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Quishqui Puncu: A Preceramic Site in Highland Peru

Abstract. *The complete campsite industry from this early site includes crude chopping tools, microblades, and numerous scraper and projectile point types. A square-based variant of the Ayampitín point is distinctive of the earliest occupation, but the incidence and distribution of other types indicate that seasonal use persisted into agricultural and ceramic periods.*

The preceramic archeological sites of Andean South America date from at least 7500 B.C. until the widespread adoption of pottery-making during the second millennium B.C. (*1*). In the central Andes of Peru, preceramic sites occur at very high elevations (over 4000 m) and near sea level on the desert coast, but they are rarely found at intermediate elevations or in valley bottoms where intensive agriculture and dense settlement have destroyed or obscured them during the last few thousand years.

Quishqui Puncu lies at an elevation of 3040 m in a major intermontane valley (the Callejón de Huaylas) between the coastal range (the Cordillera Negra) and the Cordillera Blanca, which forms the continental divide. The Community of Vicos, in which the site is located, extends from the right bank of the Río Marcará up into a glacial valley and pass 4750 m high over the Cordillera Blanca. The Quishqui Puncu site mantles the upper terrace of the Marcará at the point where it is met by a low ridge. The ridge rises as a convenient pathway from the site to the glacial trough and pass above. During the dry summer months, hunters in the Callejón de Huaylas would surely have utilized the green upper reaches of such side valleys, which provided seasonal pasture and browse for the Andean camelids and deer hunted in preceramic times. Quishqui Puncu is ideally situated where a hunting party would leave and regain the river for a trip to the high pastures, and, furthermore, its slight eminence would provide an excellent view of the surrounding countryside and game movements.

The excavated stone tool industry, as full and varied as any collected from a central Andean site, also indicates that Quishqui Puncu was a campsite. The artifacts associated with hunting and butchering are present, but so are cobble tools, borers, and thin-edged scrapers—implements for which it is easier to construe a use in camp than at a kill site. Soil conditions are not favorable for preservation of bone, but it is unlikely that Quishqui Puncu, with its topographic advantages as a campsite, ever served as a kill or butchering station. Moreover, the excavations yielded far more stone-chipping waste than one would expect at such a site. Considerable workshop activity took place at Quishqui Puncu. Large primary flakes and cores are few, so it seems that this effort was directed mainly to production of small tools and finishing and sharpening others. Moderately fresh quartzite might sometimes have been found in the Río Marcará as cobbles, but most of the favored metamorphosed volcanics, at least, must have come in unweathered workable condition directly from the zones of contact metamorphism in the mountains. Considering the situation of the site and the nature of its stone industry, it is impossible to argue that Quishqui Puncu was primarily a quarry or workshop site, as has been done in the case of the river terrace sites of Ambo (Department of Huánuco) and those discovered by Cigliano along the Río Ampajango in northwestern Argentina (*2*).

One of the best indicators of a campsite is a predominance of projectile point bases over tip fragments. This is supposed to reflect the repair of projectiles at camp after a hunt, the basal sections accumulating at the campsite while the broken tips remain at the place where the projectiles were used. Following Quishqui Puncu's original service as a campsite, thousands of years of agricultural disturbance must have caused an unknown number of complete projectile points to be broken, yielding an equal number of bases and tips to dilute the original contrast. In spite of this, and in spite of the fact that the men found tip fragments easier to recognize than the simple notchless and stemless bases, I have cataloged only 149 tips against 232 bases.

Test pits and trenches at Quishqui Puncu were distributed over an area about 100 m deep by 200 m long, at the edge of the terrace. Surface finds did not end abruptly, except at the terrace edge, and I have been unable to exactly delimit the site, especially as it extends up the ridge and away from the river. Multiple occupation campsites are not walled cities; it is unlikely that each successive camp would exactly overlie the refuse of the camp which preceded it. Thus, it is completely expectable that the intensity of use and archeological finds resemble a shotgun pattern.

About two-thirds of Quishqui Puncu now lies in agricultural terraces, frequently surrounded by fieldstone walls and brush, thorn, and agave fences from which the site takes its name. The effects of terrace building, obvious in the stratigraphy of a large part of the site, are illustrated here in trench R (Fig. 1). Loose boulder and angular rock fill (the lowest stratum shown on the profile) directly overlies culturally sterile, yellow boulder clay. Excavators and observers easily distinguished this compact subsoil from the dark, clayless fill above. Between some rocks there were even hollow pockets which had not yet filled with dirt. Above the rock fill the deposit is progressively more compact and darker, up to the level of loose plow soil, which in trench R is about twice as deep as in most parts of the site.

It is obvious that this terrace was constructed in relatively recent times. The stratigraphic levels, although meaningful to the student of terrace building in later prehistoric horizons, do not represent the relatively slow and undisturbed buildup of debris that might be found in an ideally stratified preceramic site. Excavation in this terrace, as in some others, was concentrated at the deep, lower end where there appeared to be the best chance of finding undisturbed remnants of the original midden. None was found, although in places the texture was very fine, almost ashy, and quite midden-like. I believe it is clear that the present-day terraces are not the first alteration of the landscape as it was left by its original inhabitants.

In the lower part of Quishqui Puncu, where the land slopes much less steeply, the artifact concentration is somewhat less, but in compensation the stratigraphy is more hopeful (Fig. 1). The lowest level of reddish gritty sand in trench E is the least disturbed remnant of the original preceramic site to be disclosed by the excavations. However, it bears no resemblance to normal midden, being devoid of organic matter, burned bone, or ash and showing no signs of internal stratification. Moreover, a few intrusive potsherds of later age definitely came from this stratum. As I interpret the stratigraphy, the bands of dark reddish clay which cap this level mark the beginning of slope washing and erosion on the hillside immediately above. At first, perhaps as cultivation began, fine particles were carried down and deposited where the gradient was less. Later, as denudation progressed, the volume of water was sufficient to wash down unsorted grits and sands onto the relatively flat, lower part of Quishqui Puncu. This unsorted colluvium includes small sherds and pieces of chipped stone derived from the richer part of the site undergoing erosion above. From buried sod formations, well preserved in other stratigraphic sections, it is plain that infilling of the lower part of the site has been taking place in relatively recent times. In fact, one excavation area presented a textbook example of reversed stratigraphy: preceramic, chipped stone artifacts were most common in the upper layers, while the fill at the bottom of the terrace was made up largely of broken pottery.

Such ceramic riches, dating to a variety of later pottery phases, were at first a source of considerable confusion and even embarrassment. It might be that, in spite of typological indications, the chipped stone artifacts were not truly perceramic in context or age. The Quishqui Puncu potsherds are mostly very small, eroded, and uninformative —the kind of undistinguished fragments that occur throughout the intensively utilized, arable part of Vicos. The distribution of potsherds in the excavations was highly variable. In some pits potsherds made up less than 1 percent of the total artifactual material recovered, but the figure rose as high as 70 percent in the reversed-stratigraphy pit cited above.

Quishqui Puncu yielded a rich chipped stone industry of 94,660 pieces,

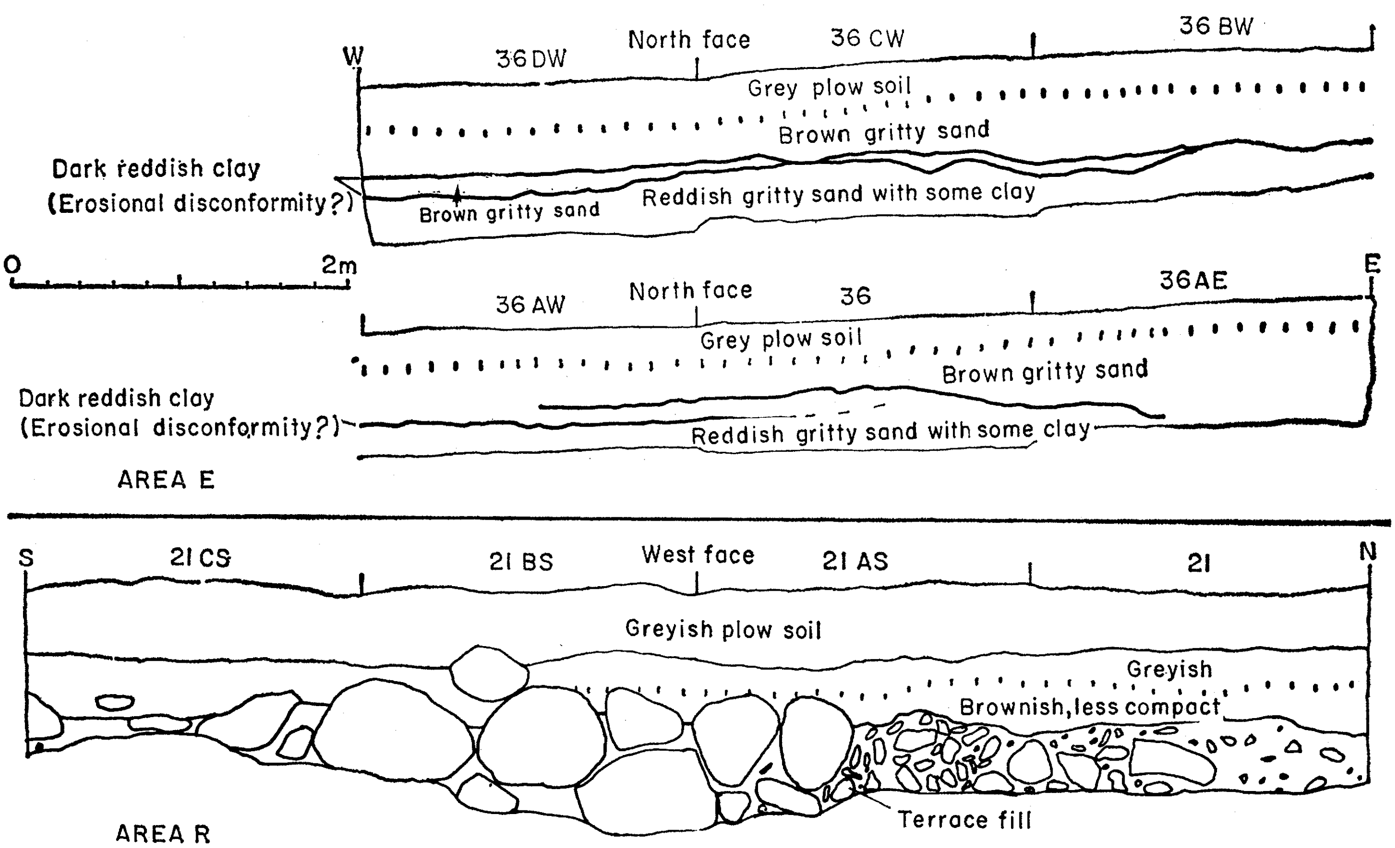

Fig. 1. Stratigraphic profiles from Excavation Area E (top) and Excavation Area R (bottom). Scale at upper left represents both horizontal and vertical distances.

including 1782 specimens which I have grouped in 66 artifact types (*3*). The distribution of types within the site has been studied in an attempt to determine which types are primarily or exclusively preceramic, or whether there is evidence at Quishqui Puncu for considering some of the preceramic types earlier than others. In the absence of undisturbed stratigraphy, the distribution of each type was compared to an "index of disturbance and contamination" based on the frequency of potsherds in each provenience unit and on stratigraphic indications of disturbance. My assumption is simply that types associated predominately with disturbed and sherd-bearing areas are likely to be later than those found randomly distributed. Although it could not be determined solely through conventional study of the stratigraphy, I decided that types associated with provenience units having the highest sherd frequencies might persist into or belong exclusively to ceramic horizons.

This analysis suggests that a square-based variant of the Ayampitín or willow leaf point, described first by González in northwestern Argentina, preceded the more common round and pointed-base forms which are better known from other Andean sites (*4*). The square-based Ayampitín variant, of which there are 118 specimens, is the most numerous point type at Quishqui Puncu (Fig. 2, a and b). The rounded-base type includes 89 examples (Fig. 2, c and d), while the usual willow leaf type has only 12 specimens (Fig. 2, e and f). A straight-based type with edges diverging from the base (reminiscent of some Angostura and Agate Basin points) is represented by 14 examples (Fig. 2g). Edge-grinding, known best from early North American fluted points, is also characteristic of these points of the Ayampitín class (Fig. 3).

There are also projectile points of a smaller size range which correspond to types known from other sites, and which are thought to span the late preceramic to early ceramic periods (that is, Lanning and Hammel's Early Lithic IV and V). These include small bipointed points, small leaf-shaped points, and stemless shouldered points of the Lauricocha III type (*1*). The numbers of specimens in the small point types, and in a few other miscellaneous types, are so small that their distributions are probably not significant.

The Quishqui Puncu industry contains 187 crudely worked bifacial knives (Fig. 2h). Knives occur relatively more frequently than projectile points in the badly disturbed areas where sherds were numerous. One interpretation of this distribution is that percussion-flaked knives remained in use longer than carefully chipped projectile points, which to some extent were replaced by ground slate points in later times.

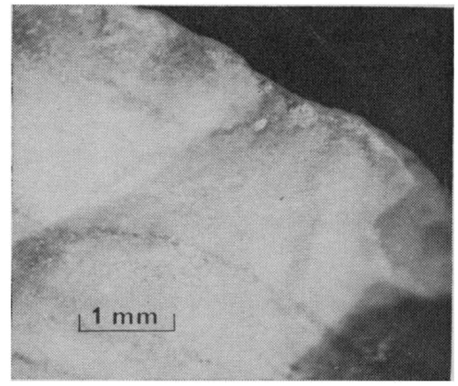

Fig. 3. Photomicrograph of the lower edge of a square-based Ayampitín point, showing edge-grinding and pressure retouch scars.

The distribution of large scraping and chopping tools confirms the widespread suspicion that "cobble tools" were in popular use in the later, ceramic periods, although such artifacts are seldom described in archeological reports. One type of heavy step-flaked scraper, always made of the same quartzite, came exclusively from pits where there were many potsherds (Fig. 2, i and j). There are 24 examples of this type. Other types of cobble choppers and scrapers have different characteristics, and they are not so consistently associated with disturbed areas.

The remaining types of chipped stone tools had more or less normal distributions, indicating that they are probably bonafide members of the preceramic industry or industries. These artifacts include bifacial disk tools, pick-like pebble tools, turtleback scrapers, snub-nosed scrapers, thin-edged scrapers, point-and-notch tools, cores, blades, microblades, a backed bladelet, and a few dubious burins or microburins. I have described and illustrated elsewhere several rock alignments which may conceivably be remains of some of the earliest known structures in America (*3*).

Judging from artifact typology, Quishqui Puncu was occupied over a period of several thousand years, probably before and during the transition to an agricultural economy. It is likely that the occupation was seasonal, and that Quishqui Puncu was a regular

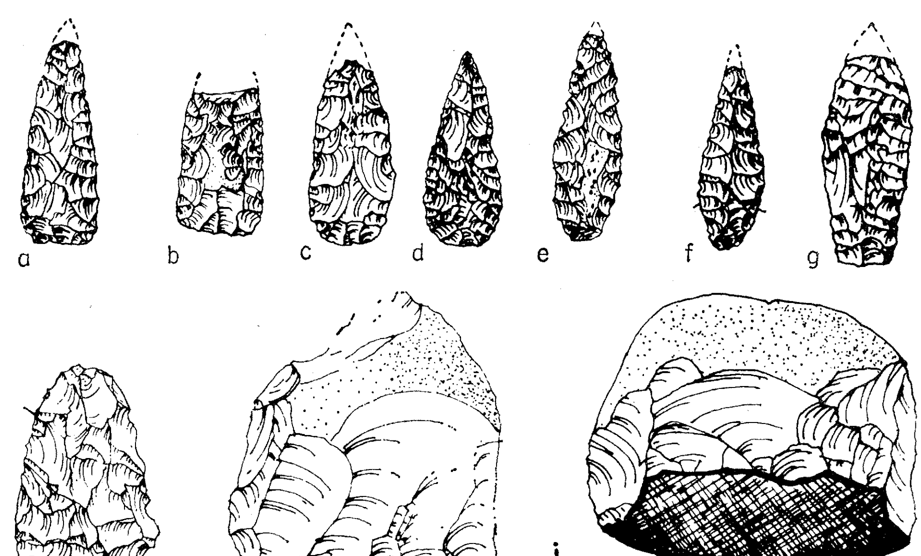

Fig. 2. Chipped stone tools from Quishqui Puncu: (a) and (b), square-based Ayampitín points; (c) and (d), rounded-base Ayampitín points; (e) and (f), pointed-base, or willow leaf Ayampitín points (edge-grinding found below projecting lines); (g), variant type with straight base and diverging edges; (h), percussion-flaked bifacial knife (edge between two projecting lines is dulled); (i) and (j), heavy step-flaked quartzite scrapers of the type found only in disturbed areas. All artifacts are drawn to the same scale, as indicated at lower right.

campsite along the route to natural pastures at even higher elevations. At different times of the year, people of the same general culture may have made use of extremely high sites such as Lauricocha, sites at moderate elevations such as Quishqui Puncu, and perhaps even coastal sites such as those found near Ancón (5). Lanning has recently stressed that the *lomas* vegetation of the desert coast comes to life only when sea fog (*garúa*) blankets the low hills from about May through November. In contrast, the season of maximum precipitation in the highlands corresponds to our winter. The seasonal variations in temperature are not great either in the highlands or on the coast, but in both zones there is marked seasonality in moisture availability and growth of vegetation. The relatively neat alternation of seasons would favor transhumance, or seasonal migrations, through the steep gradient of Andean altitudinal zones, at least until the time of really productive, settled agriculture. Seasonal movements would clearly benefit hunter-gatherers, but incipient horticulturalists (particularly of root crops) might also find transhumance attractive. Finally, whether Andean camelids are the game animals or the subjects of initial domestication, they should be expected to follow, or be improved by, seasonal changes in pasture. Andean agriculture may have its beginnings elsewhere than at the sedentary coastal midden sites where it is best documented at present.

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Seismic Delay Times: Correlation with Other Data

Abstract. *Travel-time residuals of seismic* P-*waves were expanded in spherical harmonics to determine their global variations. The expansion coefficients were correlated with similar coefficients of geopotential, variations in heat flow, and the surface topography of Earth. Although none of the correlation coefficients is very high, best values are between the seismic delay times and variations in gravitational potential and between heat flow and surface topography.*

Recently an increasing number of worldwide data have been obtained and analyzed on heat flow (*1*), gravitational potential (*2*), and more recently the delay times of seismic *P*-waves relative to a worldwide average (*3*). Variations of these quantities laterally on Earth indicate the presence of heterogeneities in Earth's crust or mantle, or in both. The nature and causes of these lateral heterogeneities, as well as the depth to which they extend, constitute an important problem in geophysics; understanding and solution of the problem require more than one set of data and a joint interpretation of various observations.

As a first step in this direction we have chosen to investigate correlation between the various sets of data. The global distribution of each set can best be expressed by spherical harmonic expansion, and the correlation coefficient can be computed by use of the harmonic coefficients. These coefficients exist for Earth's heat flow, gravitational potential, and surface topography. We now describe spherical harmonic analysis of seismic travel-time residuals.

Travel times of seismic *P*-waves from earthquakes and explosions, determined at many stations, indicate certain deviations from the standard Jeffreys-Bullen tables (*4*). Part of the anomaly is systematic, varying as a function of epicentral distance, and probably due to slight inaccuracies of the tables; part is station dependent. In other words, regardless of distance, the seismic arrivals at certain stations are consistently early; at others, consistently late. Our interest is in these deviations from the average which are controlled by crust and mantle structures under the stations.

Seismic travel times and their residuals have been extensively analyzed statistically by Herrin and Taggart (*3*), who have determined residuals at 260 primary stations. Each determination was based on at least ten events at teleseismic distances. Thus azimuthal and lateral variations were averaged, and it can be assumed that the resid-

Table 1. Spherical harmonic expansion coefficients of seismic travel-time residuals.

M	$n = 0$		$n = 1$		$n = 2$		$n = 3$	
	C_{nm}	S_{nm}	C_{nm}	S_{nm}	C_{nm}	S_{nm}	C_{nm}	S_{nm}
0	0.320	0	−0.116	0	−0.016	0	−0.049	0
1			− .266	−0.144	.090	0.099	− .364	0.005
2					− .091	.210	.185	.083
3							.115	− .127

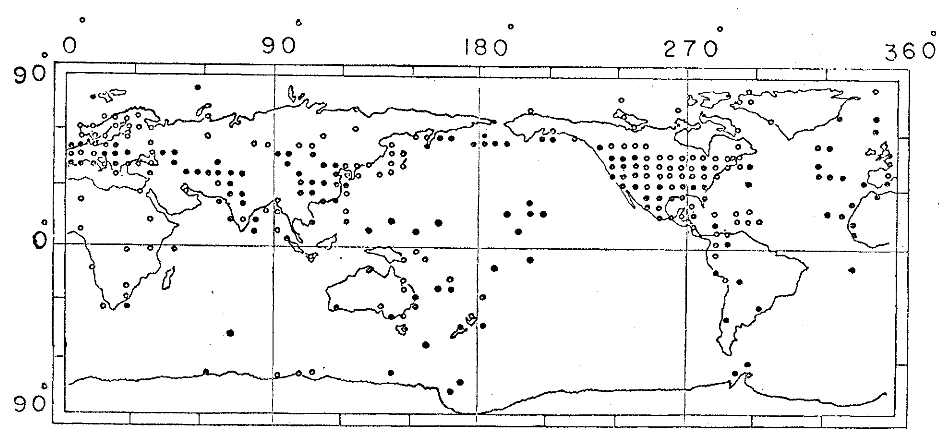

Fig. 1. Geographic distribution of data on seismic travel-time residuals after averaging over a 5° by 5° grid. Solid circles indicate positive residuals; open circles, negative.