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This presentation, although admittedly ambitious and tentative, is an attempt to shed more light on one of the basic themes of this symposium based on available archaeological data from North Peru. The research issue that underlies and unifies this paper is "Under what natural and sociocultural conditions do different modes of coast-highland interaction and resource procurement strategies emerge?"

Vertically oriented modes and strategies (linking coast and highland) have received considerable attention in recent years largely due to the influence of the ethnohistorical work of J. V. Murra. In fact, this emphasis and vogue has relegated in-depth assessment of co-existing alternatives, including horizontally oriented modes and strategies, to a secondary concern. Through fine-grained environmental analysis of contiguous coastal valleys on the North Coast and systematic examination of archaeological data for the pre-Incaic cultures of the North Coast, I argue for (1) considerably greater resource potential (quantitatively and qualitatively) and environmental heterogeneity of coastal valleys than generally assumed, (2) coastal economic self-sufficiency of state-level societies with extensive territorial control and a "horizontal archipelago" along the coast, (3) the relative stability of subsistence resource procurement strategies of coastal societies over time in the face of changing...
socio-political relationships between coastal and highland societies, and (4) the critical importance of socio-political integration of the populations involved in the emergence of varied modes of coast-highland interaction.

The Lambayeque region on the northern North Coast is the focus of this case study. The selection of this area was based on (a) varied and abundant natural resources and great agricultural potential, all favoring coastal economic self-sufficiency, (b) the fact that the region witnessed various forms of socio-political integration, including two major inter-valley polities under intensive investigation since the early 1970's, and (c) sufficient data on neighboring coastal (to the south) and highland regions for horizontally and vertically oriented comparisons. For an effective diachronic comparison, the regional prehistory is subdivided into three Periods based on the quantity of available data and inferred and documented shifts in the socio-political integration of the populations concerned. Period I, dating to 1300-600 B.C., is characterized by socio-political integration at the regional level through participation and maintenance of the religious center at the Lucia-Cholope Complex in the La Leche Valley. Period II, dating to A.D. 500-700, corresponds to Moche control of the region and a strong case can be made for coastal economic self-sufficiency based on extensive territorial control and a horizontal archipelago that appears to have encompassed the coast from Piura to Huarmey. Although material evidence for contact with the highlands is minimal, at the Moche V capital of Pampa Grande, the presence of at least one non-Moche population is suggested. Period III (A.D. 700-1100, saw for the first time abundant ceramic evidence for coastward expansion of the highland polity of Cajamarca and a symbiotic relationship between the Cajamarca and the religious polity centered at Batán Grande. Politically, we have a dynamic check and balance relationship between these two polities.

The paper concludes with consideration of various methodological and substantive issues of broad significance that emerged from the preceding sections. Among them are an attempt to establish an operational definition of the coastal valley and a critical assessment of the adequacy of archaeological data and research designs for issues pertaining to coast-highland interaction.

INTRODUCTION

Environmental diversity and extremes in the Central Andes have been effectively dealt with through a variety of biocultural means since the Pre-ceramic Periods. Andean civilization has been justly characterized as testimony to the successful adaptation to and management of environmental diversity [e.g. LANNING 1967; TROLL 1931, 1958]. Traditionally, spatial variation in Andean physiography has been perceived in terms of “Culture Areas” and “Sub-Areas,” such as Central Highlands, North Coast and South Coast [e.g. KROEBER 1944; STEWARD 1946; STEWARD and FARON 1959; LANNING 1967; WILLEY 1971]. These divisions are said to be based on definable environmental and cultural features and differences. The Culture Area approach, however, is basically typological and imposes a static picture on dynamic interacting entities with changing boundaries in time and space [LATHRAP
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1973a; SHIMADA 1981a; SCHAEDEL and SHIMADA 1982]. Today, the conventional concept of three environmental zones of selva, highland and coast with related Culture Sub-Areas is being replaced by a perspective of overlapping and oscillating interaction spheres and complex ecosystems, each with changing ecological niches and habitats.

The importance of a dynamic, ecosystemic perspective has been advocated by those who have recognized the significance of various cultural activities in the overall development of Andean civilization cross-cutting the vertical dimension of the Andes. Carl Troll [1931, 1958] provided an early lead in this direction; however, his human geographic overview of Andean “high cultures” was not immediately followed by more detailed studies.

Murra [1968, 1970, 1972], through the collaborative use of archaeology, ethnohistory and ethnography, effectively illustrated various cultural and behavioral ramifications of ecological variation in the Central Andes. Archaeological-ethnohistorical studies of the visita of Huánuco and the Inca regional center of Huánuco Pampa were designed to archaeologically test ethnohistorical data that served as the cornerstone for his “archipelago model of vertical control” [MORRIS 1972, 1974; MORRIS and THOMPSON 1970; MURRA 1962, 1964, 1972, 1975; MURRA and MORRIS 1976]. This model, primarily economic in nature but with important social and political implications, was published in explicit form in 1972 and has been influential in the subsequent formulation and direction of archaeological, ethnohistorical and ethnographic research in the Andes. However, even prior to this publication, there were indications that formalization of this model must go hand-in-hand with specification of the conditions under which the model operates without significant distortion to structural relationships existing among its components. For example, Morris speaks of the distorting effects of compulsory urbanism upon the expected redistributive function of Huánuco Pampa [MORRIS 1972; MORRIS and THOMPSON 1971].

A later collaborative investigation of the Lupaqa Kingdom on the shores of Lake Titicaca included an archaeological component aimed at defining the pre-Incaic nature and structural variation of the archipelago model [e.g. HYSLOP 1976, 1977; LUMBRERAS 1974]. However, much of the archaeological investigation of the Lupaqa project focused on late prehispanic settlements (post-Tiwanaku) in the Titicaca Basin and insufficient data exist on crucial sites along the vertical dimension (including the South and Far South Coastal regions) for comprehensive archaeological testing. Schaedel [1977] warns against the misleading impression of a pervasive, pre-Incaic archipelago model of vertical control. More recently, Nuñez and Dillehay [1979] argued for a pre-Incaic, transhumant, mobile to semi-sedentary economic and social adaptation for the South Central Andes. In this “gyratory” model, the altiplano herders with their caravans are envisioned moving along fixed paths among sedentary agricultural settlements scattered across the natural and social landscape of the South Central Andes. For areas further north, archaeological investigation at the site of Wari and its supportive rural settlements, particularly along the eastern slopes
of the Andes [Isbell 1971, 1977], suggests a settlement hierarchy during the final phase of the Early Intermediate to the early Middle Horizon (ca. A.D. 500–750?) that served to maximize control of a vertically oriented ecology. Here the key to operation of this vertically oriented economy was ecotonal locations of rural settlements subservient to the state centered presumably at Wari. Inherent characteristics of the regional ecology and the nature of sociopolitical integration emerge, in the above two cases, as the crucial factors in establishment of a given procurement strategy.

In the case of the transitional chaupiyunga zone between the highlands and coast along the Chillón Valley, Dillehay [1979; also see 1977] posits peaceful intergroup resource sharing in pre-Incaic times. Dillehay [1979: 28, 30] argues that by about 200 B.C. to A.D. 540, the chaupiyunga zone was inhabited and exploited by a mixture of local and highland populations under the dual direction of their respective leaders. He suggests a reciprocal economic arrangement under which the highlanders acquired chaupiyunga resources while offering in exchange political autonomy as well as highland products and possibly labor [cf. Murra 1958]. These arguments are interesting in light of ethnohistorical work by María Rostworowski [1967-8, 1973] who questions the applicability of the archipelago model to pre-Incaic Peruvian coastal regions and feels that such a mode of vertical resource control is intrusive to the coast, perhaps imposed by the Wari population during its westward and northward expansion around A.D. 550–700. Her position is based on the premise that coastal populations with intensive irrigation were largely self-sufficient, and that only status and ceremonial goods were imported through interzonal trade. Certainly her claim for the basic self-sufficiency of certain coastal populations is well worth our scrutiny.

RESEARCH PROBLEMS AND AIMS

Cognizant of the need to determine the degree and nature of structural and functional variation, as well as the conditions that give rise to such variation from the theoretical postulates of the archipelago model, Murra [1972] himself considered exchange behaviors and resource procurement strategies in four different spatial and temporal contexts characterized by divergent ecological, demographic and sociopolitical parameters. Included in this preliminary assessment are “grandes reinos costeños” of the North Coast (basically the Chimu Kingdom). Based on ethnohistorical data pertaining to the 15th and 16th centuries [e.g. Carrera 1939 (1644); Espinoza 1969–70] and limited archaeological data [Reichlen and Reichlen 1949], Murra [1972: 96–101] considers the possibility of a reverse verticality (coastal colonies in the highlands). The Visita de Jayanca [Espinoza 1975] published more recently also describes groups from the Lambayeque region on the northern North Coast in Guambo in the North Highlands.

Murra [1972: 95] does not fully consider alternatives to the upward or downward verticality or archipelago models, i.e., basic self-sufficiency based on a horizontal archipelago in contiguous coastal valleys. I am speaking of local self-sufficiency
without an extensive network of vertically distributed colonies. It is important to note that the horizontal archipelago may also be viewed as an exchange network along the coastal plane comprised of communities specialized in the production of specific commodities (whether natural or cultural; see Onuki [1978]).

In this presentation I examine (1) environmental diversity among contiguous coastal valleys on the North Coast, (2) the relative merits and limits of the horizontal archipelago model of coastal self-sufficiency for the pre-Incaic Lambayeque region of the North Coast from an archaeological perspective, and (3) the relative stability of given modes of subsistence and non-subsistence resource procurement (including a model of coastal self-sufficiency) and coast/highland interaction during three periods together spanning 2500 years, each characterized by a different mode of sociopolitical integration. Various questions must be considered: What were the organizational prerequisites or developments related to economic self-sufficiency? Was coastal self-sufficiency accompanied by political independence from highland polities? Did the Lambayeque population, in fact, ever achieve economic self-sufficiency and, if so, when and under what conditions? How stable was self-sufficiency once achieved? Was the compromise resource sharing described earlier applicable?

The Lambayeque region (Figures 1 and 2) is well-suited for the proposed study: (a) The region has the largest expanse of cultivable land on the Peruvian coast watered by a series of perennial rivers with high minimum discharge volumes essential for stable, large-scale irrigation, long stretches of easily accessible Pacific shoreline with abundant marine resources, and varied mineral resources, all supporting the argument for economic self-sufficiency. (b) The region experienced various forms of sociopolitical integration, including two major intervalley polities (Moche V and Classic Lambayeque) that have been under intensive investigation since the early 1970’s. (c) Sufficient data exist for the neighboring North Highlands and coastal valleys to the south for effective interregional (vertical and horizontal) comparison. In assessing various theories that argue for environmental diversity as a (if not the) key factor in the rise of complex societies, Athens [1977] cautions against the unwarranted assumption of environmental stability. Environmental diversity is a dynamic factor and present-day and prehistoric conditions cannot be equated. Similarly, the presence of certain resources does not automatically imply their prehistoric utilization. These are empirical questions that must be documented. For example, coastal valleys to the south, particularly Chicama, Moche and Virú, experienced considerable tectonic movement that affected construction and operation of irrigation systems [ORTLOFF et al. in press]. Geomorphological studies of the Lambayeque region conducted thus far [REIMCHEN 1972; SHIMADA et al. 1981] however, suggest that the region and its irrigation systems suffered little from Holocene tectonic activity. At the same time, sand sheets resulting from flood deposits at the mouth of the Reque River (Fig. 2) had considerable effect on prehistoric occupation in the lower portion of the Lambayeque region. Plant remains recovered from archaeological excavations [ANDERS 1977; SHIMADA and SHIMADA in press; SHIMADA et al. 1981: 434-437], though limited in quantity, do not indicate major shifts in the vegeta-
Fig. 1. Culture Sub-Areas along the Peruvian Coast and the location of Batán Grande and Pampa Grande within the Lambayeque Valley Complex.

tional cover of the region during the periods with which we are concerned. References to the utilization of specific resources will be limited to the periods for which documentation exists. Although relative environmental stability may be posited for the region, Athens' warnings must be kept in mind.
Fig. 2. Major settlements and archaeological features of the Lambayeque region.
My discussion will be organized in terms of Periods I through III based on (1) quantity of available relevant data and (2) inferred and documented shifts in socio-political integration of the populations concerned. Period I dates to 1300–600 B.C. when populations sharing Cupisnique-coid ceramics and ideology were integrated at the regional level through participation and maintenance of the regional ceremonial-religious center at the Lucia-Cholope Complex in the La Leche Valley. Period II corresponds to Moche control of the region and ends with collapse of the Moche V inter-valley polity centered at Pampa Grande (A.D. 500–700). Period III (ca. A.D. 700–1100) represents the time span during which the influential religious polity at Batán Grande gradually evolved and flourished. The ending date is approximate and corresponds to abandonment of the immense ceremonial-religious and funerary precinct in Batán Grande.

It should be clearly noted that what follows is a cursory examination of available archaeological data. Emphasis is on formulation and consideration of models of coastal resource procurement and interaction with the neighboring highland region.

ARCHAEOLOGICAL CHARACTERIZATION AND MODELING

A. Period I: Intra-Valley Exchange and Redistribution and Inter-regional Ideological Ties.

By about 1000 to 800 B.C. all major ecological zones of the Lambayeque region were occupied. Within the Lambayeque Valley proper we see the habitational-cemetery (and possibly mining) complex of Morro de Etén [Alva and ELERA 1980; Shimada et al. 1981: 433] situated near a cliff facing the Pacific Ocean, the cemetery at Pampa Grande at the valley neck some 50 km. inland, and scattered stone constructions and cemeteries around the town of Chongoyape (Fig. 2; toward Carniche Bajo and Alto) [Horkheimer 1944, 1950; Ishida 1960: 148; Lotthrop 1941]. Kosok [1965: 95] describes Chongoyape as within a curious “irrigated pocket” separated from the lower coastal region by a narrowing of the valley and “separated by a long chasm from the Sierra type of cultivated regions further up the valley.” This pocket is today extensively utilized for cultivation of a wide variety of fruits as well as rice, sugar cane and some coca. In the neighboring Zaña valley to the south, my survey and that of Walter Alva (personal communication 1980) indicate various small contemporaneous settlements in the middle to upper portions of the valley. Further up in Udima, Alva (personal communication 1980) located a major ceremonial-religious center with a stone-lined platform and auxiliary structures within a rare “relict forest” environment that resembles tropical rain forest on the eastern side of the Andes [Netherly 1977a]. In the adjacent La Leche Valley to the north we see extensive utilization of the middle valley known as Batán Grande for cemeteries and religious and habitational structures (e.g., Huacas La Merced, Las Ventanas [Tello 1937a, b], Facho, Tordo, Soledad, Loayza, Corte and Lucia-Cholope Complex [Shimada 1979, 1981a; Shimada et al. 1981]).

Like contemporaneous occupations around Chongoyape, Mochumi Viejo has

The Lucia-Cholope Complex centrally situated within Batán Grande emerges clearly as the dominant site of Period I for the La Leche and probably neighboring Lambayeque Valleys. The monumental conical adobe architecture of the Templo de las Columnas at Huaca Lucia with its gigantic painted columns (Photo 1) and central stairway linking an inferred sunken court with a two-tier platform (Photos 2, 3) symbolizes the emergence of a corporate authority capable of mobilizing a substantial labor force and raw materials from areas beyond the immediate vicinity. Construction of twenty-four regularly spaced columns each with a diameter of ca. 120 cm. and estimated original height of ca. 4 m. built atop a two-tier platform measuring at least 50 m. east-west attests to a supra-community level of sociopolitical integration. Available radiocarbon-14 dates (3273±163 B.P. for the Templo construction, SMU-834; and 2520±40 B.P. for its abandonment, SMU-898; Table 1) suggest that the Complex was in use from about 1300 to 600 B.C. (uncorrected dates). A funerary offering from a burial at Huaca Corte slightly west of the Complex has been radiocarbon-dated to 2880±100 B.P. (TK-30) [Shimada et al. 1981: 427]. The elaborate ritual entombment of the Templo [Shimada 1981a, n.d.] further argues for a corporate organization capable of mobilizing a tremendous outlay of labor within a short time span (perhaps a few months). The entire Templo with its columns, stairway and platform was carefully buried by clean sand brought in from perhaps as far away as an extensive sand sheet along the southern margin of the valley, a distance of some 3 km. The sand cover (at least 6.5 m. thick) was horizontally partitioned by at least two (and most likely three) clay seals. Evidence of in situ clay mixing was discovered in 1981.

The above evidence, coupled with the relative stylistic homogeneity of the ceramics from various Batán Grande sites mentioned above, argues the religious polity centered at the Complex was supported by much of the valley population. Absence of a comparable ceremonial-religious center in the Lambayeque Valley may imply that its population also participated in the operation and maintenance of the Lucia-Cholope Complex.

Melody Shimada's 2-m. square test excavations at Cholope, although limited in extent, showed a series of occupational floors associated with organic refuse materials and ceramics of this period (Fig. 3, 4), suggesting that the habitation area associated with the ceremonial-religious architecture of Lucia is to be found in Cholope. Her excavations also provide some insight into the range of resources being exploited by the inhabitants of the Lucia-Cholope Complex during Period I. Tables 2-4 show the inventory of organic materials recovered from fill between floors within stratigraphic levels 9 to 17 (the lowest level above sterile sand) that are associated with ceramics of Period I. Although the site is 50 km. inland from the Pacific, there is a considerable variety of marine shells, including Donax (approximately 4 kg; most abundant in terms of number), Olivella, scallop, clams and a variety of gastropods. Other marine resources included a range of fish, mostly anchovy to sardine size. No marine
mammals were identified. Terrestrial resources include camelids, both adult and immature, guinea pig, dog, as well as lizard, bird and mouse. Although the sample size is small, we can make several observations regarding camelid important to our discussion: (a) camelids are present in all levels except 16; (b) both mature and immature individuals are represented; (c) most body parts are present, including foot bones and skull, parts that would not be expected if camelids were brought into the site as *ch'arki* processed according to ethnographic practices [Miller 1979: 97-100; Inamura personal communication 1980], and (d) lenses of camelid dung suggest they were locally maintained. Although the sample is not sufficiently large to quantitatively distinguish species, based on the above lines of evidence, we hypothesize that we are dealing with domesticated llama.

Plant remains, whether cultivated or wild, were extremely rare, represented by

Fig. 3. Diagnostic ceramics from layer 14 of M. Shimada's test pit at Huaca Cholope, Batán Grande.
Sherds A–O correspond to layer 15; A'–J' to layer 16; A''–C'' to layer 17, Huaca Cholope test pit.
a few burnt fragments of *algarrobo* fruit and common beans. Considering the generally good preservation of recovered organic materials, the scarcity of plant remains may simply indicate they did not enter the archaeological record. The role of scavengers and domesticated animals such as guinea pigs and dogs must be kept in mind.

Overall, in regard to the procurement of day-to-day subsistence items, *available* archaeological evidence argues for coastal self-sufficiency based on intra-valley (including littoral) resources. By 1000 to 800 B.C. inland distribution of marine resources was well established. Similar patterns have been documented or suggested for valleys to the south [e.g. LANNING 1967; MATSUZAWA 1978; MOSELEY 1975; PATTERSON 1971; also see POZORSKI 1979; POZORSKI and POZORSKI 1979]. For the Casma Valley, for example, Matsuzawa [1978: 669] argued that the extensive site of Las Haldas served as a marine resource center socially linked to inland communities that supplied its occupants with agricultural produce in exchange for marine resources. The Lucia-Cholope Complex in Batán Grande may well have served as a coordinating or redistribution center for marine resources for the La Leche Valley. In this respect, future clarification of the functional role of the site of Morro de Etén on the Pacific coast is eagerly awaited. It would appear the importance of domesticated camelids as a key food source was established quite early [SHIMADA 1981b]. Camelid meat was supplemented by guinea pigs and possibly dogs, as well as by a wide range of marine fish and shellfish. In comparison with the subsistence items of Period II, we find deer, large marine fish and animals are missing from the organic remains recovered from Cholope. Their absence, however, may well be a function of the small sample size.

Just as we find no readily apparent highland products in the inventory of subsistence items defined at Cholope, the little concrete data we have on the subsistence items and patterns in the North Highlands for Period I show minimal input from the coast. Excavations at the site of Pacopampa near Chota yielded only a single "concha marina" [FUNG 1975: 186]. Similarly the two earliest phases at Huacaloma (Early and Late Huacaloma) in the Cajamarca Basin show only a few bivalve shells (Onuki personal communication 1981). Most likely, shell was imported as raw material for personal adornments. Excavations in refuse-rich areas or middens at Pacopampa, however, may well reveal additional coastal resources. In addition, if fish were imported in dried or salted form, the bones may not have been preserved. One coastal product, salt, would not be readily detectable in archaeological context. Salt was also available from the Central Highlands.

If we broaden our perspective to include non-subsistence items, a different picture of the coast-highland relationship emerges. Systematic interviews of grave looters in Batán Grande suggest that there are a substantial number of Period I burials, many associated with semi-precious stones such as quartz crystals, turquoise, and, in one case, a circular, polished anthracite "mirror" (diameter 15.5 cm), nearly identical to one reported by Larco [1963] for a Cupisnique burial in the Chicama Valley [SHIMADA 1979]. Quartz crystals and turquoise are likely to be local products, considering
local complex copper ore bodies and metamorphosed zones [SHIMADA et al. 1981: 42-3; in press]. Anthracite, on the other hand, may have been brought down from the highlands.

In areas to the south, MacNeish, Patterson and Browman [1975] have argued for an extensive “Central Peruvian Interaction Sphere” linking most closely the Central and South Coast with the Central Highlands. They argue that marine products such as fish and shells (for ornamental use) moved upslope, while obsidian, wool and copper came downslope. For the area under our consideration, however, no obsidian, copper or wool have been identified for Period I. Obsidian artifacts are very rare in the Lambayeque region and no obsidian source is known in the North Highlands [cf. BURGER and ASARO 1977].

Similar observations may be made in regard to the nature of highland-coast interaction during Period I as far as ceramics are concerned. For example, Period I ceramics from Batán Grande exhibit general stylistic and technical resemblances (e.g., incised, mostly geometric designs, post-firing painting of areas defined by incision) to those of the Chota [e.g., ROSAS and SHADY 1970; FUNG 1975], Cajamarca [TERADA and MATSUMOTO 1980], and Bagua [SHADY and ROSAS 1979] regions in the North Highlands. I suggested elsewhere [SHIMADA 1981c] that these regional populations shared a not yet explicitly formalized “Cupisnique Religious Tradition” (for lack of a better term, I use Cupisnique). The inferred proto-formalized state of the associated ideology may have permitted varying iconographic translations of the basic tenets of the ideology. This ideology may have emanated out of coastal Ecuador along with prescribed ritual items such as Spondylus and Strombus [cf. LATHRAP 1973b; PAULSEN 1974]. Alternatively one must consider that observed variation arose out of the incomplete transmission of the ideology from one region to the other with new meanings and iconographies developing within the idiosyncratic circumstances of each region.

In terms of the available material evidence, then, we are forced to conclude that the coast-highland relationship was limited in scope to non-subsistence items used primarily for ceremonial, ornamental and funerary purposes. Models of exchange behaviors presented elsewhere, such as exchange of subsistence items for status, non-subsistence items [FLANNERY 1968; SHIMADA 1981a: 45; SHIMADA et al. 1981: 444; also PIRES-FERREIRA et al. 1976] or gift exchange among elite accompanied by exchange or trade of more basic items [TOURTELLOT and SABLOFF 1972] can neither be supported nor refuted at this point.

Sociopolitical integration for individual or perhaps two contiguous valleys is inferred on the basis of observed regional variation in ceramics and spacing of what may be called “first order” ceremonial-religious centers. Participation in the maintenance of such centers (in the form of labor service, tribute payment or pilgrimage) reaffirms the social identity and coherence of the participants. Elsewhere I have argued [SHIMADA et al. 1981: 441] for the regional scope of “catchment areas” (here used in the sense of supportive demographic and territorial units) for several
centers on the North Coast, such as Huacas Lucia and de los Reyes (Moche Valley) [MOSELEY and WATANABE 1974; T. POZORSKI 1975, 1980].

There is a strong tendency among North Coast archaeologists to subsume ceramics of Period I under the heading of the Cupisnique style. However, the type collection used by Larco [1941, 1948] was largely derived from cemeteries in the Chicama Valley and manifests a strong regional character. Although there is as yet no systematic assessment of variability in Period I ceramics from various North Coast valleys, it is increasingly apparent that there are considerable intervalley differences behind certain general stylistic and technical commonalities.

B. Transition from Periods I to II

The 1100 years that separate the end of Period I and the beginning of Period II are archaeologically poorly known in the Lambayeque region. The paucity of relevant data is unlikely to be a reflection of any real hiatus in occupation, but rather a product of past research interests and priorities. Better coverage of this intervening period exists in valleys to the south, for example, the Moche and Virú Valleys [BENNETT 1950; BRENNAN 1980; COLLiER 1955; LARCO 1944, 1948; MUJICA 1975; STRONG and EVANS 1952; WEST 1977; WILLEY 1953]. Recent excavations at the site of Cerro Arena in the Moche Valley [BRENNAN 1980; MUJICA 1975] suggest that autogenous incipient urbanization was already taking place during Salinar Phase, approximately 400–200 B.C. Brennan [1980: 18] argues that limited settlement pattern data point to a “strong hierarchy of settlement size” reminiscent of settlements found in the subsequent Gallinazo Phase of the adjoining Virú Valley and in Moche occupation of the North Coast. Major known Salinar sites in the Moche Valley are situated so as to control major irrigation intake and access into the valley from the south and highlands [1980: 18]. Based on clustering of Salinar sites in areas that controlled north-south communication between the Virú and Moche Valleys, Brennan [1980: 19] further argues for possible “multi-valley integration on an economic, if not also political basis.” However, the coast-highland relationship is not considered and his interpretation is highly coast-centric.

Although Brennan [1980: 20] stated that the ceramics from Cerro Arena “suggest extremely limited contact with outside, non-Salinar groups,” more recent excavations at Huacaloma in the Cajamarca Basin revealed Red-on-White Layzon Phase bowls very similar to Salinar ceramics from Cerro Arena [TERADA and MATSUMOTO 1980]. A recently concluded analysis of faunal materials from Huacaloma by M. Shimada [in press] indicates a major economic shift from deer hunting in the Late Huacaloma Phase to the abrupt appearance and overwhelming dependence on domesticated camelids (most likely llamas) from the onset of the Layzon Phase. It is still problematical whether the economic shift documented at Huacaloma was subsequent to or coterminous with northward incursion of the Chavín ideology and iconography [cf. M. SHIMADA in press]. Clarification of the coast-highland relationship suggested by ceramic similarities is an important future task.

A recent airphoto and ground survey of the Condebamba Valley between
Cajamarca and Huamachuco by José Pineda [n.d.] indicates that during the Early Intermediate Period (400 B.C. to A.D. 540) this fertile area was extensively occupied. During this same period, the Moche intervalley polity was rapidly consolidating its political and economic control over much of the North Coast [e.g., Colllier 1955; Lumbereras 1974; Mosley 1978a; Schaede1 1951a, 1968, 1972; Strong and Evans 1952; Willey 1953]. Surprisingly, no systematic studies have been undertaken of the coast-highland relationship for this period in North Peru. North Coastal subsistence patterns and items are better covered since the pioneering work of Towle [1952, 1961], Horkheimer [1973], Herrera and Yacovleff [1935; Yacovleff and Herrera 1934], and Larco [1938; also see Pozorski 1976, 1979; Pozorski and Pozorski 1979; cf. Begler and Keatinge 1979]. Documented characteristics of North Coast subsistence for the Early Intermediate and continuity into the Middle Horizon will be discussed in the context of the following section.

C. Period II: Basic Coastal Self-sufficiency, Horizontal Archipelago and Intervally Sociopolitical and Economic Integration

The best case for economic self-sufficiency for the Lambayeque region can be made for the latter part of Period II, roughly A.D. 600–700, when the region was largely in the hands of the Moche V intervalley polity centered at Pampa Grande. Much of the discussion will center on the economic organization of Pampa Grande, for which we have abundant data derived from the multi-year study of Moche urban context by the Royal Ontario Museum expedition [e.g. Anders 1977, 1981; Day 1975; I. Shimada 1976, 1978, n.d.2; M. Shimada and I. Shimada in press].

Settlement data from the three contiguous Zaña, Lambayeque and La Leche Valleys clearly point to a major northward intrusion into these valleys by a Moche population during Phase IV (ca. A.D. 500–600?) through Pampas de Collique and Cayaltí. The “Inca Road” taken by Pizarro one thousand years later perfectly matches the Moche route of intrusion defined by linking sites with Moche occupation. The road passes through a number of strategic locations in respect to north-south movement and water distribution points within these three valleys. The Moche occupations at the Cipan-Collique Complex, the north base of Saltur, and northern spur of Cerro Patapo (later Cinto) permitted control of north-south access to the middle Lambayeque Valley and to the Taymi and Collique Canals. The latter canal was intervalley in scope, bringing water from the Chancay River to the north bank of the Zaña Valley during the late Moche occupation of the region [Nolan 1980]. It is still not clear how far the Taymi Canal reached during the same period. Cerro Boró and nearby dune sites in the middle Lambayeque Valley appear to have been the westernmost control point for the Moche population. The Moche do not seem to have had direct access to the Pacific coast from the Lambayeque and La Leche Valleys. Various workers [Kosok 1959, 1965; Rodriguez 1967; Schaede1 1951a, 1968, 1972] have argued for the existence of a strong lower Lambayeque Valley polity, perhaps centered at Colluz, that prevented further westward expansion of the Moche. This lower valley polity, however, remains largely hypothetical.
The northward intrusion reached as far north as Huacas Lucia, Facho (La Mayanga included) and Soledad at Batán Grande (Fig. 5) in the middle La Leche Valley. At Soledad there are numerous adobe burial chambers quite similar to those reported by Uhle [1913] for the site of Moche in the Moche Valley, presumed capital of the Moche polity during Phase IV. In addition, the First Phase Construction of the superimposed temples at Mound II, Huaca Soledad, has been radiocarbon dated to 1450±60 (SMU-833; A.D. 500, uncorrected date) and the few burnished blackware sherds recovered from floor context closely resemble those from Moche V Pampa Grande. Further inland at Huaca del Pueblo Batán Grande, we find various living floors associated with primary refuse and Moche IV and V ceramics. Late Moche colonies appear to have been scattered throughout much of Batán Grande in the middle La Leche Valley.

To the south, the Moche intervalley polity during Phase IV appears to have had colonies well beyond the conventionally accepted frontier center of Pañamarca in the Nepeña Valley [BONAVIA 1961; SCHAEDEL 1968, 1972; THOMPSON 1966]. Bonavia (personal communication 1981; ceramics personally examined in 1980 in Lima), in a series of surveys of the Huarmey Valley identified definite Moche ceramics at seven sites (PV35/14, 28, 37, 45, 57, 58 and 78), all dating to Phase IV, except one site with Phase III ceramics. In terms of spatial distribution, these sites together
cover lower to upper portions of the Huarmey Valley. Bonavia (personal commu-
nication 1981) also reports various Moche tombs in the Valley. In addition to
late Moche textiles in the Amano Museum in Lima and the Museum of Ethnography
in Munich [also see CONKLIN 1978], the above data argue for extensive Moche
occupation of this small North-Central Coast valley. Although the data are
insufficient to state whether the Huarmey Valley was politically integrated into the
overall Moche polity, one may argue that the Moche occupants were engaged in
activities related to procurement of goods coming from the Central Highlands and
Central and South Coast [cf. SHADY and RUIZ 1979].

The paucity of evidence attesting to Moche presence in the Casma Valley (situ-
ated between the Nepeña and Huarmey Valleys) [COLLIER 1962] would not be so
disturbing if Moche occupation in the Huarmey Valley was economic in nature.
Here Dillehay's compromise resource sharing model may be applicable. The Moche
population may have gained access to local as well as Central Highland products in
exchange for Moche goods such as copper artifacts and textiles. As in the case of
Huancayo Alto which Dillehay [1977, 1979] studied, Moche and local populations
may have retained their political autonomy. I suggest the Moche regional center
at Pañamarca represents the southern limit of Moche political integration and
control during Phase IV and that Moche occupation further south is a manifestation
of an economically motivated horizontal archipelago.

To the north, however, it is still not clear how far Moche political integration
proceeded. The middle valley locations of Moche occupation in the Lambayeque
and La Leche Valleys suggest control of north-south movement and, particularly in
the former valley, control of intra- and inter-valley irrigation systems. We cannot,
at the same time, ignore the distinct possibility of a local polity in the lower Lam-
bayeque that prevented Moche take over.

The Moche political and/or economic system may well have encompassed the
Far North Coast, particularly the area surrounding the present day city of Piura.
Moche ceramics and metalwork from Vicús and Loma Negra have been problematical
since their discoveries in regard to their true cultural identity and chronological
significance [e.g., DISELHOFF 1971, 1972; HORKHEIMER 1965; JONES 1979; LANNING
the Banco Popular del Perú collection of ceramics from the Vicús region by Lumbreras
[1979], however, sheds some light on these questions. Lumbreras [1979: 32] dis-
tinguishes the Vicús/Vicús local and Vicús/Moche styles on the basis of iconographic,
stylistic and technical considerations. Through systematic comparison with the
iconography of Moche ceramics from the North Coast, Lumbreras [1979: 118–144]
illustrates significant iconographic divergence of the Vicús/Moche ceramics and
questions the applicability of the North Coast Moche stylistic sequence and chronol-
ogy. In other words, he makes an important analytical separation between style and
time. He [1979: 118–119] rejects the possibility that the Vicús/Moche ceramics are
imported from the North Coast and favors the thesis of the coexistence of various
styles, the Vicús/Moche being products of Moche colonists. Thus Lumbreras
[1979: 119] argues that "los elementos 'trujillanos'...se imponen sobre los locales sin integrarse plenamente, manteniendo su acento 'extranjero,' pero sirviendo además para la expresión local de algunos elementos que aparentemente no encontrarían 'cupo' dentro de los recursos tecnológicos y estéticos locales" and that "en Piura desde muy temprano se impuso un patrón político de dominio trujillano, con un sector muy selecto de artesanos si no directamente trujillanos al menos muy fuertemente entrelazados con ellos, que generaron sus productos para fines estrictamente dependientes del poder estatal." He [1979: 33] feels the Vicús/Moche ceramics span ca. 100 B.C. to A.D. 600.

What is of particular importance to us is the distinct possibility that Moche colonies existed as far north as the Piura region, perhaps as early as 100 B.C. As I argued earlier in regard to the Huarmey data, these colonists do not necessarily imply political control or integration. Political integration may well have been preceded by establishment of religious/trade or exchange outposts [SHIMADA et al. 1981: 441-442]. Offers of gifts to local "señores" or selective adoption of the Moche religion and rituals may have opened the way to an amicable economic arrangement such as that argued by Dillehay [1979].

Overall, during or even prior to Phase IV, the Moche polity centered at the site of Moche seems to have attained an unprecedented political integration and/or economic network (in the form of a horizontal archipelago) from Vicús in the north to Huarmey in the south.

Phase IV ends with the near total abandonment of the site of Moche by the Moche population and the drastic shift of the capital north and inland to Pampa Grande in the Lambayeque Valley [MOSELEY 1978a; SHIMADA 1976, 1978, n.d. 2]. A combined geomorphological-archaeological project in the Moche Valley indicates that a major sand sheet invaded the site of Moche sometime during Phase IV and by the end of that phase covered the site as well as the canal supplying water to the site [MOSELEY 1978b, n.d.; MOSELEY and DEEDS in press]. The sand invasion and disruption of the extant agricultural system in the Moche may explain the northward and inland relocation of the Moche capital. However, similar relocation of major settlements inland, particularly to valley neck locations has been reported from the Central Coast [MACNEISH et al. 1975: 54]. The northward and coastward expansion of the Wari polity must be considered another contributing factor. Whether the Wari expansion happened to coincide in time with environmental deterioration on the coast is not clear as archaeological dating and data on the relevant processes and events are inadequate. One distinct possibility is that the Wari polity expanded toward the coast subsequent to abandonment of Moche to take advantage of social and political disruption within the Moche domain brought about by the relocation. Whether one opts for environmental, cultural or a combination of both for explanation of the relocation, one must adopt a sufficiently broad perspective to account for not only the North Coastal developments but also Central Coast and Highland phenomena of that general time period (A.D. 500–650).

Although diagnostic bichrome Moche V ceramics are basically limited to valleys
north of the Santa [e.g., DONNAN 1973], the effective political domain of the Moche V polity appears largely confined to areas north of the Moche Valley. Evidence of Moche V occupation is particularly strong on the coast between the Jequetepeque and La Leche Valleys. The selection of the Lambayeque Valley as the site of the new capital may be closely related to the lack of valley-wide political unification as mentioned above and its agricultural potential. Even with sudden intrusion of a large Moche population from the south, control of the critical valley neck location would have provided the Moche population with the political upperhand over the lower valley population to extract tribute in the form of labor service or agricultural produce. In addition, irrigation agriculture on the coast was more amenable to intensification. Thus expansion and improvement of extant irrigation systems may well have led to considerably greater agricultural productivity.

The Moche V capital was established on an extensive alluvial plain at the base of a series of cliff-like mountains on the south bank of the Lambayeque Valley overlooking the neck of that valley some 50 km. inland from the coast (Figs. 2, 6, 7).
The site of Pampa Grande was occupied over 1000 years earlier by a Cupisnique-coid population. Much of the standing architecture at the site, however, was built during the brief (about A.D. 600–700 according to radiocarbon-14 dates) Moche V occupation. The site today covers approximately 5 km², although there are various lines of evidence that argue the site once covered over 6 km². It is the largest site of its period on the Peruvian coast. One of the largest artificial constructions in South America, Huaca Fortaleza, occupies the center of the site (Fig. 8) with dramatic visual impact. Although the Moche V site of Galindo in the Moche Valley is also extensive, features such as (1) Huaca Fortaleza with basal dimensions of 185 × 300 m. and height of about 55 m., attesting to a central authority capable of amassing and mobilizing a large labor force, (2) architectural expanse, nucleation and diversity heretofore unseen in any Moche site, and (3) an extensive network of streets and formal storage facilities with highly regulated access, clearly distinguish Pampa Grande as the Moche V capital [SHIMADA n.d.2]. Here I characterized Pampa Grande as a Moche V ceremonial city to emphasize that the incipient urbanism observed at the site was the amplification of the inherent attractive force of the Moche ceremonial center. Compound 1 with Huaca Fortaleza played the central role in organization of multifaceted services and production at the site. The unprecedented urbanization at Pampa Grande must be understood within the context of the unique circumstances surrounding the relocation. The permanent centralized authority was the mechanism

Fig. 7. Valley neck location of Pampa Grande and that site's relationship to La Puntilla.
needed for successful establishment and survival of the new capital and security from environmental perturbation and/or political instability from the expansion of the Wari state and even from coexistence with the non-Moche lower Lambayeque polity. Although Moche IV occupation of the site is a likely possibility, most constructions were rapidly erected during Phase V. Contrary to the incremental growth of the solid adobe Pyramid of the Sun at Moche, Huaca Fortaleza was built with the chamber-and-fill technique that minimized labor, material investment and construction time. The pyramid top today shows the differential subsidence of loose fill settling below the level of the adobe chamber walls. A wide range of construction techniques and materials is seen in other structures, attesting to rapid construction using whatever technique and materials were suitable for the purpose. A plaster finish effectively homogenized and masked the variability in construction materials and techniques.

Diversity in architectural form and function, particularly among rectangular enclosures, provides the strongest argument for a complex state level social and political hierarchy. These enclosures served a wide range of functions including elite residence, closely administered craft workshops and check points for intra- and inter-site traffic (llama caravans included).

Available archaeological data indicate minimal highland subsistence or non-subistence items. Certainly, daily existence was based on locally available resources. M. Shimada [1979: Shimada and Shimada in press] has identified a wide range of locally available agricultural produce and cultivated fruits, including corn, beans, squash, gourd, avocado, peanut, lúcuma, cotton and ají (Tables 5–7). The inventory of plants utilized is quite similar to that defined for Galindo by S. Pozorski [1976: 138–140]. Both sites suffer from the relative scarcity of primary refuse. Thus, our understanding of how plants were used, prepared and consumed is quite limited.
Regulated distribution and access to certain food items is implied by burnt re­
 mains in formal, large-scale storage facilities consisting of sets of contiguously built rectangular adobe cells (Table 8). Only the two smallest storage facilities, one in Unit 32 (Sector H, five cells) and another in Unit 51 (Sector D, three cells) had their contents (maize kernels and beans) preserved due to intense fire. Based on the large quantity of kernels of highly uniform size and form, Shimada and Shimada [in press] have argued for their centralized control and use for large-scale chicha manufacture in areas of elite residence and craft activity. This argument is supported by other lines of evidence: (a) the importance of uniform kernel size for chicha making in ethnographic contexts [NICHOLSON 1960], (b) differential distribution of corn cobs (in kitchen refuse) and kernels, and (c) scattered loci of large-scale chicha making not far from kernel storage. In regard to the last point, Compound 38 (Fig. 9) and Structure 46 (Fig. 10), both in Sector H, exemplify the association between large­scale chicha preparation and elite residence and craft activity. R-Rm 8 in Compound 38, for example, produced chicha for all of the households within the compound. ARm 56 in Structure 46 similarly supplied chicha to households and a weaving workshop directly linked by streets. Patterns in Sector H indicate that the loci of craft production and food and chicha preparation were spatially segregated, occupying the extremities of a street network, but directly accessible to each other. Craft workshops commonly have only short-neck jars used for transport of food and drink to craftsmen.

An example of the regulated distribution of noncomestible items is cotton. Substantial amounts of cotton were found at two loci. The major discovery was in Compound 14 known as Deer House due to antler racks found on a terrace along with ceramic drum frames. Cotton with the seeds removed and fiber beaten into a mass ready for spinning was preserved when much of the Compound was burnt. Cotton bolls with seeds were also found in Compound 16 in large ceramic vessels. The large quantity of processed cotton coupled with the small-scale weaving workshop in Sector H [SHIMADA 1978] suggest that Compound 14 served as the collection and distribution center where cotton was beaten and distributed to scattered workshops for spinning and weaving. Once again, high level coordination of activities in spatially segregated loci is suggested.

Six other large-scale storage facilities are known from Pampa Grande, four within the northwestern half of Compound 1 (Sector A). The largest storage complex with 24 cells occurs within Sector B which also has the second largest pyramid at the site. These facilities share the standardized architectural features of a raised threshold at each cell and limited access and have a conspicuous absence of their original contents [ANDERS 1977, 1981]. While architecturally highly homogeneous, there is considerable variation in their broader architectural setting and estimated capacities (Table 8). Such variation most likely reflects logistical and strategic considerations such as the nature of the goods stored, their expected rate of consumption and deterioration, intended use and accounting and transportation techniques.
Fig. 9. Artifact distribution and architectural organization within Compound 38, Sector H, Pampa Grande.
Fig. 10. Artifact distribution and architectural organization of metal workshop in St. 52 and chicha making area in ARm 56. Corridor 5 leads to inferred weaving workshop.
If these facilities stored comestibles, their estimated quantities seem disproportionately large for the estimated number of residents of Sectors A and B. Possibly the food in these facilities was for ceremonial feasting and/or provisioning of military campaigns. Their broader architectural linkage with manufacturing activities (weaving, metalworking, etc.) in neighboring Sector H suggests that these facilities contained noncomestible goods (cloth, tools, weapons, etc.) used for intra- and intersite redistribution and provision. At the same time, we cannot ignore another distinct possibility: that the storage facilities served as "savings" in a bank to cope with variation in production due to environmental and/or cultural perturbations mentioned earlier [cf. Isbell 1978].

Large-scale storage and distribution of comestibles and noncomestibles is considerably more complex than the picture that emerges from consideration of the adobe storage facilities in the center of the site (Sectors A–D, H). For example, a badly damaged, square adobe/masonry structure in Sector J surrounded by small-scale manufacturing areas revealed cells containing large storage urns. Although the contents of these vessels could not be readily determined, much of the site seems to have had dispersed, small-scale production loci accompanied by storage and food preparation facilities to serve workers and supervisory personnel.

What is important to the basic thrust of this paper is that for the first time we have strong indications of high-level, centralized, long-term planning of the production, storage and distribution of goods. In addition, we have abundant evidence of a wide range of manufacturing activities, including ceramic, metal and weaving workshops [Shimada 1976, 1978; Shimada and Shimada in press] within the site. Some Sectors (particularly E) of the site also yielded agricultural implements such as doughnut-shaped stone soil clod breakers and stone hoes, suggesting that part of the population at the site was engaged in farming. Overall, the site provided a wide range of services and functions integrated within an elaborate redistributive framework.

Pervasive, small-scale incremental household storage complemented this large-scale storage and distribution. Compound 38 provides a glimpse of domestic storage. Single entry rooms farthest away from the corridor inside the compound served as storage rooms for large vessels with conical bases buried or placed in depressions in the floor. Close by were kitchens with batán/chunga sets, hearths, primary refuse and cooking vessels. Each household in the compound also had one unusually small, carefully plastered room which may have stored noncomestible goods.

In regard to the procurement of agricultural produce, we must consider site location and a supportive rural population. Pampa Grande was positioned to control the intervalley Collique and Taymi Canals, as well as the Lambayeque Canal that served the middle and lower Lambayeque Valley. The Collique runs along the south bank while the remaining two begin at or near La Puntilla, a dome-shaped igneous extrusion on the north bank 2 km. due northwest of Pampa Grande (Fig. 7). One can walk to the present day water diversion structure at La Puntilla from Pampa
Grande. As mentioned earlier, control of this diversion point was essential for political and economic control of the Lambayeque region as it would have provided political leverage for the Moche population at Pampa Grande over the lower Lambayeque population. In return for water rights, tribute in the form of agricultural produce and marine resources may have been extracted from the indigenous population further down valley. Although no Moche V remains occur at La Puntilla, Moche occupation at Patapo and further north in Batán Grande argue that Pampa Grande had control of the Taymi and Lambayeque Canals. It should be kept in mind that the valley neck location also would have given Pampa Grande direct access to the most fertile agricultural land of the valley, the Valle Viejo. Today, the most productive sugar cane fields are found in the Valle Viejo because of its fertile alluvium and abundant water supply.

Unfortunately, little is known of the rural population that supported the large urban population at Pampa Grande. Although our survey located various Moche V sites throughout the middle Valley, no excavation has been carried out.

In regard to nonagricultural subsistence items, we find strong continuity from Period I. Partly due to the considerably larger sample of organic remains recovered from Pampa Grande, we find the inventory of terrestrial and marine resources covering a greater range than that described for Period I. Because of the critical economic significance of llamas at Pampa Grande, we will examine their utilization in depth. Even a quick survey of archaeological and ethnohistorical publications reveals frequent remarks regarding the assumed periodic importation of llamas to the coast as beasts of burden. This position, however, ignores archaeological finds. Although they may have been imported from the highlands originally or even occasionally, subsequent to the original introduction, archaeological data force us to consider the viability of llama herding and breeding on the coast. With an increasing number of detailed archaeozoological studies in Andean archaeology and complementary ethnographic analyses of present day camelid herds in and outside of the Andes, our perspective on the economic significance and cultural ecology of camelids has undergone considerable revision. Despite the great volume of camelid remains from archaeological contexts on the North Coast, ceramic depictions of life phases (copulation, nursing, pack) and ethnohistoric references to a smaller, coastal breed [Gilmore 1950], there has been no serious attempt to document possible herding and breeding on the coast or even the existence of a distinct coastal species [cf. Horkheimer 1973].

In regard to the organic remains from Cholope (Period I), I have already argued for breeding llama populations on the coast. The overwhelming majority of faunal remains from Pampa Grande in terms of number (4,345 of 5,007 identified bones) and weight (10,678 g. of 12,086 g. of bones) are camelid [M. Shimada 1979; Shimada and Shimada 1976, in press]. Even considering the preservation and recovery problems related to fish and shellfish remains, it is difficult to deny that llamas were the primary protein source for the Pampa Grande population. All age groups, from fetal/neonatal to mature adult are represented. The age structure of the
camelid population is about half immature and half adult (under versus over 3 years), suggesting a diversified usage with perhaps more emphasis on food [M. SHIMADA 1979; SHIMADA and SHIMADA in press]. Frequent butchering scars on nearly all skeletal elements as well as primary refuse in kitchens and direct association with hearths all point to llama as a food source.

Various lines of evidence also argue for llamas as beasts of burden and the presence of llama caravans for inter-site transportation. Moche modelled pottery representing camels carrying cargo is well known. At Pampa Grande, various major streets linking the outside and central portions of the site often terminate in spacious open areas without architecture or artifacts. In fact, in most cases these spaces show no landscaping, although there is extensive terracing and dense architectural buildup in their immediate vicinity. Elsewhere I argued [SHIMADA 1976, 1978] these spaces were terminals for llama caravans. The surrounding rectangular enclosures with limited access overlooking these spaces were the formal settings for various economic and social transactions associated with cargo being loaded and unloaded. Compared to these wide avenues ending with terminals, streets that converge at the peripheries of the terminals are narrower and more tortuous. Important support for this argument for llama caravans is the centrality and proximity of the terminals to areas of craft production. Such proximity would, indeed, be expected from any major transportation terminals.

Llamas were also used for sacrifice as, for example, in the case of post-hole burials atop Huaca Fortaleza. The preceding discussion clearly attests to the varied and important roles llamas played in the economic and religious systems of Pampa Grande. The availability of large herds of llamas, then, must have been a major concern for the central authority. In addition to the zooarchaeological evidence presented above, another strong argument for coastal llama breeding and herding is their dietary and climatic tolerance. Llama are known to tolerate a broad range of forage and lower elevations. The Patterson Ranch in eastern Oregon has successfully managed a large llama herd (presently over 425 head) for over a decade with virtually no health problems [SHIMADA and SHIMADA n.d.]. Their owner reports they are "easy to maintain, having more diet tolerance than horses accepting any good hay grass or grain and able even to consume moldy hay without harm." Smaller llama herds have been successfully maintained in various locations in the United States in recent years, including upstate New York and Florida. As discussed in more detail later, in her excavation at Cerro Sapamé near the juncture of the Lambayeque and La Leche Valleys, M. Shimada encountered a substantial quantity of llama dung mixed with *algarrobo* fruit and leaves and identified *algarrobo seeds in the llama pellets*. In another layer at Sapamé, llama dung was mixed with maize stalks, cobs and leaves, suggesting they were also fed this material.

Similar to the Colonial pattern of keeping cattle owned by haciendas in the central Lambayeque Valley in the upper valley, I posited [SHIMADA 1976] intravalley transhumance in accordance with the availability of forage and grazing land. Considering the extent of deforestation and its adverse effects in retention of water, the present
extent of forage and grazing land cannot be readily assumed to reflect prehispanic distribution and availability. Netherly [1977a] argues that the coastal valleys provided enough forage in the form of salt grass, riverine and canal vegetation and algarrobo pods to maintain llama herds.

Overall, the above discussion and data indicate llamas were available in large number, served various important economic functions, and that their herding and breeding was possible on the coast and most likely practiced. This is an important point in substantiating the claim for economic self-sufficiency of North Coast populations.

Fine-grain analysis of microenvironments and their exploitation within the Lambayeque region leads us to further revise the current conception of the coastal environment and resources. For example, there is a large pukio, or sunken garden, in the middle La Leche Valley and A. Craig (personal communication 1980) discovered lush loma vegetation on the western slope of Cerro Reque near the juncture of the Lambayeque and Zaña Valleys. In the chaupiyunga of the upper La Leche Valley, we find coca cultivation and thick stands of San Pedro cactus, as well as communities of land snails, some species heretofore unreported. Craig (personal communication 1980) remarks that the large species may well correspond to those collected prehistorically by the Moche population and depicted on their vessels. The chaupiyunga zone may represent a refuge for a relict population of the land snail which prior to extensive deforestation was quite common in lower zones. Craig (personal communication 1980) also suggests that the narrow terraces built on the slopes of coastal mountains may occupy a distinct thermal belt and have been used for cultivation of wild plants preadapted to a rocky arid habitat and requiring little care and water, e.g., various species of cacti and maguey.

In addition to the varied coastal plant and animal resources mentioned thus far, the Pampa Grande population benefitted from a full range of marine products. M. Shimada [1979; SHIMADA and SHIMADA in press] identified penguin, sea lion and seal bones in refuse. Whether these species constituted exotic delicacies consumed by elite cannot be determined, as they were recovered from secondary context refuse. Gilmore [1950: 385] reports that Peruvian jackass penguin (Spheniscus humboldti) is common from Valparaiso to Lobo de Tierras, Peru, and that they can be readily hunted during the breeding season "when adult birds can be clubbed and the young and eggs gathered by the hundreds." Further, "In the winter the birds are so fat that the skins with ‘blubber’ can be burned as fuel" [Gilmore 1950: 385]. Sea lions (Otarridae) and seals (Phocidae) are known today mostly from southern Peru and Chile, although the modern distribution may not accurately reflect their earlier distribution because of intensive hunting for hides, oil and meat by the Spaniards, particularly after 1700 [GILMORE 1950: 379]. They were typically hunted by natives during the breeding season on outlying rocks using clubs and spears. Moche pottery depicts this hunting. G. Kubler [1948] describes Moche exploitation of guano deposits on Macabi Island together with the ritual significance of the off-shore islands. More recently, however, Fonseca and Richardson [1978] argued sea lions
rather than guano may have been the object of prehistoric expeditions to these islands.

How the varied marine fauna described above were obtained by the Pampa Grande population remains a matter of speculation, particularly in light of the fact we have not yet identified Moche fishing communities in the Lambayeque region. Access to the shore and its resources may well have been exchanged for water rights and craft products. Archival research suggests that during late prehispanic times various inland communities had their own fishermen [Ramirez-Horton in press; Netherly 1977b] but the applicability of this pattern to Moche V times is questionable.

Even when we broaden our perspective to nonsubsistence items, the coastal orientation of the Moche V economy remains. Copper workshops excavated in Sectors D and H (Fig. 10) at Pampa Grande indicate that their activities did not include smelting. Small ceramic crucibles, molds and faceted stones of various size and form argue that metalworkers were engaged only in the manufacture of finished products. Smelting and ingot production apparently occurred outside the site probably close to mines [Shimada et al. in press]. Lechtman [1976] and our own survey [Shimada et al. 1981: 432-433] have shown that abundant copper ore was available and prehistorically exploited. West (personal communication 1980) reports Puerto Moorin Phase (ca. 500-200 B.C.) copper mining and possible smelting in the upper Virú Valley. Additional aspects of coastal metallurgy will be discussed later. Recent documentation of extensive coastal mining and metallurgical production is yet another example of our changing perception of the resource potential and diversity of the coastal environment. Most likely, Pampa Grande metal workers obtained their copper from mining-smelting centers in the neighboring Zaña and La Leche Valleys.

*Spondylus* presents an interesting and important case study situation for operation of different procurement systems. Murra [1975: 267] suggests that during late prehispanic times *Spondylus* was brought from coastal Ecuador to various parts of the Central Andes through "administered trade." Within the context of the Moche V intervalley polity, however, one may argue for its acquisition and distribution through a horizontal archipelago economic network that extended at least to the Vicús/Piura region [Matos 1965-6; Lumbereras 1979]. In this conception, the highly prized shell was transported through trusted colonists of the state. How the shell was originally acquired in coastal Ecuador or the Far North Coast, however, is not clear at all. Limited access and distribution of *Spondylus* is clearly documented at Pampa Grande. My 1978 excavation of a masonry room with terraces (Fig. 11) contiguous to a major pyramid (Huaca 11) revealed a *Spondylus* workshop. Thirty-two whole shells and hundreds of broken spines, chips and roughly rectangular pieces were recovered (Photos 4, 5, 6). The pyramid and workshop occupied a small portion of a spacious rectangular enclosure with terraces. Although within the enclosure there was no physical barrier to impede access to the pyramid and workshop, there was only one narrow entry to the enclosure itself. Coupling of the workshop and pyramid implies ritual significance of *Spondylus* artifacts and close supervision of
Fig. 11. Distribution of whole and fragmentary shell within *Spondylus* workshop contiguous to Huaca 11, Pampa Grande.

their production. This is the only *Spondylus* workshop known at the site. Discovery of a large cache of cut and polished *Spondylus* pieces atop Huaca Fortaleza [HAAS 1976] reiterates the ritual importance and highly prized nature of the shell. A possible Moche *Spondylus* workshop at Cerro Blanco in the Moche Valley discovered by M. Uhle [1913; MENZEL 1977] also points to limited access and ceremonial significance.

Two items that indicate non-coastal origin are macaw and gold. A whole macaw was buried in the posthole of an inferred weaving workshop in Sector H [SHIMADA 1976, 1978]. It is tempting to suggest that macaws were used for feather cloth but there is as yet no direct evidence for this use. Strong [1957], in his excavation at the Nazca (terminal Early Intermediate and early Middle Horizon) site of Huaca del Loro on the South Coast, reports mummified macaw and llama sacrifices in rooms adjoining the circular "temple." John Topic [1977] found a macaw along with llamas and mishpingo seeds from a small mound believed to have been associated with "traders" or transient residents at Chan Chan. Perhaps macaw sacrifice was popularized on the coast by the early Middle Horizon (ca. A.D. 600–700) as part of the Wari-Tiwanaku religious system that spread to the coast slightly before or at about this time.

The only gold objects attributed to Moche V Pampa Grande are a set of hollow gold jaguars believed to have been found at Huaca Fortaleza. Metallurgical analysis of the jaguars has been presented elsewhere [LECHTMAN et al. 1975; see footnote 74...
Fig. 12. Architectural organization of part of Sector D, Pampa Grande. LLFA corresponds to inferred cargo terminal.
I will examine the question of gold sources and procurement in a later section.

Overall, in reviewing available archaeological data on subsistence and non-subistence items, one is impressed by their overwhelmingly coastal character. Stylistic analysis of certain ceramics in direct association with diagnostic Moche V vessels (including bichrome stirrup spout jars), however, introduces the distinct possibility of a non-Moche population at the site.

Excavation of Sector D (Fig. 12) brought to light a set of interlinked rooms with a heavy concentration of burnished blackware vessels (Figs. 13, 14), most of which are plates, bowls and short-neck jars, although a few modelled stirrup-spout jars were also noted. The last group appears to be blackware imitation of bichrome Moche modelled jars. Some blackware vessels (primarily plates and bowls) occur in important contexts such as elite residential (Compound 38) and administrative ("Deer House", Compound 14) compounds, as well as atop adobe platform mounds. Although blackware vessels are primarily utilitarian serving dishes, the contexts in which they occur strongly argue they were statusful. Much of the population, I

Fig. 13. Blackware bowls and plates from Sectors D and H, Pampa Grande.
believe, utilized gourd vessels for serving. The interlinked set of rooms with blackware vessels shows subfloor fill with blackware sherds, while other areas of Sector D are largely void of blackware on the floors or in fill. Thus, for much of the duration of the Moche V occupation of Pampa Grande, those who utilized (and perhaps made) blackware vessels remained stable in number and space. These lines of evidence argue that we had a politically influential colony of non-Moche ethnic population in Sector D. Although some of the blackware vessels, particularly double-tier neck jars and almond-shape jars (Fig. 14), suggest Wari influence, the provenience of the highly developed blackware tradition remains elusive.

Pampa Grande as a viable economic and sociopolitical entity required constant influxion of human energy, agricultural produce and natural resources from within and without the Lambayeque Valley proper. Although our knowledge of the rural population that sustained the urban population at Pampa Grande is still woefully inadequate, what concrete data we have indicate that Moche V Pampa Grande shared a coast-centric economic orientation with earlier Moche sites. Despite the contraction of the southern extent of the domain, the horizontal linkage of the Moche V intervalley polity and economic network appear to have remained strong. By the end of Phase V, however, Moche ceramics from various North Coast valleys point to strong regionalization. Within the unique circumstances surrounding relocation of the capital at Pampa Grande, it developed an elaborate redistributive economy within an incipient urban context. Establishment of large-scale storage

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Fig. 14. Blackware jars showing Wari stylistic influence recovered from Sector D, Pampa Grande.
facilities, supported by varied *in situ* craft production that was supervised by intermediate level managerial personnel, as well as unprecedented population nucleation, distinguish Pampa Grande from any other Moche settlement. There is surprisingly little concrete evidence of large-scale or intensive coast-highland interaction, although ceramics suggest as yet poorly defined (Wari) contact. From the perspective of the following Period III, the stylistic influence observed in ceramics appears to be a "prelude" to a series of major transformations to come.

D. Period III: Religious Polity of Batán Grande, Expanding Cajamarca Polity and Their Economic and Political Alliance

A significantly different coast-highland relationship emerged following collapse of the Moche V inter-valley polity on the North Coast around A.D. 700, although coastal subsistence patterns and items showed strong continuity. This change and continuity is best seen in data from the Batán Grande region of the La Leche Valley. I suggest that during Period III an emergent religious polity centered in Batán Grande established a political and economic alliance with a similarly expanding North Highland Cajamarca polity following the latter's incursion into the northern North Coast (La Leche to Jequetepeque) soon after the demise of the Moche V polity. This hypothesized alliance is believed to have been related to "water rights," expanding inter-valley irrigation systems and production of status markers and funerary goods.

The Batán Grande region encompasses approximately 55 km² of fertile valley bottom land in the Central La Leche Valley. Today much of the region is covered by dense *algarrobo-zapote* forest, an ecological zone that Tosi [1960: hoja 1] desig-

Fig. 15. Central placement of Batán Grande within the North Peruvian Interaction Sphere.
mates "bosque espinoso sub-tropical." There are some 50 major architectural mounds and cemeteries spanning the late Pre-ceramic to Colonial periods, an estimated 3500 years. In addition to this exceptional concentration of religious architecture and cemeteries, the area, despite the fertility of the soil, shows no evidence of intensive or extensive prehistoric cultivation [SHIMADA 1979, 1981a; SHIMADA et al. 1981: 405-410]. This "non-agricultural" utilization of extensive fertile alluvial land in the center of a small valley with a perennial river is unique on the entire Peruvian coast where water and cultivable land are at a premium. Batán Grande prehistory is also characterized by ceramic and mural evidence for the coexistence and stylistic blending of various major contemporaneous cultures of the Middle Horizon and Late Intermediate periods, such as Moche V, Wari, Pachacamac, Middle and Late Cajamarca, "Coastal Cajamarca," Early and Classic Lambayeque. Further, Batán Grande occupies an important nexus of prehistoric communication routes linking various parts of North Peru and coastal Ecuador (Fig. 15). The east-west route

Fig. 16. Antigua Jayanca Canal south and east of Cerro Zurita before it reaches Apurúl. 
Fig. 17. Racarumi Canal system linking the upper Lambayeque and La Leche Valleys.
through Batán Grande is the closest and one of the lowest linkages between the coast, highlands and selva. Batán Grande is also richly endowed with various mineral sources (copper, iron, rock salt; silver is also said to occur) [LECHTMAN 1976; SHIMADA 1979; SHIMADA et al. 1981: 432-433; in press]. Lastly, the location of Batán Grande affords a central role in the operation of the largest intervalley hydraulic system in the New World [KOSOK 1959, 1965; RAVINES 1980; SCHAEDEL 1951a; SHIMADA 1979, 1981a; SHIMADA et al. 1981: 430-432]. Batán Grande is situated to control the Antigua Jayanca Intervalley Canal (Fig. 16; that took water to Apurle in the adjoining Motupe Valley to the north) intake point and benefit from the Racarumi II (Fig. 17) and Antigua Taymi II Intervalley Canals bringing water from the Lambayeque Valley. Schaedel [1951a: 240] remarked that the larger Lambayeque Valley was primarily utilized for agriculture by a governing group situated in the smaller La Leche Valley.

Change and stability in the subsistence and religious systems of Batán Grande, as well as the coast-highland relationship between the Lambayeque and Cajamarca regions are best seen in the 5 m. cultural stratigraphy at Huaca del Pueblo Batán Grande that covers roughly 1000 years from late Early Intermediate (Moche IV, ca. A.D. 450-500) to Inca domination of the North Coast (Photo 7). The site is best characterized as a small rural habitational settlement. Abundant primary context organic refuse covering or associated with 12 living floors attests to basic continuity in subsistence patterns.

The notable continuity from Period II is the apparent primary economic significance of domesticated llamas; the remains of both mature and immature individuals occur throughout the stratigraphy. Camelid meat was supplemented by guinea pig (most likely underrepresented because of their small size), perhaps dog, and a variety of marine fish and shellfish (Tables 2-4). Overall, there is considerable overlap in the marine resources consumed at Huaca del Pueblo Batán Grande and Pampa Grande. The greater variety recorded for Pampa Grande is most likely a function of (a) the considerably larger sample of organic refuse analyzed, (b) nature of occupation (5.5 km² capital site vs. small rural settlement) and (c) possibly the somewhat shorter distance to the Pacific. What is perhaps most important is that such a wide variety of subsistence items was available to a small rural settlement. The documented variety is strong testimony to widespread and long-established subsistence and resource procurement patterns. Plant remains from Huaca del Pueblo Batán Grande have not been analyzed but the site of Sapamé (Fig. 5), closer to the Pacific but still within Batán Grande, had abundant plant remains. Sapamé was occupied from the Middle to Late Horizons and served as a cemetery, habitational and second or third order administrative settlement. Cultivated crops and fruits included maize (8, 10, 12 and 14 row varieties), gourd, squash and chirimoya (all of which were found in most levels), as well as cotton, aji, guava, bean, pacae and avocado (Table 4). Coca seeds were recovered from both contexts sampled and represent the only archaeologically recovered specimens in the Lambayeque region with which I am familiar. Coca may have been brought down from the “irrigated pockets” or chaupiyunga.
zones of which we spoke earlier. Locally collected plants include *algarrobo*, cane and possibly *vichayo*. M. Shimada [Shimada et al. 1981: 435] observed a stratum of llama dung mixed with maize leaves, cobs, husks and stalks and another stratum of dung mixed with *algarrobo* fruit and leaves in her excavation at Sapamé. Pellets of camelid dung were found to contain *algarrobo* seeds. The preceding argues that llama were locally maintained with available forage.

Overall, as with animal protein sources, we see considerable overlap in the range of plants utilized at Pampa Grande in Period II and at Sapamé in Period III. Despite some differences in the inventory (e.g., * lúcuma*, peanuts and lentil were not identified at Sapamé), the basic thrust of the subsistence patterns remained stable. These general observations are in basic agreement with conclusions reached by S. Pozorski [1976] for the Moche Valley. She [1976: 265] observes that “The Early Intermediate Period and subsequent Middle Horizon within the Moche Valley are characterized by very similar subsistence patterns. A focus on irrigation agriculture is reflected by the high frequency of field crop cultigens within the plant species inventory. The sites are largely independent of the coast and marine resources because most animal protein is supplied by the domesticated llama.” In regard to the preceding statement, although available data for Period III from the Lambayeque region, including the site of Chotuna [M. Shimada 1980] about 2 km. from the Pacific, point to the pre-eminence of llama as the meat source, marine resources remained an important component of the subsistence even for sites over 60 km. inland (e.g., Huaca del Pueblo Batán Grande).

Although we see strong continuity in coastal subsistence patterns, ceramics from Huaca del Pueblo Batán Grande and contemporaneous sites of Period III point to significant changes in the coast-highland relationship.

In the previous section, we saw that during Moche V new ceramic forms and decorative elements were introduced, while traditional Moche forms such as stirrup spout jars with bichrome fine-line paintings continued. Another important change during this period was a sudden increase in blackware vessels (primarily plates and bowls). In the cultural stratigraphy defined at Huaca del Pueblo Batán Grande, toward the end of or soon after Moche V, we see evidence of selected new foreign stylistic elements adapted to extant ceramic forms and technology, as well as the beginnings of two distinct ceramic traditions, *paleteada* (paddle marked) and “Coastal Cajamarca.” The latter is of particular importance to coast-highland relationships in Period III.

“Coastal Cajamarca” is characterized by mold-made plates with an off-white slipped interior with a simple and limited range of relatively invariant geometric designs in red, often outlined by black lines (Fig. 18). The plates have ring bases and oxidized reddish paste. Although the plates were manufactured using locally available clay and temper, the rigid, simple abstract designs, emphasis on interior decoration, and form point to the North Highlands Cajamarca Culture as the inspirational source. These plates make their initial appearance at Huaca del Pueblo Batán Grande
in immediately post-Moche V levels, along with various Wari and Pachacamac-derived features (ca. A.D. 700–750). These observations raise the distinct possibility that the sudden appearance of "Coastal Cajamarca" ceramics is related to the increasing prestige of the Cajamarca Culture, the northward expansion of the Wari and Pachacamac polities and ideologies, and the collapse of the Moche V polity.

Were the "Coastal Cajamarca" ceramics manufactured by colonists from Cajamarca? Both supportive and contrary evidence exist. The ceramics do not show stylistic blending either with the Moche ceramic tradition that lingered on subsequent to the downfall of the Moche V polity or other contemporaneous traditions (e.g., emerging Lambayeque blackware and *paletead* traditions). Coastal Cajamarca show strong continuity and do not reflect stylistic changes documented for the highland Cajamarca ceramics [REICHLEN and REICHLEN 1949]. Their stylistic autonomy and homogeneity are clearly seen in samples derived from various sites in the Lambayeque area (e.g., Cipan-Collique Complex in the Lambayeque Valley and Chumbinique in the Zaña Valley). At the same time, various sites in Batán Grande yielded imported kaolin Cajamarca ceramics (whistles, plates, tripod plates) for the Middle to Late Horizons suggesting continuing contact with the North Highlands (Fig. 19). What was the relationship between the imported Cajamarca and locally made Coastal Cajamarca ceramics? Do they represent two highland social classes that had little contact? Do the latter represent products of colonists entrenched within their own internal social dynamics much as the Vicús/Moque discussed earlier? Why are the Coastal Cajamarca ceramics dominated by plate forms? Did the inferred colonists specialize in production of plates? If there were colonists, why do we not find significant clusters of Coastal Cajamarca ceramics? Does the wide distribution of plates, ranging from rural habitational to prestigious ceremonial-religious sites, indicate the local potters adopted them as part of their repertoire?

About A.D. 850–900 potters who followed the canons of the Coastal Cajamarca
style began to imitate the distinctive Classic Lambayeque blackware jars that had gradually evolved from around A.D. 700–750 (Photo 8). In other words, jars with all the distinctive decorative features [e.g., stylized bird-men and feline heads; Carrion 1942; Kauffmann 1973; Zevallos 1971] of the Classic Lambayeque style were reproduced using paste and paints characteristic of Coastal Cajamarca plates.

Although we cannot draw any conclusions regarding the question of Cajamarca colonists, this imitation suggests the Classic Lambayeque ideology and iconography had attained sufficiently high prestige to influence the heretofore largely autonomous Coastal Cajamarca style. At the same time, Coastal Cajamarca plates found atop the T-shaped principal mound of Huaca Corte (latest occupation ca. A.D. 950–1000) imply the style remained prestigious, despite their utilitarian nature and eroding stylistic autonomy.

The Classic Lambayeque style is believed to be a manifestation of a fundamentally religious polity whose ideological and stylistic foundation lay in early Middle Horizon syncretism among Moche, Wari and Pachacamac ideologies. Elsewhere I argued [Shimada 1981a; Shimada et al. 1981: 442] that, immediately following collapse of the Moche V polity at Pampa Grande, the Batán Grande population selectively adopted certain features of the prestigious Wari and Pachacamac ideologies to bolster the dwindling prestige of their burial and pilgrimage center, while assuring certain continuities with the earlier Mochicoid ideology. There is no a priori reason to assume that Wari influence in Batán Grande took the form of a religious mission or ideological input. At least three distinct positions on the nature of Wari expansion have appeared in print: (1) political/military dominance [Lumbrañas 1960, 1969,
1974]; (2) religious influence [MENZEL 1964]; and (3) economic or commercial expansion [SHADY and RUIZ 1979]. These possibilities, however, should not be taken as mutually exclusive. I suggest [SHIMADA n.d.2; SHIMADA et al. 1981: 442] a possible missionary-cum-merchant mode of expansion preceding political incorporation. Batán Grande may only have been influenced by the first phase of Wari expansion. The data from Batán Grande (particularly Huaca del Pueblo Batán Grande) suggest, however, that Pachacamac influence may have been underestimated. Crucial to the evolution of the Classic Lambayeque style is a bird of prey with features clearly related to the mythical eagle of the Pachacamac style of Middle Horizon 2 [MENZEL 1968]. There may have been two episodes of stylistic and ideological influence from the south during the early Middle Horizon: (a) a brief incursion of Wari influence during Middle Horizon 1B perhaps from the North Highlands accompanied by Cajamarca colonists and (b) another from Pachacamac in Middle Horizon 2 along the coast. In regard to the latter, the quantity of Pachacamac style textiles at Pacatnamú is significant [KEATINGE 1978]. In some cases, the textiles were found in direct association with Classic Lambayeque blackware jars and cotton cloth with painted Classic Lambayeque designs (H. Eling personal communication 1981).

Clearly the early Middle Horizon was a time of complex, extensive interregional interaction (both vertical and horizontal).

The Classic Lambayeque as a distinct culture is characterized by various features in addition to the art style described above. Monumental religious architecture accompanies the art style that becomes readily identifiable by A.D. 850. By about A.D. 850-900, the extensive ceremonial/funerary zone largely formed by U-shaped architectural complexes at Huacas Las Ventanas and Corte had largely attained its maximum extent and complexity. Our excavations show that both Huacas underwent a complex series of expansions and modifications beginning around A.D. 850. Another feature of the Classic Lambayeque Culture are large shaft tombs with abundant funerary goods [e.g., PEDERSEN 1976; SHIMADA 1979; TELLO 1937a, b; VALCARCEL 1937].

The little studied monumental constructions of Huacas La Merced, Oro, Ingeniero and Rodillona (Figs. 5, 20) adjoin Huaca Las Ventanas. In terms of placement, construction technique and overall architectural configuration, they appear to have been constructed within a few centuries of A.D. 850, the tentative beginning date of the Classic Lambayeque Culture. A recent photogrammetric map of the ceremonial/funerary zone based on 1949 airphotos indicates it encompassed an enormous area of nearly 1600 m. east-west and 900 m. north-south (excluding Huaca Rodillona) and contained at least 17 major architectural mounds. Some constructions apparently have been obliterated by large-scale looting (e.g., Huaca Menor, mentioned by Pedersen [1976]). Although the present course of the La Leche River cuts through the southern portion of this zone, our combined geomorphological and archaeological study has shown that this river course was established (geologically speaking) quite recently along a natural fault line at the time of a prehistoric flood of unprecedented scale, cutting through this zone between Huacas La Merced and Oro.
Fig. 20. Western portion of the ceremonial-burial precinct in Poma District, Batán Grande. Note the present course of Río La Leche cutting through the precinct.

[SHIMADA et al. 1981: 431]. The zone was undoubtedly more extensive and complex in configuration. The map also suggests that dikes were constructed along the north bank of the newly established river channel to prevent further washout of the zone. Although the above line of evidence argues for continuing utilization of the zone,
available radiocarbon-14 dates (Table 1) suggest much of the zone was abandoned by A.D. 1100. The river shift and consequent shortage of water reaching the area of Cerro La Raya and the site of El Purgatorio is believed to have prompted extension of the Taymi II Canal to bring water from the Lambayeque to La Leche Valleys. The construction of monumental religious architecture at El Purgatorio [SCHAEDEL 1951a, c, 1958] and in its immediate vicinity (e.g., Huaca Pueblo Túcume) may be coterminous with modification of the Taymi Canal (See Table 1 for relevant radiocarbon dates). In fact, it is quite possible that the center of the Batán Grande religious polity shifted southwest to El Purgatorio. The dozen monumental pyramids and platforms distributed in a semi-circle around Cerro La Raya were built using the same chamber-and-fill construction technique that characterized the monumental architecture of Batán Grande. Further, the placement of the dozen pyramids, platforms and auxiliary structures at El Purgatorio suggests unified, sustained construction activity that could have been coordinated only by a well-established corporate organization such as the Batán Grande religious polity. The location of El Purgatorio is also strategic in regard to control of agricultural land in both the Lambayeque and La Leche Valleys. I believe this hypothesized relocation of the Batán Grande religious polity to reflect its increasing political and economic power [SHIMADA n.d.2].

The economic wealth and political power of this polity is best seen in the numerous tombs with abundant funerary offerings. Although there have been few publications on these tombs, what is known of their funerary goods is staggering, perhaps without comparison in the prehistoric Central Andes. The great majority of the inventory at the Gold Museum in Lima was looted from Batán Grande [e.g., MUJICA GALLO 1970; TUSHINGHAM 1976]. The famous “Tumi de Illimo” was actually looted from a tomb in the southern sector of Huaca Las Ventanas. Many rich tombs looted from Batán Grande had stacks of “neipes” (tabular, double-T shaped copper or arsenical bronze artifacts sometimes called “axe money”), nested gold, copper, tumbaga (copper-gold alloy) and arsenical bronze nested vessels, superimposed gold “death masks” with precious (e.g., pierced emeralds over eyes) and semi-precious stone decoration. At least some of these masks were covered with tiny feathers of various colors. A polychrome mural uncovered in 1980 at Huaca Corte (Fig. 21) [also see FLORIAN 1951; SCHAEDEL 1978] suggests these masks were also decorated with elaborate feather headaddresses. Local grave looters and collectors [SHIMADA 1979] also speak of placer mined gold nuggets in ceramic vessels accompanying rich burials.

How and from where were the raw materials for these funerary objects obtained? As we are dealing with numerous elite tombs with rich gravelots, we must consider a large scale (but perhaps intermittent), closely administered procurement and production system. As a working model for future elaboration and testing, I suggest a symbiotic arrangement between the Batán Grande and Cajamarca polities. Unlike the Moche V ceremonial city of Pampa Grande, the Batán Grande polity depended for its continuing welfare largely on the prestige of its religion and ability to supply
statusful funerary and ritual items. The Batán Grande polity could offer a variety of agricultural produce, particularly cotton and maize, and marine products such as dried and salted fish, as well as ritual paraphernalia and utilitarian metal implements produced by specialized craftsmen. Cajamarca, in return, could offer access to irrigation water and certain highland raw materials including placer-mined gold nuggets and arsenic ore. The establishment of this economic arrangement may have been the “initial kick” needed for amplification of the regional economy in the Lambayeque region, the products of which were fed back into maintenance and further intensification of the symbiosis with Cajamarca. I posit regional and interregional economies reinforcing each other with the Batán Grande elite serving as coordinators. Let us briefly examine the components of these regional and interregional economies.

Various surveys conducted since 1973 of the Zaña, Lambayeque and La Leche Valleys indicate Cajamarca ceramics at strategic upper to middle valley locations. Cajamarca IV and some V ceramics (according to the Reichlens’ system) occur at such key sites as Carniche Alto (near Chongoyape where the Racarumi I canal’s intake point is situated), La Puntilla (valley neck of the Lambayeque Valley where the water diversion point for the Taymi and Lambayeque Canals is located) and
Cerro Patapo (where Taymi I and II diverge). These Lambayeque Valley sites are of particular importance as they are situated to control the two intervalley canals at the heart of the five-valley hydrological system that Kosok describes [1959, 1965]. The presence of Cajamarca ceramics at these key sites may well reflect control of crucial irrigation water.

Racarumi Canals I and II irrigated the extensive Pampa de Chaparrí that linked the upper Lambayeque and La Leche Valleys. Although present day cultivation in the Pampa is limited to a small ca. 0.7 km² area near the Tinajones Reservoir, prehistoric irrigated fields covered an estimated 19 km² of the Pampa (Fig. 17) [SHIMADA 1981b]. The prehistoric furrows are remarkably regular in layout, suggesting a unified construction effort over a relatively short time span and consistency in its use and maintenance [SHIMADA 1981b]. Several lines of evidence indicate the Pampa was (1) under cultivation for a relatively short time span and (2) irrigated late in prehistory, about A.D. 1400 to 1550 (Chimu and Chimu-Inca ceramics) as an extension into an area marginal in terms of available water. The settlement pattern in the Pampa is characterized by scattered, small habitational sites that may have been the residences of a small local farming population. Overall, for the Period concerned here, Racarumi II (that reached La Leche) and the Pampa did not have much economic importance.

Establishment of the Antigua Jayanca Canal (Fig. 16) and associated cultivation fields surrounding the major settlement of Apurí in the Motupe Valley north of the La Leche Valley appears to date to the late Middle Horizon to early Late Intermediate Period, concurrent with the inferred establishment of economic symbiosis. Many of the ceramics at Apurí can be attributed to the Late Horizon but those from sites along the canal are earlier. The canal began northeast of the modern village of Batán Grande and took water from the La Leche to the Motupe Valleys [SHIMADA 1981b]. The layout of architecture and surrounding cultivation fields covering some 40 km² [SHIMADA 1981b] suggest unified planning implemented within a short period. Although the maximum extent of the canal and the cultivation fields may have occurred quite late in prehistory, initial construction of the canal seems to date to the latter part of Period III.

An alternative to the above reconstruction would be a cause and effect relationship between destruction brought about by the unprecedented flooding (the legendary Naymlap flood?) mentioned earlier and subsequent re-establishment and expansion of the agricultural/irrigation system. In this scheme, the center of the Batán Grande polity shifted to El Purgatorio by A.D. 1200 and construction of the Antigua Jayanca and Taymi II began following the flood. The Cajamarca polity would have had a strong vested interest in these activities because of the symbiotic relationship.

During Period III, concurrent with these coastal developments, the Cajamarca polity appears to have expanded its political control of the North Highlands. Bonavia and Ravines (BONAVIA, personal communication 1980) recorded numerous Cajamarca sites (Cajamarca III–V ceramics) in their transect survey of the headwaters region of the Lambayeque Valley up to Chota. Shady and Rosas [1977] similarly
report extensive Middle Horizon Cajamarca occupation of the Chota region. My survey of the Incahuasi region at the headwaters of the La Leche showed various sites with Cajamarca IV and V ceramics.

Acquisition of gold nuggets is one of the most problematical aspects of hypothesized Cajamarca-Batán Grande economic symbiosis. All historically documented placer gold sources occur in eastern Peru, including the Chinchipe River that flows through the Jaén region in the North Highlands. During the summer of 1942 a spectacular placer gold discovery was made along the Río Negra near Pucallpa. Craig [1973: 119] reports a substantial prehistoric occupation along this river and the presence of urn burials and Inca cast bronze axe heads, pointing to prehistoric exploitation of the gold. The Cajamarca polity, situated in an intermediate location for both sources, could well have served as middlemen for the religious polity at Batán Grande. Considering the cultural value attached to gold, importation of nuggets may well have taken the form of an administered trade.

Possible local gold sources, however, cannot be ignored. I have already mentioned the possibility of a bonanza-type gold deposit in Cerro Etén. Ramírez-Horton (personal communication 1980) observes that the 1540 visita of Da Gama indicates that the parcialidad of Jayanca gave gold and silver as tribute to the Spaniards but that the Indians had no mines and their lord traded goods (believed to have been cotton) for the metal. At the same time, she [personal communication 1980] reports a charter dated July 1, 1562, establishing a partnership to exploit “mines” within the “valley” of Túcume said to yield precious stones, gold, silver and other metals. Additional 16th century documents speak of silver (Cerro Chilete, 1534–42) and gold (no name given, 1562) in the Jequetepeque and Zaña Valleys, respectively. Considering the intensity with which the Spaniards searched for gold and silver, we cannot readily assume that historical references to these metals and mines reflect prehispanic exploitation. Further, the gold and silver mentioned in historical documents may well have been quite limited in quantity.

On the other hand, copper appears to have been locally available, despite various references to copper being a highland product imported to the coast [e.g., Rostworowski 1975]. Lechtman’s [1976] survey documented the richness of copper deposits and intensity of prehispanic exploitation in the La Leche and Lambayeque Valleys [also see Shimada et al. 1981: 432–433, in press]. Excavation at Huaca del Pueblo Batán Grande showed small-scale copper working (smelting?), while the nearby site of Cerro de los Cementerios yielded abundant evidence of large scale arsenical bronze smelting and possible ingot production dating to ca. A.D. 1000–1532. However, radiocarbon dates and over 2 m. thick cultural deposits largely comprised of metallurgical debris indicate that large-scale smelting began by ca. A.D. 1000. Much of the ore appears to have been derived from the nearby major mine of Cerro Blanco linked to the former site by a prehistoric road. It is significant that from A.D. 900–1000 large quantities of metal artifacts are found in Batán Grande elite tombs. Undoubtedly, there is a systemic relationship between the funerary custom and local large-scale copper alloy production.
Lechtman [1976, 1979] notes that there is as yet no known coastal source of arsenical ore essential for the bronze that became widespread on the North Coast during Period III. The nearest sources of this ore reported by Lechtman [1976] are at Sinchao (Cajamarca ca. 3860 m.) and Quiruvilca not too far from Huamachuco (ca. 4000 m.). Netherly [1974, 1977b] suggests that the ore was acquired by the North Coast population through exchange. Such exchange may be subsuited within the economic arrangement mentioned earlier. More specifically, we can consider an exchange between arsenic ore and finished copper alloy products (ingots and/or tools). The scale of smelting suggested by metallurgical remains at Cerro de los Cementerios may indicate that metal production exceeded regional demands and the surplus was exported. Such a reciprocal arrangement would have assured a supply of needed goods for all parties involved.

The coast did not have a monopoly on the salt supply. For example, rock salt was available in San Pedro de Cajas and saline water flowing out of a cave in San Blas near the town of Junín was collected and boiled in ceramic vessels by prehistoric inhabitants of the region (J. Rick personal communication 1982). Rick reports an impressive accumulation of ceramic vessels broken to extract encrusted salt at that site. The vessels are similar to local wares suggesting salt production remained in the hands of the local production for a long period. The salt may have been traded to highland populations. However, in the case of the North Highlands, I am unaware of any rock salt mines and suspect salt may have been imported from the Central Highlands or the North Coast.

Considering the present diversity of birds in the Batán Grande region, feathers may have been locally available to the prehistoric inhabitants. Today one can obtain red, purple, blue, green, yellow and white feathers. The algarrobo-zapote forest that covers the region today was probably similarly extensive in prehistoric times and supported a rich bird community.

In concluding our discussion of Period III, we examine briefly our limited North Highland subsistence data. M. Shimada's [in press] recent analysis of "Middle Cajamarca" Phase (Reichlen's Cajamarca III and possibly early IV) faunal remains points to continuity of earlier subsistence patterns. However, she notes a possible shift in camelid management from primary use for meat toward more diversified functions, particularly cargo carrying in posited interregional contact based on a greater proportion of the camelid population being maintained beyond 3.5 years than in preceding periods.

Overall, I suggest that with expansion of the Cajamarca polity toward the coast and their control of water, on the one hand, and emergence of a religious polity centered in Batán Grande with demands for raw materials, on the other, we see the emergence of intensive vertically-oriented economic symbiosis, perhaps for the first time on the North Coast. Batán Grande craftsmen not only processed the imported raw materials but embossed each product with Classic Lambayeque motifs that transmitted its iconography and ideology. Monopoly over the production and distribution of these status items established and perpetuated the prestige of the
Batán Grande religion over a large area on the North Coast. This hypothesized symbiosis with Cajamarca may have lasted until about A.D. 1400 when the Llam­bayque region was conquered by the expanding Chimor Kingdom [Kosok 1965; Rowe 1948]. For the acquisition of highland raw materials to be used in the production of status items on the coast, I argued for “administered trade,” while Cajamarca’s interests may have been served by establishment of colonies in the upper and middle valleys, possible for cultivation of cotton and maize. Although ethno­historical sources pertaining to the 15th and 16th centuries speak of colonies of North Coastal populations in the North Highlands [Espinoza 1969-70, 1975; also see Murra’s own assessment 1972: 95-101], archaeological evidence of Period III in the North Highlands is inadequate to draw any conclusions on this upward vertical archipelago.

DISCUSSION AND CONCLUSION

The preceding presentation, though admittedly speculative and tentative, has brought out a number of methodological and substantive issues of broad significance that merit further attention.

A. Environmental Diversity along the Horizontal Dimension

By and large, our knowledge of the range and quantity of natural and cultural products available and exploited prehistorically in different regions of the Central Andes is woefully inadequate.

A basic thrust of the preceding presentation has been to show that (1) fine-grained environmental analysis of coastal valleys reveals considerable diversity from one valley to the next rather than “repetitive” valleys with “redundant” resources [Carneiro 1970; Patterson 1973], and (2) although most coastal valleys are triangular, sufficient irregularity occurs to create a complex mosaic-like ecology rather than a simple linear ordering of ecological zones. To illustrate these two points, I described “irrigated pockets” in the upper parts of some valleys, relict forest that resembles tropical rain forest in the upper reaches of the Zaña Valley, extensive, dense algarrobo forest with rich avian and animal life (e.g., parrots, squirrels, anteaters, puma and boa constrictors) in the La Leche Valley, and mineral sources in the mountains separating one valley from the next. I urge revision of our current conception of coastal valleys and their environmental and resource diversity. Characterization of the coastal valleys as repetitive or redundant is valid only at a very general level.

B. Vertical and Horizontal Archipelago Models and Associated Sociopolitical Systems

When the above points are considered, the horizontal archipelago emerges as a realistic and viable model for basic coastal self-sufficiency (subsistence and non­subsistence items). Clearly, the degree of self-sufficiency is likely to increase as a given population gains access to a wider extent of coastal valleys. Available archaeo-
logical data point to the critical importance of sociopolitical integration in achieving or approximating self-sufficiency. Late Moche state-level society apparently established sufficiently extensive political control along the coast and a series of economically motivated colonies beyond the zone of political integration to approximate coastal self-sufficiency and minimize economic interaction with highland polities. It is important to note that along the coast, the Moche state did not encounter significant competition from other polities. Period II provides the best case for coastal self-sufficiency based on direct control and a horizontal archipelago. In general, it is my impression that the vertical dimension of Andean culture ecology has been over-emphasized in recent years to the detriment of the horizontal dimension.

Regarding subsistence items and patterns, we see strong continuity and intensification or elaboration of the subsistence inventory and strategies established earlier, at least by the end of Period I. The economic importance of domesticated llama was established by the end of Period I and certainly by the end of Period II was the primary meat source for the Lambayeque population. Marine resources remained an important part of coastal diet throughout the periods examined but even at sites close to the Pacific (for Periods II and III) appear secondary to llama as a protein source. However, it should be kept in mind that available archaeological data most likely have been skewed by differential preservation.

In regard to nonsubsistence items, particularly status goods, we see shifts in the mode of procurement and nature of coast-highland relationships. In Period I, political integration of the North Coast populations appears regional in scope (one to two contiguous valleys) but for the acquisition of nonsubsistence goods their sphere of interaction expands to the neighboring highlands and coastal regions. The exchange of coastal products (salt, dried and salted fish, agricultural produce) for highland goods or compromise resource sharing in the transitional zones seems likely. For Period II, I have argued for administered trade of localized but statusful goods such as Spondylus. In general, one would expect highly localized and prized resources (e.g., unprocessed gold, obsidian, arsenic ore, Spondylus) to be procured by “administered trade” for state-level societies (and perhaps chiefdom-level societies as well). At the beginning of Period III, soon after the downfall of the Moche polity, we see coastward expansion of the Cajamarca polity whose impact on North Peruvian culture development, I believe, has long been underestimated.

The sudden appearance and long stylistic autonomy of Coastal Cajamarca ceramics and their later “imitation” of the Classic Lambayeque style during Period III appear to reflect a changing political relationship between Cajamarca and the emergent Classic Lambayeque polity at Batán Grande. Although the latter by A.D. 850-900 seems to have gained political control of the Lambayeque region and expanded south at least as far south as the Jequetepeque Valley, control of critical irrigation water appears to have remained largely in the hands of the Cajamarca polity. In this context, I argue for an economically symbiotic and politically dynamic check and balance relationship between the North Highland Cajamarca and North Coastal Batán Grande (Classic Lambayeque) polities. Actual boundaries of terri-
torial control by these polities may have oscillated according to their internal dynamics. However, our understanding of the North Highland Cajamarca style during the crucial Middle Horizon and Late Intermediate Period is still limited. The University of Tokyo's recent excavation at Huacaloma [MATSUMOTO 1980; TERADA and MATSUMOTO 1980] has greatly revised the Reichlens' [1949] earlier cultural chronology. For example, although the Reichlens and Thatcher [1975; also see 1972] distinguish various types of "Cajamarca Crusivo" as representing two different periods, they are both found in the same stratigraphic level at Huacaloma.

Elaborate funerary offerings at Batán Grande removed considerable quantities of locally available and imported resources from circulation. Gold nuggets and arsenic ore may well have been obtained from the North Highlands in exchange for tribute payments of agricultural and marine resources. However, we do not as yet have solid evidence of a vertical archipelago procurement system operating in the North Highlands or Coast for this period. If the Coastal Cajamarca ceramics imply Cajamarca colonists, what were they doing in the Lambayeque region? In general, I would argue that where adjoining coast and highland regions are controlled by two distinct but contemporaneous state-level societies, the extent and importance of vertical archipelago resource procurement is minimized in favor of "administered trade," a "horizontal archipelago," "compromise resource sharing," or direct tribute payment. In respect to the Huánuco region and Lupaca Kingdom where the archipelago model was developed, we are dealing with either (a) an asymmetrical situation where no opposing or competing group with a degree of sociopolitical integration comparable to the Lupaca or Inca existed along the vertical dimension, or (b) a situation where all parties concerned had a similarly low level of sociopolitical integration. Under the former condition, local populations might well accede to physical coexistence or permit exploitation of local resources by foreign colonists. In the latter situation, however, competition or even armed conflict would be expected unless truly symmetrical reciprocity could be achieved.

What goods must exist along the vertical dimension for the archipelago model to evolve and successfully operate? In discussing the vertical archipelago model, Moseley [1978a: 506] argued for an inherent downward thrust. However, the different sociopolitical systems of the populations involved, the quantity and quality of goods sought and general and specific ecological conditions all affect the nature of coast-highland interaction. For the Lambayeque region during the three periods examined, the overall thrust is, if anything, upward toward the highlands in search of localized, prized nonsubsistence raw materials. Moseley [1978a: 506] notes an upward thrust for the South and Far South Coast of Peru characterized by limited agricultural potential due to seasonal and entrenched rivers and small cultivable land surface. To properly answer this question, we need a systematic comparison of various coast-highland transects at different latitudes along the Andes.

C. Toward an Operational Definition of the Coastal Valley

Thus far, no explicit definition of the coastal valley has been offered, although
I have discussed "coastal" subsistence and self-sufficiency at some length. Despite numerous publications dealing with coastal settlement and subsistence patterns, an explicit, culturally and behaviorally meaningful definition of the coastal valley has been sorely lacking. How do we know when we come to the "boundaries" of a coastal valley in our archaeological fieldwork? Clearly how and where boundaries for the coastal valley (or for any "study area") are drawn significantly affect our perception of phenomena with spatial dimensions [PINDER et al. 1979]. This is particularly apparent when major sites or clusters of sites occur near the "edge" of a coastal valley [PINDER et al. 1979]. The use of natural barriers or other features for heuristic purposes is understandable but when they are used for cultural analysis and interpretation obvious problems emerge. Afterall, we are speaking of "cultural space" and not the basically static space defined by the Andean foothills.

One obvious solution to the definition of the coastal valley is to adjust the definition in accordance with the research questions posed. However, this has the major drawback of limiting inter-valley comparison. A compromise solution that incorporates cultural and natural features is in order. For research questions related to periods after the inception of large-scale agriculture, I suggest the adoption of the furthest inland points of the north or south bank Maximum Elevation Canal as the upper limit and the highest construction above the Canals along the same slope as the north and south extent of the coastal valley. The western limit would be the Pacific Ocean. The basic outline thus produced must be adjusted to local, idiosyncratic circumstances, for example, pockets of high water table in quebradas that permit "sunken garden" cultivation.

Areas where separate irrigation systems occur further inland from the intake points of the Maximum Elevation Canals may be described as "Intermediate" or "Transitional" zones. Such zones may well correspond to the chaupiyunga that is economically important due to coca, fruits and other cultigens that are not cultivable or available further down the valley.

The underlying justification for this approach is that the Maximum Elevation Canals reflect the extent of land brought under cultivation by coastal populations and that, since water is the critical element in coastal existence, its control and efficient use was the overriding concern of the population. The canals and their intake points embody these concerns and achievements. Further, this approach leads to a dynamic conception of the coastal valley. While the highest canals (north and south banks) constructed and their physically associated settlements serve as the boundaries for settlement pattern analysis, for settlement system analysis of a specific time period, the Maximum Elevation Canals and associated settlement of that particular period become the boundaries. Maximum Elevation Canals in many valleys have changed from one period to the other, perhaps due to tectonic activity or extensive washouts from flooding. The adoption of this approach brings up another important point. Consider the case of the Racarumi Canals in the Lamberque Valley (Figure 2). These canals, along with the Taymi Canal, are the Maximum Elevation Canals and, at the same time, intervalley in scope. The
Horizontal Archipelago and Coast-Highland Interaction

approach in this case leads to, by necessity, an intervalley perspective away from the overly constricting conventional view that the individual valley is the basic spatial unit of study in Peruvian coastal archaeology. Further, this approach permits effective comparison as basic cultural geographical parameters are standardized. Izumi [1971: 19-30] criticized the valley-unit approach as a major factor underlying regionalization of our perspective and the false impression that intra-valley patterns could be generalized to the entire Andean region. He lamented the tendency among North American graduate students to entrench themselves in a single valley. The approach I advocate may better deal with these limitations and tendencies.

D. How Adequate are our Archaeological Data and How Well Prepared are Archaeologists to Deal with the Coast-Highland Relationship?

Considerable excitement was generated by Murra's verticality thesis and more and more archaeologists are incorporating detailed ecological analysis and questions surrounding coast-highland interaction in their research designs and fieldwork. However, available archaeological data are fragmented and not sufficiently detailed, too often the coincidental byproduct of fieldwork carried out for other research interests within a single valley or environmental zone [SCHAEDEL and SHIMADA 1982]. This criticism is applicable to my own work and data. Stimulated by Murra's work, some (but still too few) archaeologists have begun systematic assessment of various models of coast-highland interaction [e.g., DILLEHAY 1977, 1979; LYNCH 1967, 1971; ONUKI 1978, 1981]. Important fieldwork is being carried out by John and Teresa Topic in the transitional zone between the upper Chicama and Moche Valleys, on the one hand, and the North Highlands west of Huamachuco, on the other. They [1981] have documented extensive wall constructions and numerous hilltop settlements in their study area, attesting to intense prehistoric occupation. Whether these settlements are defensive in nature remains problematical. Were they permanent settlements or temporary refuge for times of hostility as Duviols [1973] describes for the Central Highlands? Further study of transitional zones is essential for comprehensive understanding of North Highlands-Coast interaction.

Following J. C. Tello's theory of the "cultura matriz" and significance of selva cultures in the rise of Andean civilization [TELLO 1942], Lathrap [e.g., 1963, 1965] showed that the emergent concept of interaction sphere should include the selva. Rather than speaking of coast and highlands, perhaps we should speak of lowlands and highlands so that the vertical linkage being examined includes the eastern slopes of the Andes. We need a series of interdisciplinary team studies of various transects linking the coast and selva at different latitudes similar to the geographical profiles Troll [1931, 1958] presents.

In addition to conceptual and research design problems, archaeologists face a series of challenging methodological problems in the field. In many cases, analyses of subsistence remains suffer from limited sample size and contexts as well as preservation problems. Archaeological dating and functional identification are ever-present problems. Actual identification of local and foreign products, whether
natural or cultural, is often far easier than identification of the cultural means of their acquisition. How can we differentiate a structure involved in trade rather than redistribution?

Archaeological field identification of the presence of intrusive groups such as mitmaes typically depends on recognition of distinct cultural patternings (including inventories of portable artifacts and architecture) without local antecedence. This is more easily said than done, particularly at the ethnic level. In reality, identification of different ethnic groups remains a largely theoretical possibility. If we are dealing with foreign colonies representing an advanced culture with its own distinct ceramic style and art, their identification may not be difficult. However, if exploitation of local resources by foreign groups was transitory in nature without establishing permanent bases or they represent an ethnic group without a readily distinguishable artifactual style or inventory, archaeological identification of their physical presence may be quite difficult. For example, can we readily show the physical presence of groups of North Highlanders who today gather seaweed and shellfish along the Huanchaco beach near Trujillo? I think this would be a very challenging task.

Related to this problem is the question of the degree to which the material culture of various mitmaq communities retained their identity over time and space. What were the effects of permanency of the colony and distance separating the colony from the home community? Do long-term colonies in distant lands effectively maintain their social and material identities?

Finally, how can archaeologists identify territories controlled by different groups? Certainly some areas are physically marked by walls or other structures. What about beaches? Without documentary assistance can we readily identify the ethnic or cultural groups in control of beaches or coca plantations [cf. Rostworowski 1973; Netherly 1976]? What about the ubiquitous stone walls found on coastal mountains? Are they territorial markers? If so, how can we identify those in control?

These questions, cautions and conditions must be kept in mind in any archaeological discussion of prehispanic coast-highland interaction, including the archipelago model.

**Conclusions**

This ambitious presentation is meant to set the stage for more structured and detailed examination of coast-highland relationships and conditions that give rise to different resource procurement systems. Perhaps with some success, I explored the limits of coastal self-sufficiency based on a horizontal archipelago. Environmental diversity of coastal valleys as well as the viability of the horizontal archipelago/self-sufficiency model must be further pursued with more rigor. This presentation also serves as a plea for additional work in the North Highlands in close coordination with those working on the North Coast.
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ZEVALLLOS, Jorge
Table 1. Radiocarbon dates for the Lambayeque Region

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<tr>
<td>SMU-873 1520±65 B.P.  Stratum XII-N; charcoal</td>
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<td>SMU-901 1450±60  Stratum XII-D-E; charcoal</td>
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<td>SMU-876 1385±65  Stratum XII; charcoal from buried urn</td>
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<td>SMU-899 1030±40  Stratum XI-A; charcoal</td>
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<td>SMU-875 932±41  Stratum IX; charcoal</td>
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<td>SMU-900 770±40  Stratum VI-A; charcoal</td>
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<td>SMU-902 740±40  Stratum IV; charcoal</td>
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<tr>
<td>SMU-834 3273±163  Templo de las Columnas; charcoal from floor context offering fire</td>
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<td>SMU-898 2520±40  Templo de las Columnas; charcoal from the center of a clay column (abandonment)</td>
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<td>SMU-833 1450±60  Construction Phase I; charcoal</td>
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<td>SMU-903 910±50  Construction Phase III; decayed wood of plastered, painted column</td>
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<th>Huaca Corto</th>
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<td>TK-30 2880±100  Huaca Corto cemetery, “pre-Chavin” burial; charcoal</td>
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<td>Beta-1802 985±65  Platform Mound I top; charcoal from burnt roof</td>
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<td>GN-5474 915±50  Classic Lambayeque burial, Huaca Menor; wooden bow</td>
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<th>Cerro de los Cementerios, Sector III</th>
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<tr>
<td>P-3121 940±50  Deep trench cutting through 2 meters of cultural deposits; charcoal from bottom</td>
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<td>P-3119 890±40  Deep trench cutting through 2 meters of cultural deposits; charcoal from the middle of stratigraphy</td>
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<td>P-3120 730±50  Deep trench cutting through 2 meters of cultural deposits; charcoal near top of stratigraphy</td>
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<td>Beta-2591 450±60  Smelting furnace, Excavation Area I; charcoal</td>
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<th>Huaca Las Ventanas</th>
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<td>Beta-3403 1090±60  Immediately below Wall 1, Eastern Sector (Construction Phase I?); charcoal from firepit.</td>
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<th>Túcume-El Purgatorio</th>
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<td>Bonn-1956 900±70  Huaca del Pueblo, Túcume; wood</td>
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<td>Bonn-1955 790±70  Túcume, pre-Spanish pyramid; wood</td>
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<td>Bonn-1144 690±50  Huaca Alagarda, Túcume, E. wall, 45–60 cm. below top; wood</td>
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<td>Bonn-1142 680±50  Huaca El Mirador, NW platform, 55–60 cm. under surface, Túcume; charcoal</td>
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<td>Bonn-1141 660±60  Huaca El Mirador, Túcume; wood</td>
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Huaca Chotuna

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<td>Bonn-1957</td>
<td>720 ± 70</td>
<td>Huaca Chotuna, Lambayeque; wood</td>
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<tr>
<td>Bonn-1958</td>
<td>590 ± 70</td>
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Pampa Grande

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<tr>
<td>A-1705</td>
<td>1380 ± 70</td>
<td>Moche V primary context wooden post; charcoal</td>
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<tr>
<td>SMU-399</td>
<td>1300 ± 60</td>
<td>Moche V floor context; charred cotton</td>
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<tr>
<td>A-1704</td>
<td>1280 ± 70</td>
<td>Moche V primary context wooden post; charcoal</td>
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Apuré

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<td>1430 ± 50</td>
<td>Secondary context overlying a floor? Adobe structure 1; charcoal</td>
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<tr>
<td>Bonn-1813</td>
<td>1100 ± 70</td>
<td>Secondary context overlying a floor? Adobe structure 2; charcoal</td>
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</table>

Table 2. Faunal Remains from Sapamé, Cholope and Huaca del Pueblo Batán Grande

<table>
<thead>
<tr>
<th>Faunal Remains</th>
<th>Sapamé</th>
<th>Cholope</th>
<th>Huaca del Pueblo Batán Grande</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rodents</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caviidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cavia porcellus</em> (guinea pig)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Cricetidae (rat)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Carnivores</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Canidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Canis familiaris</em> (dog)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><em>Dusicyon</em> sp. (fox)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Artiodactyles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Camelidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Lama</em> cf. <em>glama</em></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Primates</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hominidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Homo sapiens</em></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Reptiles</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Teiidae (lizard)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Dicrodon guttulatum</em></td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Birds</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tinamidae (tinamou)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Phalacrocrocoridae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Phalacrocorax</em> sp. (cormorant)</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Scolopacidae (sandpiper)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Columbidae (dove)</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Corvidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Cyanocorax</em> ynca (jay)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unidentified Bird</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Fish</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Myliobatidae (ray)</td>
<td>x</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Sciaeniidae (drum)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Sciaena delicosa</em> (saco)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Clupeidae</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Sardinops</em> sp. (herring)</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Unidentified Fish</td>
<td>x</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Crabs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portunidae</td>
<td>x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Table 3. Shell Remains from Sapamé, Cholope and Huaca del Pueblo Batán Grande

<table>
<thead>
<tr>
<th>Shell Remains</th>
<th>Sapamé</th>
<th>Cholope</th>
<th>Huaca del Pueblo Batán Grande</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amphineura (chiton)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Buccinidae (whelk)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Cantharus sp.</td>
<td>X</td>
<td>X</td>
<td>X</td>
</tr>
<tr>
<td>Cypraecidae (cowrie)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Cypraea sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Donacidae (wedge clam)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Donax peruvianus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Naticidae (moon snail)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Sinum sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Polinices sp.</td>
<td>X</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Nassaridae (mud snail)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Nassarius cf. taeniolatus</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olividae (olive shell)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Olivella sp.</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Pectinidae (scallops)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aequipecten sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semelidae (semele clam)</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Semele corrugata</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spondylidae (thorny oyster)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Spondylus princeps</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terebridae (auger shell)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Terebra sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Thaididae (dog winkle)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Thais sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Trochidae (tegula top shell)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Tegula sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Turbinidae (turban shell)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Turbo sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Veneridae (venus clam)</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Protothaca sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Terrestrial gastropod</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Scutalus sp.</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4. Plant Remains from Sapamé and Cholope

<table>
<thead>
<tr>
<th>Plant Remains</th>
<th>Sapamé</th>
<th>Cholope</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annonaceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Annona cf. muricata (guanabana)</td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Capparidaceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Capparis ovalifolia (vichayo)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cucurbita sp. (squash)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Lagenaria siceraria (gourd)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Erythroxylaceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Erythroxylon coca (coca)</td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Plant Remains</td>
<td>Sapamé</td>
<td>Cholope</td>
</tr>
<tr>
<td>-------------------</td>
<td>--------</td>
<td>---------</td>
</tr>
<tr>
<td>Gramineae</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gynerium sagittatum</em> (cane)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><em>Zea mays</em> (corn)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Lauraceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Persea americana</em> (avocado)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Leguminosae</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Phaseolus vulgaris</em> (common bean)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><em>Prosopis chilensis</em> (algarrobo)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td>Malvaceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Gossypium</em> sp. (cotton)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Myrtaceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Campomanesia</em> sp. (palillo)</td>
<td>x</td>
<td>x</td>
</tr>
<tr>
<td><em>Psidium guajava</em> (guava)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td>Solanaceae</td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>Capsicum annuum</em> (aji)</td>
<td>x</td>
<td></td>
</tr>
<tr>
<td><em>Inga feuillei</em> (pacae)</td>
<td>x</td>
<td></td>
</tr>
</tbody>
</table>

**Table 5.** Flora from Pampa Grande (Those species marked with an asterisk were recovered outside and not within the stratified random sample)

<table>
<thead>
<tr>
<th>Family</th>
<th>Species</th>
<th>Common Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Capparidaceae</td>
<td><em>Capparis angulata</em></td>
<td><strong>Zapote</strong></td>
</tr>
<tr>
<td>Cucurbitaceae</td>
<td><em>Cucurbita maxima</em></td>
<td><strong>Squash</strong></td>
</tr>
<tr>
<td><em>Cucurbita</em> sp.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Gramineae</td>
<td><em>Gynerium sagittatum</em></td>
<td><strong>Cane, caña brava</strong></td>
</tr>
<tr>
<td></td>
<td><em>Zea mays</em></td>
<td><strong>Corn</strong></td>
</tr>
<tr>
<td>Lauraceae</td>
<td><em>Persea americana</em></td>
<td><strong>Avocado</strong></td>
</tr>
<tr>
<td>Leguminosae</td>
<td><em>Arachis hypogaea</em></td>
<td><strong>Peanut</strong></td>
</tr>
<tr>
<td></td>
<td><em>Canavalia</em> sp.</td>
<td><strong>Bean</strong></td>
</tr>
<tr>
<td></td>
<td><em>Phaseolus vulgaris</em></td>
<td><strong>Common bean</strong></td>
</tr>
<tr>
<td></td>
<td><em>Prosopis chilensis</em></td>
<td><strong>Algarrobo</strong></td>
</tr>
<tr>
<td>Malvaceae</td>
<td><em>Gossypium</em> sp.</td>
<td><strong>Cotton</strong></td>
</tr>
<tr>
<td>Myrtaceae</td>
<td><em>Campomanesia lineatifolia</em></td>
<td><strong>Palillo</strong> (guava-like fruit)</td>
</tr>
<tr>
<td></td>
<td><em>Psidium</em> guajava</td>
<td><strong>Guava</strong></td>
</tr>
<tr>
<td>Sapotaceae</td>
<td><em>Lucuma bifera</em></td>
<td><strong>Lúcuma</strong></td>
</tr>
<tr>
<td>Solanaceae</td>
<td><em>Capsicum annuum</em></td>
<td><strong>Chili pepper</strong></td>
</tr>
</tbody>
</table>
Table 6. Faunal List for Pampa Grande (Those marked with an asterisk were recovered outside and not within the stratified random sample.)

<table>
<thead>
<tr>
<th>Mammals</th>
<th>Rodents</th>
<th>Artiodactyles</th>
<th>Amphibians</th>
<th>Reptiles</th>
<th>Birds (List incomplete; being identified by P. Brodkorb, Univ. of Fla.)</th>
<th>Fish</th>
</tr>
</thead>
<tbody>
<tr>
<td>Marsupials</td>
<td>Rodents</td>
<td>Artiodactyles</td>
<td>Amphibians</td>
<td>Reptiles</td>
<td>Birds (List incomplete; being identified by P. Brodkorb, Univ. of Fla.)</td>
<td>Fish</td>
</tr>
<tr>
<td>Didelphidae</td>
<td>Cricetidae</td>
<td>Cervidae</td>
<td>Salientia</td>
<td>Squamata</td>
<td>Psittacidae</td>
<td>Carangidae</td>
</tr>
<tr>
<td>*Didelphis sp.</td>
<td>cf. Oryzomys sp.</td>
<td>Dama virginianus</td>
<td>Bufonidae</td>
<td>Boidae</td>
<td>*Columbidae</td>
<td>*cf. Caranx</td>
</tr>
<tr>
<td></td>
<td>cf. Sigmodon sp.</td>
<td>Cameroon</td>
<td>*Bufo cf. marinus or blombergi</td>
<td>*Constrictor constrictor</td>
<td>*Carcharhinidae</td>
<td>*cf. Sardinops</td>
</tr>
<tr>
<td></td>
<td>Caviidae</td>
<td></td>
<td>Ranidae</td>
<td>Caudata</td>
<td>Cathartidae</td>
<td>Mugilidae</td>
</tr>
<tr>
<td>Cavia porcellus</td>
<td>Chinchillidae</td>
<td></td>
<td>*cf. Rana</td>
<td>Teidae</td>
<td>*Myliobatidae</td>
<td>Mugil sp.</td>
</tr>
<tr>
<td></td>
<td>*Lagidium peruanum</td>
<td></td>
<td></td>
<td></td>
<td>*Spheniscus humboldti</td>
<td>*Myliobatidae</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Pomadasyidae</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>*Anisotremus sp.</td>
</tr>
</tbody>
</table>

- opossum
- rice rat
- cotton rat
- guinea pig
- mountain viscacha
- domestic dog
- fox
- seal
- white-tailed deer
- cameld (compare llama)
- toad
- frog
- boa constrictor
- lizard
- black vulture
- jack-ass penguin
- pampano
- requiem shark
- sardine
- mullet
- ray
- grunt
*Rhinobatidae  
Sciaenidae  
*Sciaena deliciosa  
*Paralsonchurus sp.  
*Cynoscion sp.  
*Baierella sp.  
Sphyrinidae  
*Sphyra sp.  
Syruriformes  
*cft. Ariopsis  
*cfr. Rhambdia  
*cfr. Scaides  
*cf. Eleotridae  
Crabs  
Portunidae  
*Callinectes toxotes  
*Platythauus orbignii  

Table 7. Shell Remains from Pampa Grande

<table>
<thead>
<tr>
<th>Amphineura (chiton)</th>
<th>Semelidae (semele clam)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balanidae</td>
<td>Semelie corrugata</td>
</tr>
<tr>
<td>Balanus sp. (barnacle)</td>
<td>Spondylidae (thorny oyster)</td>
</tr>
<tr>
<td>Buccinidae (whelk)</td>
<td>Cantharhis fusiformes</td>
</tr>
<tr>
<td>Cantharhis sp.</td>
<td>Cantharhis fusiformes</td>
</tr>
<tr>
<td>Cardiidae (cockles or heart clam)</td>
<td>Cantharhis fusiformes</td>
</tr>
<tr>
<td>Mexticardia procrea</td>
<td>Cantharhis fusiformes</td>
</tr>
<tr>
<td>Conidae (cone shell)</td>
<td>Conus fergusoni</td>
</tr>
<tr>
<td>Conus fergusoni</td>
<td>Conus fergusoni</td>
</tr>
<tr>
<td>Donacidae (wedge clam)</td>
<td>Donax peruvianus</td>
</tr>
<tr>
<td>Donax peruvianus</td>
<td>Donax peruvianus</td>
</tr>
<tr>
<td>Nasseraridæ (mud snail)</td>
<td>Nasseraridæ sp.</td>
</tr>
<tr>
<td>Nasseraridæ sp.</td>
<td>Nasseraridæ sp.</td>
</tr>
<tr>
<td>Naticidae (moon snail)</td>
<td>Polinices sp.</td>
</tr>
<tr>
<td>Polinices sp.</td>
<td>Polinices sp.</td>
</tr>
<tr>
<td>Olividae (olive shell)</td>
<td>Olivella columnellaris</td>
</tr>
<tr>
<td>Olivella columnellaris</td>
<td>Olivella columnellaris</td>
</tr>
<tr>
<td>Pectinidae (scallop)</td>
<td>Aequipecten sp.</td>
</tr>
<tr>
<td>Aequipecten sp.</td>
<td>Aequipecten sp.</td>
</tr>
</tbody>
</table>

Table 8. Estimated storage capacity for the eight units

<table>
<thead>
<tr>
<th>Provenience</th>
<th>Number of cells</th>
<th>Computed storage capacity using a standardized height of two meters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unit 25</td>
<td>24</td>
<td>1242.2 m³</td>
</tr>
<tr>
<td>Unit 29</td>
<td>20</td>
<td>570.4</td>
</tr>
<tr>
<td>Unit 30</td>
<td>14</td>
<td>487.2</td>
</tr>
<tr>
<td>Unit 28</td>
<td>6</td>
<td>131.7</td>
</tr>
<tr>
<td>Unit 27</td>
<td>7</td>
<td>237.3</td>
</tr>
<tr>
<td>Unit 26</td>
<td>5</td>
<td>111.0</td>
</tr>
<tr>
<td>Unit 32</td>
<td>4 or 5</td>
<td>185.3</td>
</tr>
<tr>
<td>Unit 51</td>
<td>3</td>
<td>30.6</td>
</tr>
</tbody>
</table>

Figures based on Anders [1975]
Photo 1. Circular painted columns at Templo de las Columnas, Huaca Lucia, Batán Grande, looking north.

Photo 2. Portion of the central stairway leading up to the Templo de las Columnas atop 2-tier platform, looking south.

Photo 3. East edge of stairway. Note clay seal at the top of the stairway and another being cleaned by worker below.
Photo 4. & Photo 5. *Spondylus* fragments from workshop contiguous to Huaca 11, Pampa Grande.
Photo 6. Cut and polished *Spondylus* fragments recovered from cache atop Huaca Fortaleza, Pampa Grande.

Photo 7. General view of stratigraphy of principal trench at Huaca del Pueblo Batán Grande.
Photo 8. Example of a Classic Lambayeque blackware jar.