

Late Ceramics from Pucara, Peru

An Indicator of Changing Site Function

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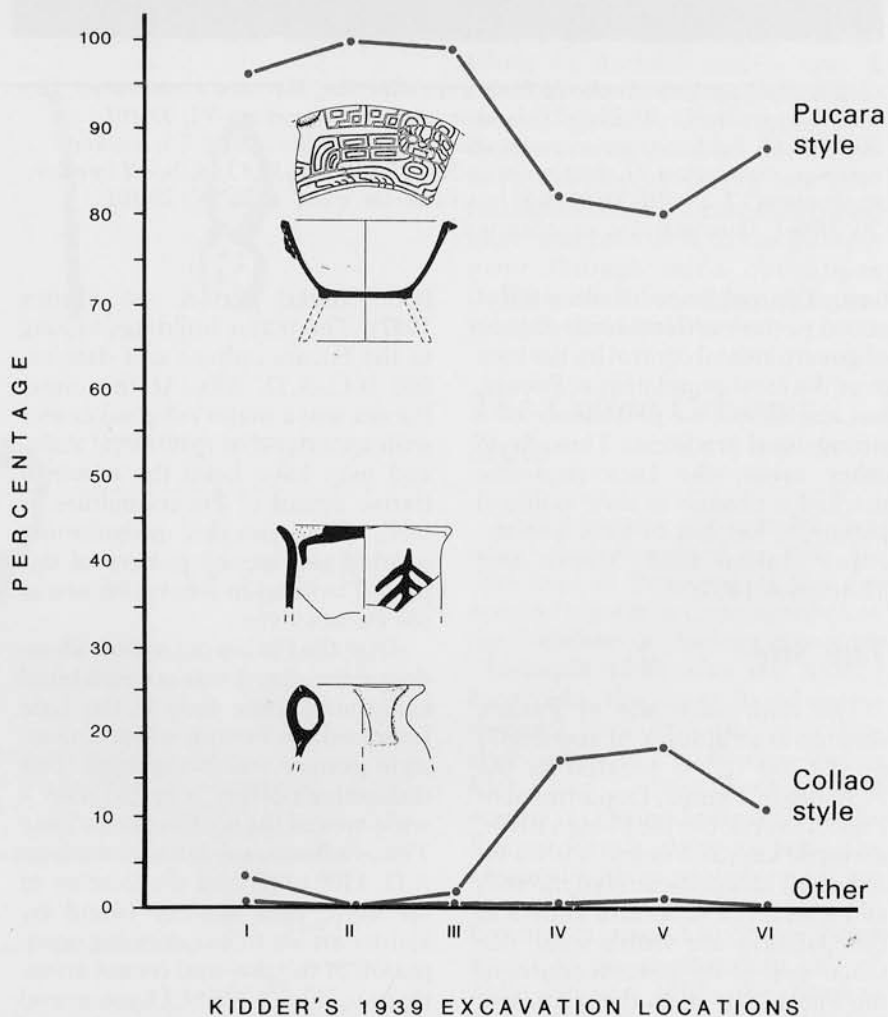
In the southern reaches of the Peruvian Andes lies a high, spacious plateau within the northern Lake Titicaca Basin (see map, p. 3). It is characterized by rolling topography of moderate relief, high altitude, and harsh climate: in general, it is dry and cold during the entire year, with rains exclusively 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 ce-

ramic 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-



1
Frequency polygon showing the ceramic composition of Kidder's excavations at Pucara, Peru. The percentages are based on tabulations from Kidder's unpublished manuscript. "Other" refers to Inca, Inca-related, and Colonial-style ceramics.



2 Collao-style pottery (Peabody Museum collection, Harvard University). Top row, l. to r.: 39-101-30/2646-21, beaker interior, excavation VI; 39-101-30/2646-16, beaker exterior, excavation VI; 39-101-30/2646-6,7,8, beaker exterior, excavation VI. Bottom row: 39-101-30/2646-12,13,14, bowl interior, excavation VI; 39-101-30/2548-3, bowl interior, excavation IV; 39-101-30/2499-1, bowl interior, excavation IV

ture. The presence of Inca-influenced pottery reflects some degree of governmental control by the Inca over the local population at Pucara, but also shows the persistence of a strong local tradition. Thus, as in other areas, the Inca presence marked a change in state political authority, but not in local bureaucracy (Julien 1983; Morris and Thompson 1985).

The Site

The impressive site of Pucara, situated at an altitude of about 3871 m (12,700 ft), is located in the Province of Lampa, Department of Puno. It overlooks the Pucara River, about 60 km (37.5 miles) northwest of Lake Titicaca. Scattered mounds and a series of structures known as the Qalasaya are visible some distance west of the present course of the Pucara River, to the southwest of the present village of Pucara (K. Chávez this issue: Fig. 8).

Excavations at the site have revealed a discontinuous sequence of occupations beginning about 1300

B.C. (Initial period; see Mujica 1987). The major buildings belong to the Pucara culture and date ca. 200 B.C.-A.D. 200. At this time, Pucara was a major religious center with an extensive residential zone, and may have been the administrative center of Pucara culture as well. The complex polychrome painted and incised pottery of this period belongs to what is known as the Pucara style.

After the Pucara occupants abandoned the site, it was not inhabited again until some time in the Late Intermediate Period, when Collao-style pottery was being used. This distinctive pottery is found over a wide area of the northwestern Lake Titicaca Basin and dates from about A.D. 1100 until Inca domination of the area. Inca pottery found by Kidder attests to a continuing occupation of the site, and recent investigations by a UNESCO-sponsored (COPESCO) project have isolated Inca construction overlying Pucara-phase structures in the southern portion of the Qalasaya (Paredes 1985:22).

Although the Collao, Inca, and related style pottery recovered by Kidder came from mixed contexts (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 autonomous political and/or ethnic groups flourished in the Titicaca Basin of Peru and Bolivia, some of these having been characterized as "chiefdoms" or "kingdoms." The writings of 16th-century Spanish chroniclers Pedro de Cieza de León (1959) and Garcí Diez de San Miguel (1964) frequently mention the Colla and the Lupaca, 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 primary regional centers that coexisted 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.

Although none of Kidder's excavations revealed any architecture that could be associated with this reoccupation of the area, recent work has shown that some of the earlier Pucara structures in the Qalasaya area appear to have been re-used and modified in the Collao period (Paredes 1985:38) or later. The frequency distribution of pottery from Kidder's excavations (Fig.

1) leads us to argue that the Qalasaya 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 ethno-historical sources, a fortification was built on one of the smaller peaks to the south of the Qalasaya area at Pucara, and this has been verified archaeologically. The fortified summit, called Incacancha de Pucara, appears to have been constructed by the Colla people to resist the Inca during the rebellion of A.D. 1471, over which the new Inca ruler Topa Inca Yupanqui was victorious (Rowe 1942:66-71; 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 similarity of their pastes to Collao vessels; their form also resembles spindle whorls found in late pre-Inca contexts elsewhere (Tschopik 1946: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.

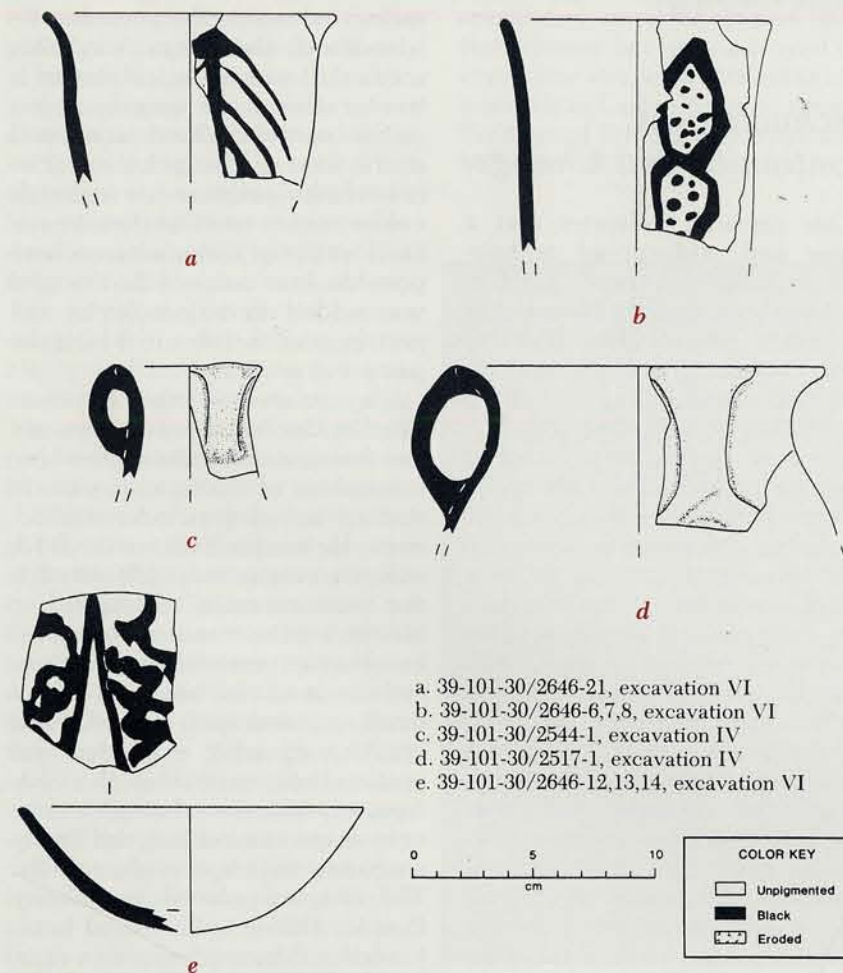
In the southern highlands of Peru the appearance in the archaeological record of clay artifacts that have been shaped and fired specifically for use as spindle whorls may mark the beginnings of specialization in the production of the spindles and whorls, and may also imply specialization in spinning and textile production (Sergio Chávez, pers.

com. 1984). Earlier cultures in the area used ceramic vessel fragments reworked or modified into 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 of 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 (Chávez 1977: 959, 964).

We know that a major focus of Titicaca Basin economies were the immense herds of llama and alpaca, and the vast grasslands there 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 developed during late pre-Inca times. Later, during Inca times, cloth was provided to the government through *mit'a* obligations (taxes in the form of labor) supervised by the local chiefs.

The Collao Ceramic Style

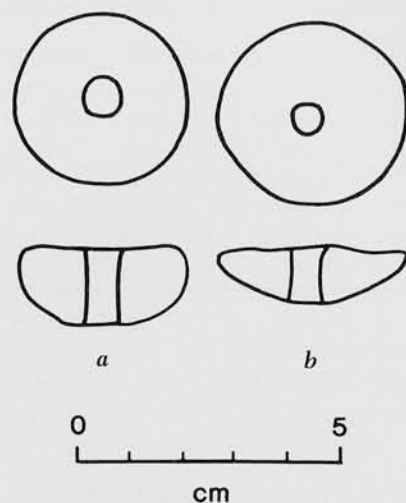
Collao pottery was initially classified and described in 1941 by members of Project 7 of the Research Projects in Latin America of the Institute of Andean Research (Tschopik 1946; also see Kidder biography, this issue). Based on this research, the distribution of Collao-style ceramics (Tschopik's Collao Plain and Collao Black-on-Red wares) is confined primarily to the Pucara-Ramis river system, the Huancané river system, and the area of Juliaca and Puno (Fig. 5). Examples may also have been found at the southeastern end of Lake Titicaca. While the distribution of this ceramic style within the Titicaca Basin may be even more extensive, archaeological surveys in other areas of the basin have failed to document its extent precisely.



3a-e Collao-style beakers or tumblers, one-handed jars, and deep bowl (Peabody Museum collection, Harvard University). These are the most common vessel forms in Collao-style pottery.

Collao-style pottery is very distinctive in vessel shape, decoration, and paste from all other ceramic styles at the site of Pucara (Figs. 2, 3). The three most common vessel shapes are a beaker or tumbler, a one-handed jar, and a deep bowl. Decoration consists exclusively of black painted linear and curvilinear designs on the exterior of beakers and on the interior of bowls. Although the jars are incomplete, they appear not to have been decorated, and our evidence shows them likely to have had one handle. The painting 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, an unslipped 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 purple. On 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 delimit the entire design.

Collao-style ceramics have largely been ignored because of their appearance. Aesthetically, they do not appear equal to either the preceding Pucara style or the later Inca ceramics. Unfortunately, archaeologists have equated aesthetics with technology, and I 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, such as original firing temperature of the vessels, paste composition, and vessel-forming techniques. Paste refers to the mixture of clay, its natural impurities, and added temper used in manufacturing pottery.



a. 39-101-30/2613-1, 16.94 grams, excavation V
b. 39-101-30/2463-1, 10.71 grams, excavation IV

4
Pottery spindle whorls from Pucara (Peabody Museum collection, Harvard University).

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 the 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 Inca state-mandated craft production.

The paste of the finely decorated Pucara-style ceramics was composed of weathered feldspar fragments, some intrusive igneous rocks, and various amounts of ferromagnesium minerals (Chávez 1977:1167). The paste inclusions are consistently small in size; the average is less than 1 mm. As in Collao-style ceramics, the clay is a highly oxidized orange-red in color.

With the assistance of Dr. Kwo-Ling Chyi, geologist in the Department of Geology at Central Michigan University, Collao-style ceramics from the site of Pucara and several other sites in the northwestern Titicaca Basin were examined. Specimens from each site were subject to testing by petrographic 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 obtained from all three techniques as a means of verification.

Petrographic analysis requires thin sections of the pottery to be made for examination under a petrological microscope. All thin sections were cut parallel to the walls 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 characterize the ceramic pastes on the basis of the kinds, sizes, and distribution of the inclusions. The identification of these raw materials 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 mixed.

Clay minerals cannot be identified in this way because they are too fine-grained; instead, the clay mineralogy of the ceramic paste is studied by x-ray powder diffraction. In conjunction with DTA analysis, 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 from the sherd 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 placed in an X-ray Powder Diffractometer and bombarded with monochromatic x-rays, which diffract at different angles depending on the clay crystals present. Its 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 high or long enough to decompose the clay minerals completely; in fact, if the firing temperature was only slightly higher than that needed to cause destruction of the clay structure, rehydration which restores the crystals might occur with time.

Differential thermal analysis determines the temperature at which the crystalline structure of the various clay minerals is destroyed. Each of the common clays has a specific known DTA pattern that characterizes its structure. By comparing the known clay mineralogy of Collao pastes to the established DTA patterns, the temperature to which the pottery was originally fired can be inferred.

Petrographic observations by Chyi show that the paste of Collao pottery is composed predominantly of subangular soft white fragments and hard gray ones, such as are observable on the surface of the ceramics in Figure 2, as well as less abundant red subrounded chunks. She identified these major inclusions as talc schist, phyllite, and magnetite/hematite, respectively. The large size of the inclusions, ranging from 1-3 mm, and the highly oxidized orange-red clay are diagnostic of this ceramic style. There seems to be no doubt that the phyllite and talc schist were added intentionally to the clay as temper.

This suite of rock inclusions that characterizes the Collao-style paste at the site of Pucara was very similar to that of the Collao ceramics we examined from other sites in the northwestern Titicaca Basin, from Ayaviri in the north to Saman in the south (Fig. 5), despite their separation by 80 km (50 miles). Chyi's observations of five thin sections from four sites clearly demonstrated this conclusion.

X-ray powder diffraction patterns of several samples of Collao pastes has led Chyi to indicate that they were composed predominantly of illite clay. Confirmation of a firing temperature below 900-1000° C. is provided by the x-ray diffraction pattern of illite and

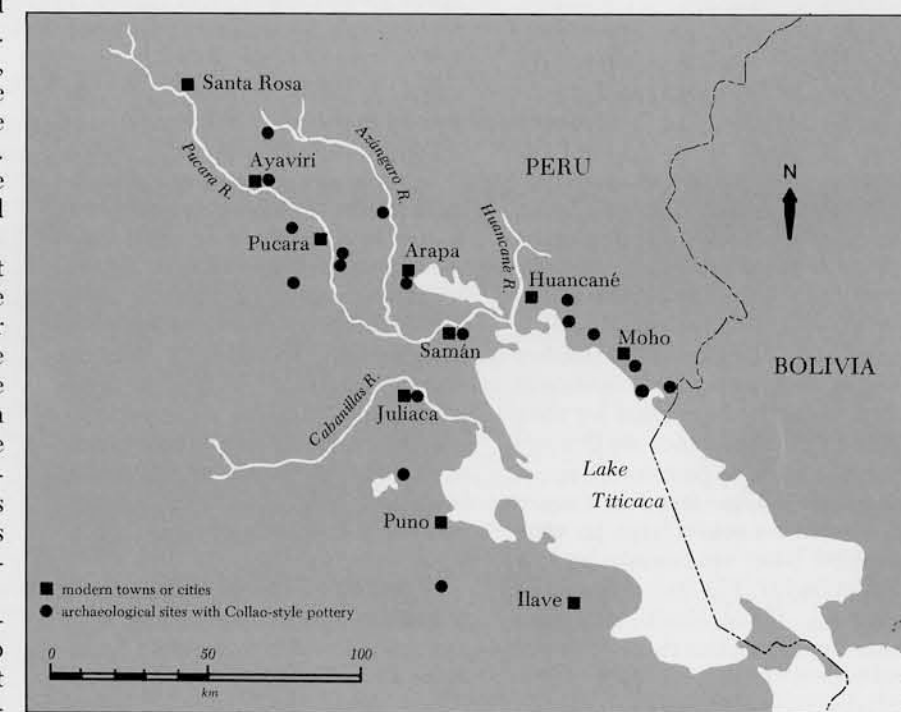
DTA studies. According to published DTA studies (Grim 1968) the structure of illite clays is not destroyed until at least 900° C. The preserved illite structure of the clay samples from Collao vessels further suggests that the vessels were not fired high or long enough to decompose the clay minerals completely and, therefore, the original firing temperature of Collao vessels appears to have been below 900° C.

In order to confirm the upper limits of the original firing temperature, firing experiments were conducted on two raw illite clay samples from the same general area of the northwestern Titicaca Basin, an illite standard, and three clay samples from Collao pottery. At 750° C. the structure of illite in all three groups of samples was maintained; however, at 1000° C. decomposition or a complete breakdown of the mineral structure of all three types of samples occurred. In conclusion, since the original firing temperature has not destroyed the crystalline structure of the illite clay minerals in Collao ceramic vessels, the original firing temperature must be below 900-1000° C.

The Inca Presence at Pucara

Archaeological and ethnohistorical data suggest that Pucara functioned as an Inca *tambo* (Nakanakari 1978:789), 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 Guamán Poma de Ayala. Guamán Poma's *tambo* list places Pucara (a *tambo rreal* or royal *tambo*) along the Inca road (1980:1006), and Cieza de León mentions Pucara as being located along the southern highland branch of the highway (1959: Part II, chapter 94, p. 277). A royal *tambo* appears to have housed the best-furnished storehouses and possessed shelters of considerable size in comparison to the more common *tambos* (Rowe 1946:231).

The archaeological evidence substantiating that Pucara was a large

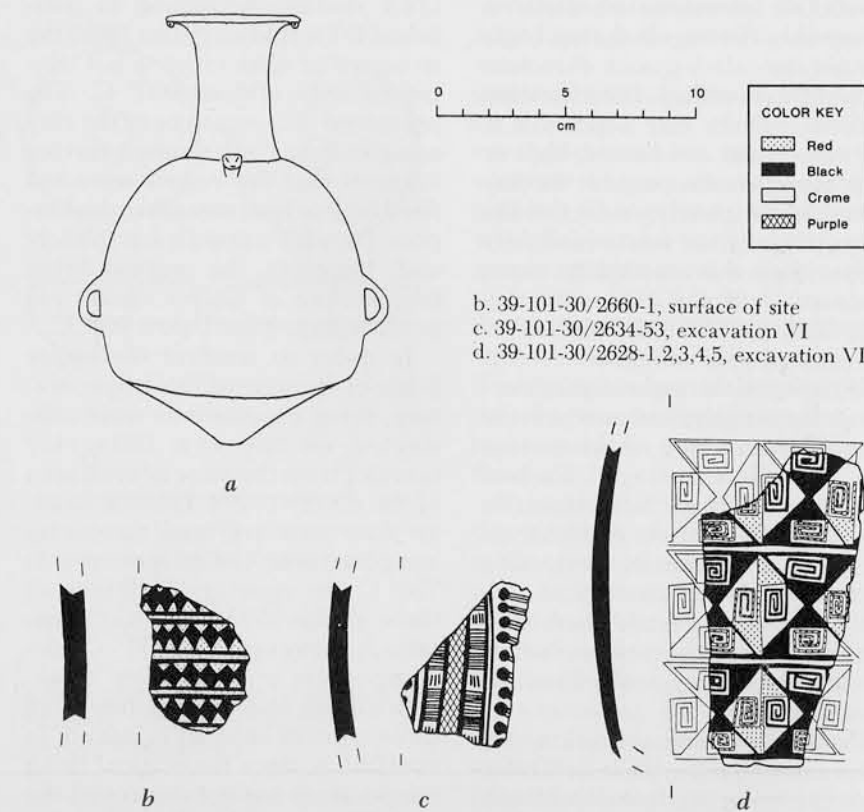


5
Map showing the distribution of Collao-style pottery in the Lake Titicaca Basin. (After Tschoepik 1946:Fig. 1, Table 4)

Inca tambo 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 ceramics of probable late pre-Inca/Inca date have been exposed (Paredes 1985:38) within Enclosure 3, and virtually all of the Inca-style ceramics from the site, whether collected by Kidder from the surface of Pucara or recovered through excavation, came from this area.

If Pucara's function within the Inca empire was solely as a royal Inca tambo, evidence for a more substantial, permanent Inca occupation at Pucara should not be present. Kidder himself felt that the small quantity of Inca (non-local) cultural remains indicated that no permanent settlement of Inca soldiers or officials from Cuzco was located at Pucara (1943:8, n. 16). Instead, the settlement of Inca soldiers appears to have been located at Sicllani, an Inca fortified site on the summit of Llallahua around 8 km south of Pucara (Rowe 1942:71-74). In their 1471 revolt against the Inca, the Colla had fortified this summit, but the Incas destroyed the fort and built their own garrison there.

Two kinds of ceramic evidence from Pucara also reflect the existence of different degrees of association between the local population and the Inca government: the presence of imitation Cuzco-Inca vessels having diverse non-Collao style pastes, and the occurrence of Inca-influenced pottery having the traditional Collao paste. As at the Inca provincial center of Huánuco Pampa and Hatunqolla, the pottery vessels representing the Inca state at Pucara could be identified by their imitation of Cuzco-Inca shapes and designs. The most common Cuzco-Inca shape encountered at Pucara was a narrow-necked large jar with a pointed base, commonly known as an *aryballos* (Fig. 6a). As in many areas, the Cuzco-Inca large jar appears to have been the vessel that symbolized Inca rule and state-related activities in a region (Julien 1983:251). Typically, simple geometric patterns predominate on the large jar form, as they do here (Fig. 6b-d). At Pucara, the pastes used in



6a Representation of a narrow-necked large jar, known as an Inca *aryballos*. H. 44 inches. (University Museum object no. SA 4615)

6b-d Large jar fragments from Pucara (Peabody Museum collection, Harvard University). Such jars were characteristically decorated with simple geometric patterns.

the production of the large jars and other imitation vessels of the Cuzco-Inca style are different from the local pastes used by Pucara potters in the manufacture of their own vessel shapes. Cuzco-Inca imitation ceramics found at Pucara show considerable diversity in their paste composition. To date, 11 different paste groupings have been isolated from only 37 ceramic fragments. The diversity of Cuzco-Inca pastes may reflect governmental travelers from different regions transporting various goods in imitation Cuzco-Inca containers.

In order to determine the origins of these imitation Cuzco-Inca style jars at Pucara we need to know more about the Cuzco-Inca style of Cuzco itself, the imperial capital. Were the large Inca-style jars from Pucara imports produced in or near Cuzco under direct supervision of the government, or were they pro-

duced in the Titicaca Basin by local potters who copied or were made to copy the Cuzco-Inca ceramic shape 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 Inca state (Morris and Thompson 1985:73-80).

The second line of evidence seems to show some degree of independence of local populations from the Incas. The same suite of rock inclusions characteristic of Collao-style pottery that was used by the earlier local occupants continued to be employed during the Inca domination of Pucara, as shown by Inca stylistic influence on sherds with this paste. Apparently potters of the region continued pottery manufacture using the tradi-

tional local resources while at the same time incorporating elements of Inca shape, such as the flaring rim and shoulder nubbin. In fact, this same paste technology may still be in use today at the present town of Pucara, a well-known ceramic producing center (S. Chávez, pers. com. 1984).

Ceramics and Late Titicaca Basin Societies

The foregoing discussion has attempted to define the utilization of Pucara by two cultures through an examination of their ceramic wares. The late pre-Inca settlement of Pucara was defined by the presence of Collao pottery which is

found over a wide area of the northwestern Lake Titicaca Basin. A sizable residential population existed on the floodplain area of the site.

This preliminary analysis of Collao pottery at Pucara elucidated the technology of the ware at one large and important site, but it has also raised many questions regarding the course of ceramic development in the region as a whole. How was the technique of tempering with phyllite and talc schist introduced and how rapidly did it spread? Further research is needed to explain not only the role of phyllite and talc schist tempering, but also why such an innovation was so widely accepted. What was the extent of its distribution and where

were the chief centers of production? Does the pattern of standardized paste/temper and shapes and designs in Collao-style pottery over a large area reflect some kind of centralized control of production and distribution?

Ethnohistorical documents, Inca architecture, and imitation Cuzco-Inca style ceramics document Pucara as a state-controlled settlement in the Inca Empire. Inca expansion into the area, however, does not appear to have impacted all levels of the local Pucara culture. The population continued to identify itself with the previous local cultural tradition especially in its persistent use of the late pre-Inca ceramic technology. 2.

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