

## Reconsidering the Archaeological Rarity of Guinea Pig Bones in the Central Andes<sup>1</sup>

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In his *Peru Before the Incas*, E. P. Lanning suggested that guinea pigs (*Cavia porcellus*) might have been one of the most important food animals in the ancient central Andes (1967:18): "If we had any way of estimating the number of guinea pigs eaten in ancient times, we might find that they ranked with seafood as the most important sources of protein in the ancient diet, well ahead of the camelids and the Andean deer." Lanning was convinced that these small rodents, often kept in the kitchen and usually fed table scraps, were seriously underrepresented in the archaeological record and thus the quantity of their bones uncovered during excavation was not a true reflection of what might have been eaten in the past. Since Lanning's observation, excavations have been carried out at many central Andean archaeological sites, and they have yielded guinea pig bones only occasionally (e.g., Wing 1972; 1975:79; 1980; Pozorski 1976:136; 1979:175; Shimada 1982; Hastorf 1993:180; Burger 1992:267-68; Valdez 1988; Miller and Burger 1995; Pozzi-Escot and Cardosa 1986). Compared with the quantity of bones of the South American camelids, the quantity of guinea pig bones is insignificant.

The low frequency of guinea pig bone remains in archaeological sites has led many to emphasize the role of the South American camelids as the most important source of meat in the ancient central Andes.<sup>2</sup> Indeed, a brief review of zooarchaeological reports for the central Andes shows not only that these are entirely concerned with studies of camelid bone remains (e.g., Wing 1972; Shimada 1982, 1985; Miller and Burger 1995) but also that they consider llamas (*Lama glama*) and alpacas (*Lama pacos*), followed by some deer, the principal sources of meat. This view, however, is entirely based on the predominance of camelid bones and the relative absence of guinea pig bones.

Fortunately for zooarchaeologists, many Andean communities still raise guinea pigs (Andrews 1975; Bolton 1979; Morales 1994, 1995), perhaps in the same way as in ancient times. It is well known that guinea pig populations increase dramatically with very little care (Gade 1967:219; Bolton 1979:231). In fact, a three-

month-old female is capable of becoming pregnant; gestation takes only 63-74 days (Bolton and Calvin 1981: 275; Gade 1967:214), and the number of newborns varies from three to four or even more. Significantly, immediately after delivery females are again receptive and may become pregnant. Finally, and most important, because adult male guinea pigs (*kututus*) are territorial (Bolton 1979:278; Brothwell 1983:117), they are frequently killed in large numbers to prevent fighting and unwanted deaths. It is very common to keep only one adult male with a large number of females (Gade 1967: 214) while the rest are killed and eaten. In short, according to ethnographic studies, guinea pig raising involves continual killing of large numbers of animals. One therefore wonders why their bones are seldom found in archaeological sites.

To explore this question, a contemporary Peruvian central highland kitchen was chosen for excavation.<sup>3</sup> This kitchen, located in the Ayacucho Valley at about 2,500 m above sea level, was first built in the 1930s. Guinea pigs (locally called *cuyes*) were introduced shortly thereafter, and the structure was used for raising them until the early 1980s, when it was abandoned. According to the structure's owner, who has recently established a small new kitchen a few meters from the old one, the average number of guinea pigs raised at a time in the old kitchen was 20-25 adult females and a *kututu*.<sup>4</sup> Then as now, guinea pigs were raised for household consumption only, although some might be given to a recently married young couple as a present.

An excavation unit of 1 × 2 m was established at the southeast corner of the abandoned kitchen to look for guinea pig remains. The excavations<sup>5</sup> revealed the presence of two levels, one from the period when the kitchen was in use and an overlying one from the period since it was abandoned. Most of the deposits belonged to the latter level. The first occupation was basically represented by the kitchen floor. A hard, compact, and very well-preserved floor covered the entire excavation unit, which was basically clean. Indeed, no material remains were found in this level except dark burned spots in the floor itself. The owner had anticipated this result, saying that "the kitchen was kept clean." The second level was composed entirely of postabandonment deposits.<sup>6</sup> What is interesting is that although the residents of this household, like neighboring rural residents of this valley, consumed not only guinea pigs but also

3. We thank our aunt Delfina Cárdenas Palomino for allowing us to dig in her old kitchen and for sharing a delicious guinea pig dish with us. We thank Isaac Cárdenas for helping us in the excavations.

4. The new kitchen contains 12 adult female guinea pigs and a *kututu*; their number has dropped because during the conflictive period of the 1980s this residence was partially unoccupied.

5. A 4-mm sieve was used to screen the dirt removed.

6. Among these were plastic remains, a shellfish, a piece of metal, a piece of rope, a small bottle and a bottlecap, two ball-point pens, seven pottery fragments, a comb, a pair of running shoes and another shoe, a corn cob, 23 bone fragments (most of them European sheep and some cow), and only 1 guinea pig bone (a juvenile right tibia).

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2. As at present, llamas were most likely valued as cargo animals and alpacas as wool providers, not basically as meat animals.

corn, the excavations failed to reveal any considerable remains of either.

The owner explained why there were no guinea pig remains in the abandoned kitchen. Guinea pigs eat all the time, she said, and consequently the kitchen floor was often covered with guinea pig feces, which required sweeping at least once a day. Guinea pig manure was regarded as one of the best soil fertilizers, and therefore the sweepings were taken to the cornfields. In other words, most of the evidence of guinea pig raising and consumption was daily removed as the kitchen floor was swept. At the same time, guinea pig bones were discarded not in the kitchen but outside. Therefore it was a mistake to look for guinea pig bones in the place where these rodents were raised. Indeed, a meal made of guinea pigs was served us for lunch,<sup>7</sup> and all the bones were kept until everyone had finished and then placed on the patio for the three dogs to share. In a very few minutes all the greasy, fragile bones had been entirely eaten by the dogs; inspection of the patio did not locate a single piece of guinea pig bone. Again, the informants had anticipated that this would be the case, because "dogs like guinea pig bones" (and see Valdez 1995).

A 1 × 2-m excavation conducted in an abandoned kitchen where guinea pigs had been raised for nearly 50 years failed to report any substantive evidence of such activity. In the first place, the daily sweeping of the kitchen floor had removed most of the evidence of the presence of these animals in the kitchen. Secondly, the fact that guinea pig bones were discarded outside had made it less likely that any bone would be found inside. Finally, the direct intervention of dogs had made it unlikely that any such bones would have survived.

When a test excavation such as this one fails to provide any conclusive evidence that guinea pigs were raised and eaten in a particular place, it is likely that the rarity of their bones in archaeological sites does not necessarily represent their limited use in the past. Instead, it appears that guinea pig bones do not show up in the archaeological record because just after discard they are subjected to taphonomic processes that tend to eliminate them. Therefore, the relative abundance of camelid bone remains, for instance, compared with the remains of guinea pig bones should not be seen as conclusive evidence of the greater importance of the former species. As noted by Lanning (1967), it is difficult to find "a way of estimating the number of guinea pigs eaten" in the past or of demonstrating that these small domesticates were raised in ancient times. Guinea pigs are, as Izumi Shimada (1994:186) argues, "greatly underrepresented in the archaeological record."

Nevertheless, the simple fact that guinea pigs were domesticated is indicative of their food value in ancient times as in many contemporary Peruvian highland communities. Most important, despite the introduction of Old World animal species, the guinea pig has re-

mained one of the important meat sources in the central Andes and beyond them (Morales 1995). It should be clear from this that not all of what was eaten in the past is represented in the archaeological record.

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7. Two adult female guinea pigs were killed to prepare the lunch, which was shared by four individuals.

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## Late Ceramics in Samoa: A Test Using Hydration-Rim Measurements<sup>1</sup>

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Archaeological research on Tutuila Island, in the central Pacific, in the late 1980s and early 1990s produced some quite startling results. Tutuila is one of nine major islands in the Samoan Archipelago of western Polynesia (fig. 1). In the 'Aoa Valley, on the north coast of eastern Tutuila, Clark and others discovered and partially excavated what was at the time the only ceramic residential site known for the island. (Numerous other ceramic sites had, however, been reported from 'Upolu and Manono Islands to the west.) The 'Aoa site produced an unusual abundance of volcanic glass and basaltic rock artifacts as well as a large collection of pottery sherds. A set of radiocarbon determinations suggested that site occupation began perhaps as much as 3,000 years ago and, quite surprisingly, that pottery use continued until the 15th to 17th centuries A.D. and perhaps later. Furthermore, none of the ceramics collected from the site, either from excavation or from the surface, displayed the Lapita dentate stamping that would be expected from a site at the early end of that time range (see Green 1979). These data challenged the conventional culture-historical model of Samoan—and

indeed West Polynesian—prehistory. In particular, the late ceramics were perplexing in that they appeared to date some 1,000 years after pottery was thought to have been abandoned in West Polynesia (Clark 1993, 1996). In light of this contradiction between the 'Aoa data and the conventional model, we report here the results of a test of the late-ceramics hypothesis through the use of hydration-rim measurements from a sample of volcanic-glass artifacts collected from the site.

### THE 'AOA SITE

In 1986, as part of an archaeological research program on the eastern end of Tutuila Island, Clark and Herdrich (1993) conducted an intensive survey of the 'Aoa Valley and surrounding ridges. 'Aoa is a small amphitheater valley with an eastern lobe that is slightly higher in elevation than most of the valley floor (fig. 2). The modern village of 'Aoa occupies most of the eastern lobe. Six streams cut down the surrounding ridge slopes and across the valley floor. A band of calcareous sand fronts most of the valley, and inland of that are silty clays and stoney silty clays that are slightly to mildly acidic (pH 5.6–6.0). There is also a small estuary and area of mangrove where three of the valley streams converge. The water table is normally 1.0–1.5 m below the surface.

Survey of the valley revealed archaeological materials (artifacts, shell, and traces of house floors) over most of the lower (coastal) half of the valley. Because these materials occurred in a continuous pattern, one site number, AS-21-5, was assigned to the entire area, with 16 localities distinguished on the basis of geomorphic features or density of surface artifacts. Most of the artifacts, including all of the pottery, have come from the eastern lobe.

Locality 2 is in the western part of the eastern lobe, immediately inland of the primary settlement zone of 'Aoa Village. Areas adjacent to this locality were infilled a few decades ago to reclaim swampy ground. At about the same time, Puna Stream was diverted from a course through the village to its current channel behind and around the west side of the village. The stream channel now cuts along the edge of Locality 2. The land surface gently slopes upward (3.5–4.2 m a.s.l.) to the north and east until reaching the base of a steeply rising ridge.

The site was first tested in 1986, when Clark and Herdrich (1988) discovered pottery sherds in the Puna Stream bed and a bank cross section that revealed a cultural deposit including at least two cultural layers and several features. Excavations (fig. 3) in three 1-m<sup>2</sup> units (designated XU-1, -2, -3) were terminated when seepage from the water table flooded the units. Two years later, Clark (1989) returned briefly to the site to dig a small (1.0 by 0.5 m) unit (XU-4) into the stream bank to obtain charcoal for dating. Three charcoal samples (Beta-28210, -28211, -28212) yielded results suggesting occupation between A.D. 1450 and 1650 (calibrated) (Clark 1989). In 1991, excavations at Locality 2 were expanded with four additional units (XU-5–8) covering 10 m<sup>2</sup>

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