarlet Macaws didn't have much access to maize in their native forests, aside from crop raiding, the presence of the chemical signal of maize in their bones would indicate that they were raised in captivity. Parrots love corn and it happened to be the agricultural specialty of Paquimé.

Oxygen, like carbon, is another element that can tell us valuable information about the ancient lives of the macaws. Oxygen from bone tissue primarily comes from the water you drink, and different regions, due to differences in rainfall, altitude, temperature, or local humidity, have naturally different ratios of oxygen isotopes in their local water sources. The unique oxygen isotope ratio found in bones, therefore, serves as a rough fingerprint for the region where an animal lived. At a basic level we know that the water of the natural tropical forests of macaws differs significantly from the water of the Paquimé region.

WITH THIS KNOWLEDGE of expected chemical signatures in hand, we analyzed 30 long bones from Paquimé's Scarlet Macaws, graciously lent to us by the Museo de las Culturas del Norte in Casas Grandes, Chihuahua with permission granted by the Instituto Nacional de Historia e Antropología. To our surprise all of the macaws had a diet that included a large portion of maize. Perhaps “large” is an understatement. The average percentage of maize in their diet was 94%! These birds were fed practically nothing but maize. Certain patterns in the data suggest that younger macaws may have enjoyed a more varied diet (though still mostly maize), but as soon as they were past the delicate nestling phase, they knew nothing but corn. Thus, the birds appear to have been captive from egg to burial pit. These were not wild-caught parrots traded up from the lowland jungles; they had spent their entire lives living with humans and being fed by humans. But was it at Paquimé?

The oxygen data suggests that Paquimé was indeed the only home these birds ever knew. The oxygen values across the different macaw bones seem to mimic the local rainfall patterns of northern Chihuahua. This finding suggests that the birds were not exotic imports, but desert-raised captives.

Therefore, the carbon and oxygen isotope values both provide strong support to the idea that Paquimé had indeed developed, or acquired through training with southern specialists, the skills to maintain and reproduce a large population of Scarlet Macaws, presumably to harvest their feathers for political and ritual means. Archaeological evidence shows that not only did they successfully maintain this colony, but they did so for at least 200 years!

CERTAINLY SOME SORT OF CONTACT must have existed between the American Southwest, including Paquimé, and southern communities of Mesoamerica. Indeed, we have recently learned that the ancient inhabitants of Chaco Canyon in New Mexico had access to cacao (chocolate) drinks – a product grown only in Mesoamerica. And let's not forget that the macaws were acquired via trade in the first place. Our data suggests that Paquimé had a degree of independence and that it did not constantly rely on Mesoamerican polities to fuel its economy. By possessing the means to produce and then trade or gift the high-prestige parrots and feathers, Paquimeños would have seen their status in the region grow. Since they already controlled the distribution of other high status items such as shell bracelets and copper bells, Paquimé rose quickly to become one of the most complex and impressive pueblos of the ancient New World. 

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Stylized macaw motifs on this Ramos Polychrome vessel from Paquimé point to the importance of macaws in pueblo culture.

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