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THE LATE ARCHAIC PERIOD
OCUPATION AT CARRIZAL,
PERU

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THE LATE ARCHAIAC PERIOD OCCUPATION AT CARRIZAL, PERU

KAREN WISE

ABSTRACT. Recent archaeological research at a Late Archaic period (5000–3500 B.P.) component of the site of Carrizal on the far south coast of Peru reveals evidence of domestic terraces located on hill slopes overlooking a shell midden. The pattern of domestic terraces overlooking a midden area is similar to that documented at Quiani on the coast of northern Chile and to Kilometer 4, a site located on the coast approximately 7 km south of Carrizal. A burial excavated at Carrizal is similar to burials documented from Quiani, from Kilometer 4, and from other Late Archaic and Early Formative period sites in the coastal south-central Andes. The Carrizal site probably represents a basic settlement type of the Late Archaic period on the south-central Andean coast, which is associated with the mortuary complex sometimes called Quiani. It is proposed that this type of site may represent early sedentary villages of Late Archaic peoples.

RESUMEN. Recientes investigaciones arqueológicas en un sitio del periodo Arcaico Tardío (5000–3500 A.P.) en Carrizal, en la costa del extremo sur del Perú, han revelado evidencias de terrazas domésticas ubicadas en las colinas próximas a un conchal. El patrón de terrazas domésticas con vista hacia una zona de conchal es similar a lo que se ha encontrado en Quiani, en la costa norte de Chile; así como en Kilómetro 4, un sitio ubicado en la costa aproximadamente 7 km al sur de Carrizal. Un entierro excavado en Carrizal es parecido a los entierros documentados en Quiani, Kilómetro 4, y en otros sitios de los períodos Arcaico Tardío y Formativo Temprano en la costa sur central Andina. El sitio de Carrizal puede representar un tipo básico de asentamiento humano del periodo Arcaico Tardío en los Andes sur centrales, asociado con el complejo mortuario conocido como Quiani. Se plantea que este tipo de sitios puede representar asentamientos tempranos sedentarios del periodo Arcaico Tardío.

INTRODUCTION

The study of the Archaic period occupation of the Americas is critical to an understanding of the development of indigenous cultures of the New World. It is during the Archaic period that sedentary life, distinctive local cultural traits and material culture, and the foundations of horticulture develop among hunting and gathering groups in many parts of the Americas. Understanding the sequence and development of Archaic period societies provides the basis for the study of local cultural development, the evolution of regional groups, and the technological and other achievements of later societies, as well as for informing research on hunting and gathering societies and how they change through time. This paper reports on recent excavations at a Late Archaic period site at Carrizal on the far south coast of Peru, presenting new data on the early occupation of a region that has only recently come under study.

The Archaic period occupation of the south-central Andean coast (Figure 1) is best known for two notable features: the elaborate mummies of the Chinchorro Complex (Allison et al. 1984; Bittrmann 1982; Bittrmann and Munizaga 1976; Guillén 1992; Uhle 1918) and the fishing tradition represented both by fishing technology (Bird 1943, 1946) and marine faunal remains (Llagostera 1979a, 1979b, 1989; see also Sandweiss et al. 1989). Relatively little attention has been given to patterns of settlement, domestic occupation, and site structure characteristic of this time period, except in summary form (see Núñez 1969, 1983, 1989; Llagostera 1989). Recently published excavations indicate the presence of small groupings of ephemeral domestic structures up to 8000 to 9000 years old at the Acha-2 site (Muñoz et al. 1993), and the few published domestic sites from the Late Archaic period suggest that, by around 4000 to 5000 B.P., small villages containing groups of more substantial structures were in use on the south-central Andean coast (see Muñoz and Chacama 1982; Zlatar 1987). At the sites of Quiani 9 (Muñoz and Chacama 1982) and Kilometer 4 (see Wise et al. 1994), Late Archaic period domestic terraces are located on artificially constructed hillside terraces.

Sites dating to before approximately 5000 B.P. on the south-central Andean coast include cemeteries, middens, and a few domestic sites. Published descriptions of early domestic structures are limited to Acha-2, with two radiocarbon dates of approximately 8000 and 9000 B.P. (Muñoz et al. 1993), and Villa del Mar, with three radiocarbon dates between 6000 and 8000 B.P. (Wise 1995), as well as

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Figure 1. The central and south-central Andes showing locations of sites mentioned in the text.

1 Carrizal, Kilometer 4, Villa del Mar
2 Acha-2, Quiani
3 Caleta Huelen
the inland Archaic period site of Tiliviche-2 (Nuñez and Moragas 1978). In all three cases, the structures are represented by shallow circular depressions. At Acha-2 and Tiliviche-2, these depressions were associated with post-holes. Nuñez (1969) has stated that the early occupants of the northern coast of Chile tended to settle in river valleys and to occupy special use (fishing and shellfishing) sites near maritime resources away from sources of fresh water (see also Nuñez 1983). This general model appears to fit the available data, although published data on domestic sites on the south-central Andean coast remain rare.

By the Late Archaic period (5000-3000 B.P.), the inhabitants of the south-central Andean coast appear to be relatively sedentary, to live in small villages, and to be developing new patterns of mortuary treatment (shifting from the extended and artificially treated multiple burials of the Chinchorro Tradition to the individual flexed burials of the Quiani Tradition). Archaeologists have argued for the intensification of fishing activities and increasing occurrence of specialized tools oriented toward the exploitation of the marine environment (Llagostera 1979a, 1979b, 1989; Nuñez 1983, 1989; Wise 1990). Most of the known Late Archaic period sites are in northern Chile, but several sites have now been identified on the coast of southern Peru.

The majority of Late Archaic period sites on the northern coast of Chile are identified in the literature as shell middens or simply as midden sites (see Nuñez 1983). Data from 10-12 of these sites have been used to reconstruct a pattern of changing technology and exploitation of marine resources (see Bird 1943, 1946; Llagostera 1979b, 1989; Nuñez 1983). Late Archaic period burials and cemeteries include both extended and flexed burials. Extended burials, with dates between roughly 3000 and 5000 B.P., are found at Caleta Huelen (Nuñez et al. 1974), Camarones (Schippacasse and Niemeyer 1984), El Morro (Allison et al. 1984), and Pisagua Viejo (Nuñez 1976, 1983). Flexed burials, of the Quiani Tradition, are found both with and without pottery at Quiani (Dauelsberg 1974), El Morro (Guillén 1992), Punta Pichalo (Bird 1943), and Playa Miller (Focacci 1974). Cemeteries containing both extended and flexed burials have been reported at Camarones-15 (Rivera et al. 1974) and at sites excavated by Bird (1943).

There is little published data on Late Archaic period habitation sites from the coastal south-central Andes, and published descriptions and illustrations are available only for the sites of Quiani (Dauelsberg 1974; Muñoz and Chacama 1982) and Caleta Huelen-42 (Nuñez et al. 1974; Zlataf 1983, 1987). At Quiani, domestic terraces are found on a slope adjacent to a coastal drainage (Muñoz and Chacama 1982). Other sections of the site include a formal cemetery with individual flexed burials (Dauelsberg 1974) and a large midden (Bird 1943). No full map of the areas and components at Quiani has been published, making it difficult to understand the structure of even the surface of the site. The domestic features at Quiani are described by Muñoz and Chacama (1982) as semi-circular depressions, and their illustrations demonstrate that the structures are located on domestic terraces excavated into the side of a hill (Muñoz and Chacama 1982: 63, 64). They report a date of 5250 ± 430 B.P. from a layer which appears to overlie living floors and of 6370 ± 540 B.P. from a post-hole. Another date of 6115 ± 280 B.P. is reported without information on context.

Caleta Huelen-42 is a Late Archaic period site located approximately 2 km from the mouth of the Loa River that contains approximately 30 substantial semi-subterranean structures with large stone slab walls and extended burials found underneath their floors (Nuñez 1983; Nuñez et al. 1974; Zlataf 1983, 1987). This site, with dates of 3780 ± 90 B.P. from a harpoon shaft associated with a burial under a house floor and 4780 ± 100 B.P. from a firepit excavated into sterile soil (Zlataf 1987), appears unique with respect to architecture characterized by heavy stone walls, with the possible exception of another site mentioned by Zlataf (1987: 11) known as Chacay-2.

Nuñez (1983) and Zlataf (1987) refer to other Archaic period habitation sites containing semi-circular structures from the northern coast of Chile, but none are illustrated or described in depth. These include a site called Punta Guasilla-1 with radiocarbon dates of 3490 ± 290 B.P. and 4730 ± 190 B.P. (Montenegro 1982 bachelor’s thesis cited by Zlataf 1987: 11) Los Canastos-2 (Bustos cited by Zlataf 1987: 11), and Taltal (see Mostny 1964).

Recent and ongoing research in the Department of Moquegua, Peru, demonstrates the presence of Late Archaic period occupations in several coastal spring systems, including Carrizal (Wise 1989, 1990) and Kilometer 4 (Wise et al. 1994). Both of these sites contain areas of domestic terraces placed on hill slopes above midden areas. Carrizal and Kilometer 4 are apparently somewhat similar in structure to Quiani, although no published map is available that shows the exact relationship of the different areas at Quiani. I suggest that these sites represent a distinctive type of Late Archaic period habitation site for the south-central Andean coast, although considerably more published data will be needed to confirm this. The discussion that follows reports on research conducted at a Late Archaic component of the Carrizal in 1985 and 1988. My goal is to provide a basic description of this site and the small scale excavations conducted there in order to provide primary data on this time period that will allow some preliminary comparisons to be made with other sites in the south-central Andes and beyond.

**CARRIZAL**

Carrizal (Figures 2 & 3) is the name of a small coastal spring and its associated drainage system.
Figure 2. The Moquegua coast showing locations of sites mentioned in the text.
The current spring outlet is found at approximately 100 m above sea level, about 1 km inland. Today, the water flow from the spring is sufficient to support only a small planting of a few fruit trees. Below the current outlet of the spring, however, the remains of both old olive plantations and prehistoric agricultural terracing are still visible from the surface (Bawden 1989a, 1989b; Clement and Moseley 1989, 1991). Clement and Moseley (1989), in a study of the ancient spring outlets and prehistoric and historic agricultural features, have demonstrated a long-term pattern of drying and of lowering of the spring outlet. They identified a series of nine holding tanks or reservoirs, showing that the oldest tanks were located at the highest elevations, feeding the oldest of the agricultural terraces (Clement and Moseley 1989: 446-448). Although Clement and Moseley's study did not deal with the hydrological resources of the preagricultural Archaic period, their conclusions indicate that several thousand years ago there was considerably more water available at the Carrizal spring than can be seen today and that the spring outlet was at a higher elevation, close to the Late Archaic period site reported here.

Archaeological research has been ongoing at Carrizal for the past decade (see Bawden 1989a, 1989b; Bolaños 1987; Clement and Moseley 1989, 1991; Wise 1989, 1990), demonstrating that human settlement of the Carrizal drainage system began at least 5000 years ago and continued into the present day. Bawden's (1989a, 1989b) archaeological survey of Carrizal identified 20 separate sites or components on both sides of the quebrada, extending from the ocean to approximately 3 km inland. He described the early ceramic and Late Intermediate period occupations of Carrizal and identified four sites with Preceramic surface or midden deposits along the shoreline, at or near sea level, as well as four sites located higher up along both sides of the quebrada (Bawden 1989b: 43, 44). He argued that the sites located directly on the coast represented "small semi- or fully-sedentary villages" (Bawden 1989b: 44), while the extensive lithic scatter found along the ridge tops above the quebrada "reflects long term transient hunting and camping" (Bawden 1989b: 44). A midden (Bawden's site 53) found just above one of the oldest tanks identified by Clement and Moseley is argued to represent the remains of permanent occupation of Carrizal. This midden, which Bawden's test probes showed to have the densest deposits of apparently Preceramic material at Carrizal, was chosen for testing in the first phase of research into the Archaic period occupation of the coastal spring systems north of the Osmore River.

Preliminary excavations at the Late Archaic period component of Carrizal (Figure 4) were conducted in 1985 (Wise 1989). The work consisted of surface mapping, cleaning of a small section of the midden profile cut by the quebrada, and exca-
contains the deepest deposits, with a rapid decline in the thickness of the midden moving south and east. Deposits in the northwest sector of the shell midden are as much as 1.7-m deep, while those in other areas taper to 20 to 30 cm.

In 1988, work was continued at the Archaic period component of Carrizal. Three sections of profile exposed by a quebrada were cleaned, and three new test units were opened in the shell midden (Figure 5). The 1988 excavations brought the total excavated area in the midden to 11 m$^2$, with 12 m of exposed profiles. Test excavations, including small probes and a single 1 x 2-m trench, were also made in the terraces in the hills above the midden. Although the combined excavations at Carrizal were limited, they provided the first data from excavated contexts on the Late Archaic period occupation of the far south coast of Peru.

The Shell Midden

The Late Archaic period shell midden at Carrizal is located 150 m above sea level and just over a kilometer inland. The midden overlooks the ocean and is approximately 2 km west and downslope from the nearest patch of lomas (seasonal fog-fed vegetation). The surface of the shell midden is irregular, and several shallow depressions of between 2 and 4 m in diameter are distinguishable. The midden measures approximately 60 m$^2$, and it is bounded on all sides by small drainages (see Figure 4).

The primary goal of our excavations in the shell midden at Carrizal was to collect data on the sequence of occupation. Our secondary goal was to collect a stratigraphically controlled sample of artifacts and subsistence remains in the hopes of identifying diagnostic artifacts and allowing basic descriptions of subsistence and technology. Constraints on time and finances prohibited areal excavations, which would have allowed more in-depth analysis of the site.

Excavations were conducted in the northwest section of the midden, where the deepest deposits were found. It was expected that this area would also contain deposits representative of the greatest temporal range at the site. Although excavations were limited to small test units, we placed units such that they intersected with two of the depressions noted on the surface of the site in hopes of correlating the surface depressions with subsurface features, such as possible domestic remains. Three sections of profile were cleaned and documented, including Bawden's excavation unit (see Figure 5). Three excavation units were opened as well, including the 1 x 1-m unit 4 adjacent to the 1985 excavation unit 2 and two 2 x 2-m units (units 3 and 5). Units were excavated to sterile soil, which was reached between 110 and 130 cm below the surface. Fill was screened using 1/4" screens. Exposed profiles, including both excavation units and quebrada profiles, were documented, and 20 x

![Map of the Late Archaic component at Carrizal, showing locations of domestic terraces and shell midden. Numbers indicate locations of excavation areas in domestic terraces (1) and shell midden (2).](image)
20-cm column samples were taken of each stratum for flotation to allow systematic recovery of small remains.

The stratigraphy of the shell midden was relatively uniform in the test units in the densest area of the midden (Figure 6) and apparently more complex around the northwest edges of the midden in the exposed quebrada profiles (Figure 7). The strata were easy to distinguish from one another due to variations in soil color and texture, as well as content of the fill, especially relative amounts of shell and of shells from different species. Differences were seen in amounts of charcoal, densities of shell and bone, species of fauna represented, and content of rock or gravel. Of particular interest is the general trend for the concentration of shell to be much lower in the stratigraphically lowest layers as compared to the upper and middle strata. In addition, the pit features located at the base of Profile Two (Figure 7) tended to have more large mammal bone and less shell than was seen in the layers above.

Radiocarbon dates indicate (see Table 1) a sequence of deposition in the midden covering a relatively short period. Uncalibrated dates from the shell midden are between 4390 ± 110 and 4690 ± 120 B.P., with calibrated ranges indicating a slightly longer period of occupation.

The shell midden at Carrizal is composed almost entirely of subsistence remains, especially shell, with varying amounts of animal bone and some ground and chipped stone and few other artifacts. Carbonized vegetation, including seeds, twigs, and small fragments of burned wood, is also present, and it is generally found mixed or scattered throughout the fill. We were unable to identify surfaces, floors, or other features during excavations, and we found no evidence in the profiles of features that might have been associated with the depressions seen on the surface of the midden. It is possible that larger horizontal exposures would reveal evidence of surfaces or other features, but we did not have time to conduct such excavations at Carrizal.

Most of the debris and fill found throughout the shell midden appears to be garbage, and except for a few associations of ground stone (see below), there is little evidence for any activities other than discarding of food remains and other debris in the shell midden. The contents of the strata in the low-
The Domestic Terraces

The remains of a series of terraces constructed on the hill slope above and to the north of the midden are visible on the surface of the site (Figure 4). From afar, these terraces are visible as lines on the hill; from closer up, they appear as marked depressions along the side of the hill (Figure 8). Although fewer in number than the terraces found at the nearby site of Kilometer 4 (Wise et al. 1994), surface indications suggest that they represent the remains of domestic terraces similar to those at Kilometer 4. Test probes were placed across several transects running from the ridge above the terraces down to the shell midden. These confirmed the presence of cultural debris in the depressions, as well as in other areas of the slopes.

A single 2-m test trench was excavated approximately 1-m deep into one of the terraces (because of the slope on the surface, excavation depth varied from 85 to 110 cm below the surface). This trench revealed domestic refuse, including slumped mud or possibly adobe, carbon, bone, some shell, and other remains. One small piece of brown fiber-tempered pottery was recovered from the unit, approximately
30 cm below the surface. A radiocarbon date of 3640 ± 100 B.P. (see Table 1) comes from a charcoal sample collected from the layer directly above the pottery fragment.

The excavations in the terraces were not sufficiently extensive to allow description of houses or to reveal patterns of use of this area. Several observations suggest that this area contains the remains of domestic structures and that it was used in ways different from the shell midden below. First, the contents of the fill in the hills above the midden, particularly in the depressions or terraces, is markedly different from the contents of the midden. There is little shell in terraced areas, while shell makes up the majority of the fill in the midden area. Adobe slump, almost never observed in the midden, was found in several levels of the excavation unit in the terrace. Although coherent features were not identified in the limited excavation, areas of differing color and contents were identified in most levels of the excavation in the terraces, suggesting the possibility that larger-scale horizontal excavations might reveal domestic features, including houses and activity areas.

The single radiocarbon date of 3640 ± 100 B.P. obtained from the upper levels of the test unit in the terraces is considerably later than the dates that have been obtained from the shell midden (see Table 1). Sterile soil had not been reached at 1 m below the surface, however, and it is unclear how deep or extensive occupation of the hillside was. Further excavations and dates would be necessary to pinpoint the chronological relationship between archaeological remains from the slope and the midden areas. Much more extensive domestic terracing, found in the slopes above a midden area at the site of Kilometer 4, has been dated to approximately 3700 B.P. (Wise et al. 1994), and our more recent excavations at Kilometer 4 suggest that the lower levels of the terraces may be considerably earlier than the upper layers. By analogy, it is possible that the terraces at Carrizal were constructed while the shell midden was in use, but additional excavations and chronometric dates would be needed to further define the chronological relationship between the shell midden and the terraces.

**BURIALS**

Two burials were encountered during excavations in the shell midden at Carrizal. The first burial was found in excavation unit 3 (see Figure 6) in a roughly circular tomb that had been excavated into the layers of the shell midden in strata dated to between 4450 ± 100 and 4690 ± 120 B.P. The grave had been lined with a layer of *totoro* (reed) matting, or *estera*, which had disintegrated almost completely. The skeleton, of an older adult female, was in a flexed position, lying on its right side, with head and knees toward the north (Figure 9). The legs were bound in place and the left knee was
Table 1. Radiocarbon dates from Carrizal (all samples composed of burned wood).

<table>
<thead>
<tr>
<th>Uncalibrated date</th>
<th>Number</th>
<th>Context</th>
<th>Calibrated B.P.</th>
<th>Calibrated B.C.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3640 ± 100 B.P.</td>
<td>Beta 31075</td>
<td>Domestic terrace, 26 cm below surface</td>
<td>4237–3688</td>
<td>2287–1738</td>
</tr>
<tr>
<td>4390 ± 110 B.P.</td>
<td>Beta 18920</td>
<td>Midden Unit 2, stratum 8</td>
<td>5313–4813</td>
<td>3363–2863</td>
</tr>
<tr>
<td>4450 ± 100 B.P.</td>
<td>Beta 31073</td>
<td>Midden Unit 3, stratum 5</td>
<td>4317–4838</td>
<td>3676–2888</td>
</tr>
<tr>
<td>4620 ± 100 B.P.</td>
<td>Beta 31074</td>
<td>Midden Profile 2, stratum 28</td>
<td>5583–5029</td>
<td>3633–3079</td>
</tr>
<tr>
<td>4690 ± 120 B.P.</td>
<td>Beta 27417</td>
<td>Midden Unit 3, stratum 10</td>
<td>5653–5039</td>
<td>3703–3089</td>
</tr>
</tbody>
</table>

* Calibration using Stuiver and Reimer (1993), probability distribution (Method B) at 2 sigma.

pulled closer to the trunk than the right knee. The long bones showed evidence of having been completely wrapped with processed *tortora* fiber wrappings, and a vegetal fiber basketry hat was found on the individual's head. The head and trunk had been covered in a *tortora* fiber textile. The only non-perishable artifact found in association with the burial was a single piece of ground stone placed just to the southeast of the body behind the individual's back.

A second burial, of a male between 35- and 45-years old, was found at the north edge of the midden adjacent to the west edge of Profile 2. Unlike Burial 1, the skeleton was lying face down, oriented toward the southwest. The skull was resting on its left side, facing northwest. The hands were under the pelvis, and legs were flexed such that the feet were placed next to the pelvis. The pit was shallow and no artifacts or evidence of textiles or other grave goods were found with this burial. This burial was located at the edge of a small drainage adjacent to the north of Profile 2, but there was no clear stratigraphic or other relationship to the profile or to the midden in general. Thus, it remains unclear what the precise relationship of this burial was to the midden or to the terraces.

Burial 1 fits into the general pattern of mortuary treatment known from the Late Archaic to Formative periods in northern Chile, although the individually wrapped limbs of the skeleton are not like other published burials. Flexed and semi-flexed burials, placed in individual graves, with differing types of grave goods, are typical of the Quiani Tradition known from the northern coast of Chile (see Bird 1943; Dauesberg 1974; Focacci 1980; Muñoz 1982). Although most of the burials that have been published from northern Chile contain considerably more grave goods than does Burial 1 from Carrizal (Bird 1943; Dauesberg 1974; Nuñez 1969; Rivera et al. 1974), the Carrizal burial does appear to fall within general patterns seen in the south-central Andes. Flexed burials are also known from Preceramic period sites on the central Andean coast, including La Paloma (Engel 1980; Quilter 1989), Asia (Engel 1963), and Paracas (Engel 1991), but the textiles, placement, and position of burials on the central coast appear distinct from that seen on the south-central Andean coast.

**CHRONOLOGY**

Radiocarbon dates obtained from samples of burned wood recovered from the midden at Carrizal yielded uncorrected dates of between 4390 ± 110 and 4690 ± 120 B.P. Calibration of these dates suggests ranges of dates in the period around 3000 to 3500 B.C. (see Table 1). Although none of the dates come from the uppermost strata of the site, the range of dates suggests a relatively brief occupation with substantial midden accumulation occurring probably within a period of somewhere between approximately 500 to 800 years at this section of the site. Even if this time period is being underestimated, it seems apparent that midden ac-

![Figure 8. Surface profile across domestic terraces.](image-url)
cumulation in this section of Carrizal took place between roughly 3000 and 4000 B.C.

The single radiocarbon date of 3640 ± 100 B.P. from the upper portions of the domestic terrace that was tested is considerably later than the dates obtained from the midden. This single late date is consistent with the two dates obtained from the upper portions of a residential terrace at the nearby site of Kilometer 4 (Wise et al. 1994). Ongoing excavations at Kilometer 4 are demonstrating that the domestic terraces there were constructed and used beginning around 3000 to 4000 B.C. and that they continued to be used until approximately 2000 B.C. Although further excavations and dat-

ing of the terraces at Carrizal would be necessary to define fully the sequence of occupation of this portion of the site, analogy with Kilometer 4 suggests that these terraces may have been constructed on the hill slopes at the same time as the shell midden was being accumulated at the base of the hill.

ARTIFACTS

Artifacts were not commonly found in the excavations of the Preceramic shell midden at Carrizal. The few that were found tended to be heavily used, broken, and/or burned. Only a very small fraction
of the pieces were recognizable types, but they do show some similarity to artifacts found at other Archaic period sites on the south-central Andean coast, and their analysis provides some preliminary data on production and use of tools at Carrizal. Most of the artifacts found consisted of stone tools and debris made by both chipping and grinding. More detailed descriptions of artifacts and debris are found in Wise (1990).

Chipped Stone

Fifty-one chipped stone artifacts were collected, including 13 retouched flakes, 15 unifaces, 16 bifaces, 1 small drill fragment, and 6 cores. Of the artifacts other than the cores, 17 (38 percent) were whole, while 28 (62 percent) were broken, and almost all showed evidence of having been burned.

The forms of the chipped stone bifaces mostly correspond to morphological types that can be identified from the published literature on the Archaic period in the south-central Andes (see Bird 1943). Projectile points were found, including point fragments (Figure 10a) and fragments of projectile points with indented bases (Figure 10b and c) such as are known throughout the Andes during and after the Archaic period. Such points are known from the Toquepala Caves (Ravines 1972), as well as from the upper Osmore area (Aldenderfer 1989). In addition, two medium-sized (4.2 cm and 4.53 cm) elongate points (Figure 10d and e) are similar to a variety of local and regional Archaic points (see Bird 1943; Muñoz et al. 1993; Muñoz and Chacama 1982; Schiappacasse and Niemeyer 1984). Other bifaces of interest included one whole (Figure 10f) and one fragmentary circular biface and a very rough large biface. Five of the 16 bifaces had been reworked.

The few unifacial artifacts were rough tools without fine retouching, and they were similar to artifacts found at the nearby sites of Kilometer 4 and Villa del Mar. Three scrapers with three or more projections were found, and two cobble cortex tools (see Sandweiss et al. 1989) were identified.

The chipped stone debris consisted mostly of small flakes and broken flakes from later stages of chipped stone reduction (i.e., secondary and tertiary flakes). Seventy-three percent of the debris was under 2 cm in maximum dimension, and most of the debris consisted of small flakes or broken flakes (74 percent of the debris is from one of these categories). Material quality, assessed on the basis of grain size and presence of visible inclusions, was almost all (92 percent) coded as fair. Five percent of the pieces were of good quality material and 3 percent were poor quality, with large grain size and/or inclusions. Very little of the debris came from the early stages of reduction, 89 percent of the material contained no cortex, and most of the rest had only small patches of cortex.

The condition of the chipped stone tools suggests that the shell midden area was used primarily for the disposal of chipped stone tools that had been used, often reworked, and often broken. The presence of only small amounts of chipped stone debris, mostly from later stages of manufacture or reworking of tools, indicates that there was little, if any, primary production of chipped stone conducted at the shell midden site. This is consistent with our observations of most of the shell midden area, which contains food remains and debris, indicating that the area was used primarily for discard.

Ground Stone

The ground stone assemblage constitutes the only set of tools that may have been used in the shell midden area. The assemblage consisted almost entirely of tools that can best be described as multipurpose manos. Nineteen ground stone tools and three pigmented stones on which working could not be identified positively were recovered in excavations at Carrizal. These tools were variable in shape and size, but they tended to be round to ovate objects with more than one use surface. There were no large grinding stones that could be classified as metates or batanes. On three occasions, two or more pieces were found in association with one another in areas that were in no other way remarkable. These areas showed no evidence of prepared or used surfaces.
or of other concentrations of artifacts or of particular kinds, sizes, or amounts of food remains. A number of the heavy stone objects had pigment on them. Five of the pieces had red pigment on them, and one piece had traces of purple pigment of the kind emitted by *Conchalepas conchalepas* (Bruguière 1792, *syn. peruvianus* Lamarck 1801), a local gastropod (Marinovich 1973).

The ground stone artifacts are almost all heavily used in a variety of ways. Twelve of the pieces (63 percent) are whole, whereas seven (37 percent) are broken. Nine of the pieces show evidence of being intentionally shaped by pecking, whereas 10 of the artifacts indicate use but no purposeful modification. Almost all of the artifacts had more than one use face, and a total of 64 use surfaces were recorded for the 19 tools. Forty-eight of the use faces (75 percent) had been battered or pounded, 12 (19 percent) were ground, and 4 (6 percent) were pigmented only. The use surfaces generally showed moderate to heavy use. Of the 60 use surfaces (excluding the 4 pigmented surfaces), 15 (25 percent) showed light use, 27 (45 percent) had moderate use, and 18 (30 percent) were heavily used.

Almost all the pieces demonstrated a predominance of use surfaces used for battering and pounding, which suggests breaking or cracking activities. These motions are consistent with uses such as cracking nuts, opening shellfish, and lithic manufacture. Given the context of the artifacts and their association with shells, as well as the general lack of lichen materials or plant materials, I suggest that the ground stone tools recovered at Carrizal may represent a heavy stone technology oriented largely toward the processing of shellfish and possibly hide working.

Three unmodified stones that had red pigment on them were recovered from Carrizal. One of these stones was a small ovoid cobble suitable for use as a mano or hammerstone, but had been unused. The other two stones are irregular pieces that are nearly half covered with red pigment. These rocks were found in midden contexts with no unusual associations and little to distinguish them from other larger stones except for the pigment. Ground stone artifacts with red pigment on them are reported by Engel (1963) from the central Andean coast but have been little discussed in the published literature of the south-central Andes.

There were four other stone artifacts recovered from the shell midden. These are apparent weights for fishhooks or nets (Figure 11), including a small oblong-shaped stone artifact, which was made from granular dark blue-gray igneous rock and appears to have been manufactured by grinding and polishing (Figure 11a); a fragment of an oblong-shaped stone object with a small groove encircling approximately three-quarters of the circumference (Figure 11b); and a small curved-shaped stone object, which was made from a granular stone and appears to be a portion of a composite fishhook in an early stage of manufacture. There was also a small, irregular stone ball with a diameter of approximately 2 cm. It is made of a fine-grained igneous rock.

Three fragments of bone artifacts were recovered from screens and identified in the field. Several others were found during the course of faunal analysis, but these have yet to be described. The artifacts analyzed include a small bone awl and two very small fragments of worked bone that may be bone bead fragments.

The general scarcity of artifacts in the midden area and their poor condition suggest that this area of the Carrizal site was used primarily for the processing of shellfish and for disposal of kitchen debris and some other items. The tools found are representative of Late Archaic assemblages seen in northern Chile (see Llagostera 1989), but they add little to our understanding of Late Archaic technology or activities. It is interesting to note that the contents of the midden suggest that it was a segregated area of the site which was not used for many domestic activities but was primarily for the processing of shellfish and for disposal. Clearly, interpretations must be considered tentative due to the small area excavated and to the very small sample of artifacts recovered.

![Figure 11. Small ground stone fishing weights.](image)

**CARRIZAL AND THE LATE ARCHAIC PERIOD OCCUPATION OF THE SOUTH CENTRAL ANDEAN COAST**

The surface indications at Carrizal suggest that the site represents a small village characterized by a domestic area containing some form of structures located on terraces, adjacent to a segregated midden area separated slightly from the area of habitation. Our limited excavations and the few dates obtained from the site did not confirm the contemporaneity of the domestic terraces and the shell midden below, but even our limited research at Carrizal provides important new data on Late Archaic period settlements on the south-central Andean coast. Domestic terraces placed on the side of the hill are now documented from three Late Archaic period sites on the south-central Andean coast: Kilometer...
4 (Wise et al. 1994), Quiani 9 (Muñoz and Chacama 1982), and Carrizal.

Domestic terraces clearly represent a different type of structure from those seen at the Early to Middle Archaic period sites of Acha-2 (Muñoz 1981; Muñoz et al. 1993; Muñoz and Chacama 1982), Camarones-14 (Schiappacasse and Niemeyer 1984), and Villa del Mar (Wise 1995). At these earlier sites, domestic features are found in midden areas, with burials and small cemeteries located in the same areas. The Late Archaic period terrace structures of the south-central Andes, although they remain to be fully defined through excavations, also differ from contemporaneous structures known from the central coast (see Engel 1980, 1991; Malpass and Stothert 1992).

The pattern of domestic features at Carrizal and of other Late Archaic period sites on the south-central Andean coast indicates that there was a shift in settlement sometime in the Late Archaic period. While much more research is necessary to understand the site structure, organization, sequence, and seasonality of Late Archaic period sites in the Andes, these sites are qualitatively different than earlier sites. The sites of Acha-2, Camarones-14, and Villa del Mar contain relatively light midden deposits accumulated over periods of from 1,000 to several thousand years. Carrizal, like Kilometer 4, contains thick and dense midden material that accumulated rapidly, perhaps 1-m thick over 20 to 30 m² in just a few hundred years. Carrizal, Kilometer 4, and Quiani contain the remains of domestic structures located on terraces, which are located on hill slopes above midden areas. Finally, Quiani and Kilometer 4 contain separate cemeteries, indicating that space was segregated as well for the disposal of the dead. Further field research would be required at Carrizal to determine whether separate cemeteries dating to the Archaic period exist there as well.

It is well known that Late Archaic period cultural developments in the south-central Andes differ from trends seen on the central Andean coast (see Moseley 1975; Moseley and Feldman 1988; Nuñez 1983, 1989; Llagostera 1989). Although the sample of documented domestic sites of the Archaic period is small and our research at Carrizal was limited to small excavations, the observations and comparisons we can now make suggest that cultural developments along the south-central Andean coast may parallel, in many ways, the changes in Archaic period settlement and subsistence observed in many parts of North America (see Matson and Coupland 1995; Phillips and Brown 1983; Price and Brown 1985), where sedentary life developed during the Archaic period. Investigation of the sequence, seasonality, site structure, and other aspects of Archaic period sites along the south-central Andean coast will be necessary to confirm that sedentary life in small permanent or semi-permanent villages developed during the Late Archaic period, but the evidence to date suggests that the sites of Carrizal, Kilometer 4, and Quiani 9 may represent such villages.

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