Late Ceramics from Pucara, Peru

An Indicator of Changing Site Function

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In the southern reaches of the Peruvian Andes lies a high, spacious plateau within the northern Lake Titicaca Basin (see map, p. 3). It is characterized by rolling topography of moderate relief, high altitude, and harsh climate: in general, it is dry and cold during the entire year, with rains exclusively in the months of October to March. It is within this environmental setting that a number of complex highland cultures developed.

The archaeological site of Pucara, located along a major river valley of the northern Titicaca Basin, served as an important center for the region during several prehistoric periods. These include the late pre-Inca period, beginning about A.D. 1100, as well as the period of Inca domination. Although the Incas began to expand in the area of Cuzco in 1438, the centers of the northwestern Lake Titicaca Basin, including Pucara, were not incorporated into the Inca Empire until 1463. This area remained an important outlying province of the Inca Empire until the Spanish conquest (the Late Horizon, A.D. 1476-1532; see chronological chart, p. 2).

Examination of the material excavated by Alfred Kidder II at the site of Pucara (1939) provides an opportunity for investigating the changing status and function of the settlement before and after the Inca incursion. This article views these changes through an analysis of the ceramic assemblage, including ceramic technology, vessel shape, and use. Hypotheses or models derived from these data can then be tested using other archaeological data and, in this case, ethnohistorical sources.

Briefly, ceramic evidence suggests that prior to Inca expansion into the area, Pucara was a large local center that functioned importantly within a larger political struc-
Although the Collao, Inca, and related style pottery recovered by Kidder and others from various sites (such as the fill of earlier structures), its analysis augments our knowledge about changing ceramic technology and site function during later periods.

The Collao: Late Pre-Inca Occupants of Pucara

Around A.D. 1100, several important political and/or ethnic groups flourished in the Titicaca Basin of Peru and Bolivia, some of these have been characterized as "chiefdoms" or "kingdoms." The writing of historical chronicles by chroniclers Pedro de Cieza de Leon (1589) and Garcilaso de la Cueva (1609) frequently mention the Collao and the Lurinaca, centered on the western shores of Lake Titicaca, as being rivals and perhaps the most powerful of all the other political groups during the Inca domination of the area. Archaeologists have proposed that these same political groupings, although perhaps with different boundaries, also existed in immediately late pre-Inca times.

Pucara may have been one of several regional centers that existed in the region and may have had a sizable population. The abundance of Collao-style pottery in at least two areas of the site and on the adjacent fortified summit supports this assumption. Collao pottery found in the area of Excavation IV is primarily utilitarian and may be associated with residential architecture; the majority of the sherds represent one- or two-handled jars, and in some cases these vessels are blackened on the exterior possibly from use in a cooking fire.

While none of Kidder's excavations revealed any architecture that could be associated with a stonework of the area, recent work has shown that some of the earlier Pucara structures in the Titicaca area appear to have been reoccupied and modified by the Collao phase structures in the southern portion of the Titicaca (Paredes 1995:38) or later. The frequency distribution of pottery from Kidder's excavations (Fig.

1) leads us to argue that the Collao phase structures in the Titicaca area (as revealed in Excavations V and VI), as well as the adjacent plain below (Excavation IV), were used intensively by people who had Collao-style pottery.

Furthermore, according to ethnohistorical sources, a fortification was built on one of the smaller peaks to the south of the Titicaca area at Pucara, and this has been verified archaeologically. The fortified summit, called Incaencache de Pucara, appears to have been constructed by the Collao people to resist the Inca during the rebellion of A.D. 1471, over which the Inca ruler Topa Inca Yupanqui was victorious (Rowe 1945:66-71; see Niles, this issue, Table 1).

Some evidence for the economy of Pucara during the Collao period is provided by several ceramic spindle whorls (Fig. 4). These have been identified as Collao in date based primarily on the strong similarities of their pastes to Collao vessels; their form also resembles spindle whorls found in late pre-Inca contexts elsewhere (Tschopik 1949:Fig. 30). A whorl is the weight attached to the bottom of a spindle that functions to keep it rotating during the spinning of yarn or thread. The presence of whorls in an archaeological context is usually taken as an indication of the presence of textile weaving.

In the southern highlands of Peru the appearance in the archaeological record of clay artifacts that have been shaped and fired specifically for use as spindle whorls may mark the beginnings of specialization in the production of the spindles and whorls, and may also imply specialization in spinning and textile production (Sergio Chavez, pers. comm. 1994). Earlier cultures in the area used ceramic vessel fragments or modified or reworked spindle whorls and therefore were not manufacturing a special purpose tool. It is possible, however, that earlier intentionally manufactured spindle whorls of wood could have been used but not preserved; whorls of stone as well as bone have also been found in possible Late Horizon contexts in the Titicaca Basin (Tschopik 1946:44). Today in the southern highlands of Peru both the spindles and the whorls are manufactured entirely of wood (Chavez 1997:599, 604).

We know that a major focus of Titicaca Basin economies were the immense herds of llamas and alpacas, and the vast grasslands these provided ideal pasturage. Not only were they a source of meat, fuel, hides, and transport (llamas), but their wool was also highly valued. Cloth in Andean society was a valuable commodity, and specialization in spinning and textile production using camelid wool may have been developed during late pre-Inca times. Later, during Inca times, cloth was provided to the government through mita's obligations (taxes in the form of labor) supervised by the local chiefs.

The Collao Ceramic Style

Collao pottery was initially classified and described in 1941 by members of Project 7 of the Research Projects in Latin America of the Institute of Andean Research (Tschopik 1946; also see Kidder biography, this issue). Based on this research, the distribution of Collao-style ceramics (Tschopik's Collao Phase I) and the development of andesite (collao ware) is confined primarily to the Pucara-Ramis river system, the Huancamé river system, and the area of Jilaca and Puno (Fig. 5). Examples may also have been found in the southwestern part of Lake Titicaca. While the distribution of this ceramic style within the Titicaca Basin may be somewhat extensive, archaeological surveys in other areas of the basin have failed to document its extent precisely.

36a. Collao-style beakers or tumblers, one-handed jars, and deep bowls (Peabody Museum collection, Harvard University). These are the most common vessel forms in Collao-style pottery. (Peabody Museum collection, Harvard University.)
Collao-style pottery is very distinctive in vessel shape, decoration, and paste from other common ceramic styles at the site of Pucara (Figs. 2, 3). The three most common vessel shapes are a beaker or vessel similar to a one-handled jar, and a deep bowl. Decorative motifs exclusively used black painted lines and survived designs on the exterior of beakers and on the interior of bowls. Although the jars are incompletely decorated, they appear not to have been decorated, and our evidence suggests that they likely have not had one handle. The excavating of Collao pottery exhibits lines of uneven density and irregular margins that in some cases show the paint to have dripped. Designs are in matte black on a red slipped or, more commonly, a yellow slipped background. On many of the sherds the edges of the black lines are blurred and the paint does not cover the inclusions in the paste. It either was applied very thinly or eroded easily because on many of the sherds the black paint takes on the color of the background and thus ranges in color from brown to pink. In many of the sherds the paint will be removed if anything harder than one's finger is used to clean the surface. It is usually necessary to hold the ceramic fragment under direct light to delineate the entire design.

Collao-style ceramics have been largely ignored because of their appearance. Aesthetically, they do not appear equal to either the preceding Collao-style or the later Inca ceramics. Unfortunately, archaeologists have equated aesthetics with technology and thus why the Pucara assemblage would argue that this has led to the assumption that Collao ceramics are also technologically inferior. The present study was begun in order to describe more completely this local ceramic tradition, to explain Collao ceramic technology, and to illustrate the skill and standardization employed in its manufacture. By ceramic technology I mean the culturally dictated methods of ceramic production, including the physical characteristics of the vessel such as its original firing temperature of the paste, paste composition, and vessel form. The notation of "collao" refers to the mixture of clay, its natural impurities, and added temper used in manufacturing pottery.

With the assistance of Dr. Kwong Chyi, geologist in the Department of Geology at Harvard University, the Collao style ceramics from the site of Pucara and several other sites to the north-western Titicaca Basin were examined. Specimens from each site were placed in separate plastic bags and processed through a graphic examination, x-ray powder diffraction (XPD), and differential thermal analysis (DTA). Although each method is valuable by itself, it is often necessary to combine the information of these three techniques as a means of verification.

Petrographic analysis requires thin sections of the pottery to be made for examination under a petrological microscope with reflected light. Thin sections were cut parallel to the wall of the pottery sherds and hand finished to 30 microns in thickness. By examining the pastes in this manner, visible non-clay inclusions imbedded within the paste can be identified; the purpose of this method in archaeological studies is to identify the various mineral inclusions on the basis of their sizes, shapes, and distribution of the inclusions. The identification of various minerals can be used to establish their source and location of manufacture where possible, how much of the material was added intentionally by the potters, and the way in which the paste was formed.

Clay minerals cannot be identified in this way because they are too fine-grained to be observed. The clay mineralogy of the ceramic paste is studied by x-ray powder diffraction (XPD) and differential thermal analysis (DTA). In both cases the x-ray powder diffraction is the most common technique for identifying the common clays used in ceramic production. The procedure involves breaking off a small fragment of the specimen and crushing it using a mortar and pestle, then separating the clay from any inclusions through a sieve or by suspension settling, and finally mounting the clay on glass slides. The sample is scanned on an X-ray Powder Diffractometer and bombardied with monoenergetic x-rays, which diffract the x-rays in a pattern depending on the crystal structure present. This chief limitation in ceramic studies, however, is that the crystalline structure of clays is commonly destroyed during high-temperature firing and therefore cannot be identified. Identification of fired pottery clay is possible if the vessel was not heated long enough to decompose the clay minerals completely; in fact, if the firing was not long enough to cause destruction of the clay structure, reheating a fired pottery sherd may cause crystals to melt with time.

Differential thermal analysis determines the crystalline structure of the crystalline structure of the various clay minerals is determined. Each of the common clay minerals has a specific known DTA pattern that characterizes its structure. By comparing the known DTA pattern of the clay with those from the samples of the Titicaca Basin, we are able to identify which clay minerals were present in the sherd. This method is sensitive enough to detect even tiny traces of crystal inclusions.

Technological Continuity and Change

Our research indicates that a major and widespread technological change in ceramic production clearly occurred at Pucara after the Early Intermediate (Pucara) period, although the social mechanisms that effected this innovation have yet to be fully assessed. This change is clearly demonstrated when we compare the paste of the late pre-Inca Collao style with that preceding Pucara-style ceramics. Our investigations also show a strong continuity of the late pre-Inca local ceramic technology into the period of Inca control, with local products coexisting alongside the Incas state-influenced craft production.

The paste of the finely decorated Collao-style ceramics was composed of weathered field-spar fragments, some intrusive igneous rocks, and various amounts of ferromagnesium minerals (Chávez 1977:1007). The paste inclusions are consistently small in size; the average inclusions diameter is less than 1 mm. As in Collao-style ceramics, the clay is a highly oxidized orange-red in color. The Inca Presence at Pucara

Archaeological and ethnohistorical data suggest that Pucara functioned as an Inca tambu (Nakanadaki 1978:78), one of a series of state lodgings situated at intervals along the Inca road system to provide government travelers with shelter and food. The Inca road system within the Titicaca Basin is relatively well documented in the writings of Pedro de Cieza de León and Felipe Guaman Poma de Ayala. Guaman Poma's tambu list places Pucara (a tambu real or royal tambu) along the Inca road (1500-1000), and Cieza de León mentions Pucara as being located along the southern highland branch of the highway (1559: Part II, Chapter 64, p. 277). A royal tambu appears to have housed the best-furnished storerooms and possessed shelters of considerable size in comparison to the more common tambus (Rowe 1940:231).

The archaeological evidence substantiating that Pucara was a large
Inca tambos or some other kind of important Inca center comes from recent excavations at Enclosure 3 (Sector BA), directly to the north of Enclosure 2. Habitation architecture and Inca-related ceramic styles of probable late pre-Inca/Inca date have been exposed (Paredes 1985:22) within Enclosure 3, and virtually all of the Inca-style ceramics from the site, whether collected by the survey team or from Pucará or recovered through excavation, came from this area. If Pucará's function within the Inca empire was solely as a royal Inca tambo, evidence for a more substantial, permanent Inca occupation at Pucará should not be present. Kidder himself felt that the small quantity of Inca pottery, Inca cultural remains indicated that no permanent settlement of Inca soldiers or officials from Cuzco was located at Pucará (1943:8, n. 16). Instead, the settlement of Inca soldiers appears to have been located at Siclllantla, an Inca fortified site on the summit of Llallatun about 40 km south of Pucará (Price 1982:77-74). In their 1471 revolt against the Inca, the Colla had fortified this summit, but the Inca destroyed the fort and built their own garrison there.

Two kinds of ceramic evidence from Pucará also reflect the existence of different degrees of association between the site and the Inca crown and the Inca government: the presence of imitation Cuzco-Inca vessels and variation in the diversity of Cuzco style pastes, and the occurrence of Inca-influenced pottery having the traditional Cuzco style. Inca provincial ceramics found at Pucará show considerable diversity in their paste composition. To date, 11 different paste groupings have been identified from only 37 ceramic fragments. The diversity of Cuzco-Inca pastes may reflect governmental travel from different regions transporting various goods in imitation Cuzco style containers.

In order to determine the origins of these imitation Cuzco-Inca style vessels, we need to know more about the Cuzco-Inca style of Cuzco itself, the imperial capital. We observe that the large Inca-style jars from Pucará imports produced in or near Cuzco under direct supervision of the government, or were they produced in the Titicaca Basin by local potters who copied or were made to copy the Cuzco-Inca ceramic style as well as design elements and paste? At other state-controlled Inca sites, the imitation of Cuzco ceramics has suggested to researchers some degree of state supervision of pottery manufacture and, therefore, a ceramic assemblage identified with the state (Morrin and Thompson 1985:78-80).

The second line of evidence seems to show some degree of independence from local populations of the Inca. Some of the suite of rock inclusion characteristics of Colla-style pottery that was used by the earlier local occupants continued to be employed during the Inca domination of Pucará, as shown by stylistic similarities of the sherds with this paste. Apparently potters of the region continued potter manufacture using the traditional resources while at the same time incorporating elements of Inca style such as rim and shoulder mounds. In fact, this same paste technology may still be in use today at important towns of Pucará, a well-known ceramic producing center (S. Chávez, pers. comm. 1994).

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