WAS HUARI A STATE?

William H. Isbell and Katharina J. Schreiber

Pristine state government evolved among the indigenous cultures of the central Andes, but archaeologists have not demonstrated when and where. Conceptualization of the state as an integrative mechanism for gathering and processing information and for deliberating decisions provides explicit archaeological criteria for statehood. Examination of the archaeological record reveals that Middle Horizon Huari fulfills almost all of these criteria for statehood, although many data remain to be collected before the processes of prehistoric Andean state formation will be fully understood.

PRISTINE STATES contrast with other states in that they arose through internal evolutionary processes, uninfluenced by more complex state societies (Fried 1960, 1967). Known cases are limited to a few centers of prehistoric civilization, perhaps to only 2. Pristine state formation, a process often associated with the urban "revolution" (Childe 1950), provides archaeology with one of its best opportunities to study prehistoric cultural transformation and to contribute evolutionary information to the anthropological goal of explaining culture change.

Archaeological study of prehistoric state formation has been restricted by definitions of statehood that tie investigations to written documents. Conceptualized as a collection of organizational features, state definitions reflect more interest in jurisprudence than in sociocultural evolution. Three criteria generally appear in all definitions of the state (Adams 1966; Fried 1967; Krader 1968; Service 1975). First, the state exercises a monopoly upon the right to use force in the execution of decisions and in the maintenance of order. Second, the state defends a territory against encroachment upon its sovereignty. Third, the state administers public affairs within its territory through a hierarchy of officials. Additional special interests may also appear, such as private property, control of foreign trade, or formalization of law. Such criteria are often difficult to identify from the archaeological record.

In the central Andes, writing never was the means of recording information, and the organizational features of statehood were not documented until Spanish descriptions of the Incas. In consequence, differences in opinion concerning the pristine Andean state are vast. Kirchhoff (1949) notes that several stratified political organizations had existed prior to the Inca state. The Early Horizon (1300-300 B.C.) has been accredited with the pristine state (Proulx 1976); the Moche culture of the last half of the Early Intermediate period (300 B.C.-A.D. 550) has had the same claim made for it (Willey 1971); and the Huari polity of the Middle Horizon period (A.D. 550-950) has also been given the honor (Lumbreras 1969). Unfortunately, these assessments have not been subjected to detailed evaluation according to a consistent set of criteria. Obviously the central Andes, and other nuclear areas, are not going to contribute to significant cross-cultural generalizations about processes of pristine state formation until archaeologically identifiable criteria of statehood are established.

An evolutionary conceptualization of state origins may be established on the basis of the relative frequency of decisions made by an institutionalized decision-making body as opposed to decisions reached by consensus based in customary behavior. As the frequency of decisions made by the institutionalized body rises, it becomes full-time and requires a formal communications network to gather and process the information relevant to decisions being deliberated.

The relative frequency of decisions deliberated by an institutionalized decision-making body is certainly not directly apparent in the archaeological record. But, the information gathering and processing network whose complexity is proportional to the amount of data processed by the

William H. Isbell, Department of Anthropology, State University of New York, Binghamton, NY 13901
Katharina J. Schreiber, Department of Anthropology, University of Connecticut, Storrs, CT 06268

decision-making body can be studied by archaeologists. Wright and Johnson (1975) have already formulated explicit criteria for statehood which appear to be based upon a conceptualization like that outlined here. As this scheme provides one potentially useful means of evaluating prehistoric Andean political organizations, we propose to examine the case of Huari in light of these criteria.

CRITERIA FOR STATEHOOD

State government is a hierarchical administrative structure for consciously collecting, processing, and storing information in order to reach and carry out decisions based on that information. Processed data from low-level collection points are communicated to higher order nodes within the hierarchical communications network where processing, storage, and communication are repeated. At each nodal level, decisions are made and communicated upward as well as back down the hierarchy through executive officials. Wright and Johnson (1975) argue that the administrative mechanisms of successively higher nodes require functionally specialized facilities of different orders of magnitude. Further, a close correlation has been shown to exist in preindustrial societies between the number of functions fulfilled by a community and its population size (Johnson 1973). Consequently, a hierarchical administrative structure should be reflected in a multimodal distribution of prehistoric community sizes. Site size modes should correspond to administrative modes within the state communications hierarchy. It is stressed, however, that a settlement hierarchy alone directly implies little about administration. Further evidence of administrative activities must be demonstrated, for example, through artifact associations.

Obviously all societies collect, process, and store information, and some nonstate societies may have relatively formal mechanisms for such activities. However, Wright and Johnson (1975) argue that state government requires at least 3 levels of administrative nodes above the minimal community. In a defined region, state government may be recognized by a settlement hierarchy with a single (or low number of) large, first-order settlements. A greater number of smaller, second-order settlements should coexist with a significantly larger number of third-order centers and a yet greater number of minimal communities. A settlement hierarchy with even more site size nodes would indicate a more complex state administrative structure, while a lower number of nodes would indicate a simpler form of organization such as a chiefdom. A single mode normal curve might indicate an egalitarian society with community size reflecting differential resources and alliances.

In addition to these quantitative criteria, Wright and Johnson (1975) support their identification of prehistoric state administrative structures with qualitative criteria. These include the presence of administrative artifacts and architecture within individual settlements as well as the location of settlements of various sizes relative to access or communication routes among them. Fieldwork designed to identify early Mesopotamian states consisted of surface survey and limited excavations that investigated the number of sites, total site area, architectural features indicative of administrative functions, presence of administrative artifacts, and the spatial relationships among settlements of different rank orders for successive time periods.

This conceptualization of the state as a conscious decision-making mechanism provides the archaeologist with tools necessary to study the pristine state. However, until these criteria are tested in several archaic states, the relevance of exceptions and variations found in modern regional settlement hierarchies cannot be fully evaluated.

INCA REGIONAL ORGANIZATION

A preliminary and somewhat intuitive test of the proposed operational criteria for statehood can be conducted with Inca settlements whose administrative functions are known from sixteenth century history. Unfortunately there is no single region which combines complete settlement survey with historical documentation. However, a multitiered settlement hierarchy that parallels Inca administrative structure does become obvious when the Inca empire is examined. With the exception of the variability in lower order centers, the hierarchy would be easily identified by archaeological survey.

Cuzco was the largest sixteenth century center in the Andean highlands, with 4000 residential structures in its nucleus and perhaps 100,000 structures in the valley (Rowe 1967). It still contains the remains of magnificent administrative buildings, even though perishable administrative artifacts such as the string *quipu* account records, clothing and headdresses indicative of official statuses, and scale models of provincial territories are gone today.

A system of highways connected Cuzco with provinces in each of the 4 quarters into which the state was divided. The capital contained at least 2 administrative nodes within itself—the highest level, represented by the Sapa Inca, and the quarter-level represented by the governors for each quarter, who sat in council to the Sapa Inca along with supreme military dignitaries (Rowe 1946).

The second-order settlements were provincial capitals distributed along the main highways. Each quarter of the state contained a number of provinces, each with a more or less equivalent provincial center. In the highlands, these were large towns with many administrative buildings of fine cut stone similar to, but on a smaller scale than Cuzco. Morris' (1967, 1971, 1972b, 1974) research at Huánuco Pampa indicates that this provincial capital contained 3500 structures spread over 250 ha. It housed a small, permanently resident group of administrators, including the provincial governor and stewards who were in charge of provisioning and maintaining the *tambos* or roadside waystations spaced at regular intervals along highways for the convenience of official travelers. A modest corpus of full-time craft specialists occupied barracks-like quarters and workshops, while most of the remainder of the settlement was devoted to quarters for traveling officials and a substantial population of periodically rotated commoners paying their labor tax in state service. Vast warehouse facilities contained stored goods collected throughout the province for the support of the resident officials, corvee laborers, and a variety of state retainers.

Third-order settlements were connected to the provincial capital by a secondary road network. These centers were also administrative and were generally the residences of chiefs or kings of the local ethnic polities that had existed before Inca annexation. Although the old ethnic polities were reorganized by the Inca and required to pay special tribute and/or labor tax to the state, they maintained at least some of their pre-Inca integrity. As a consequence, their capitals vary greatly depending on the size and degree of centralization of the older polities. On the coast it appears that some powerful and majestic centers became seats of Inca provincial authority as well as capitals of incorporated polities (Menzel 1959), compressing the administrative settlement hierarchy, but this was uncommon in the highlands. Third-order highland Chuquitos, the 80 ha Lupaca capital (Hyslop 1976), which administered the affairs of about 20,000 family units and was in turn subject to the Inca provincial center of Hatun Colla, was much larger and more impressive than Ichu. But Ichu, a site of unspecified size containing somewhat more than 100 structures, was also a third-order administrative center, housing the chief of the Chupaychu—an ethnic polity of about 3000 family units. Ichu was subject to the provincial center at Huánuco Pampa, but was an administrative center for fourth-order settlements such as Auquimarca, a community with only 40 to 55 structures, which was the residence of a Chupaychu chief of 1000 family units (Morris 1966, 1967, 1972a, 1972b, 1974; Morris and Thompson 1970; Murra 1956, 1962, 1968, 1972, 1975; Murra and Morris 1976).

WAS HUARI A STATE?

Huari is a vast archaeological site in the Ayacucho Valley of central highland Peru (Figure 1). It shares a distinctive iconography and ceramic style with so many other Andean settlements that the iconography and style have become a time marker known as the Middle Horizon (Figure 2). Stylistic unity in ceramics and some other media, formal similarities in architecture, and the great size of Huari have all supported the interpretation of Huari as the capital of a pre-Inca, Huari empire. It is now possible to examine the evidence for Huari statehood employing the operational criteria discussed above.

The proposition to be specifically evaluated states that Huari society was administered by a state level government during the Middle Horizon period. Following the criteria delineated above, the testing of this proposition involves 2 major requirements.

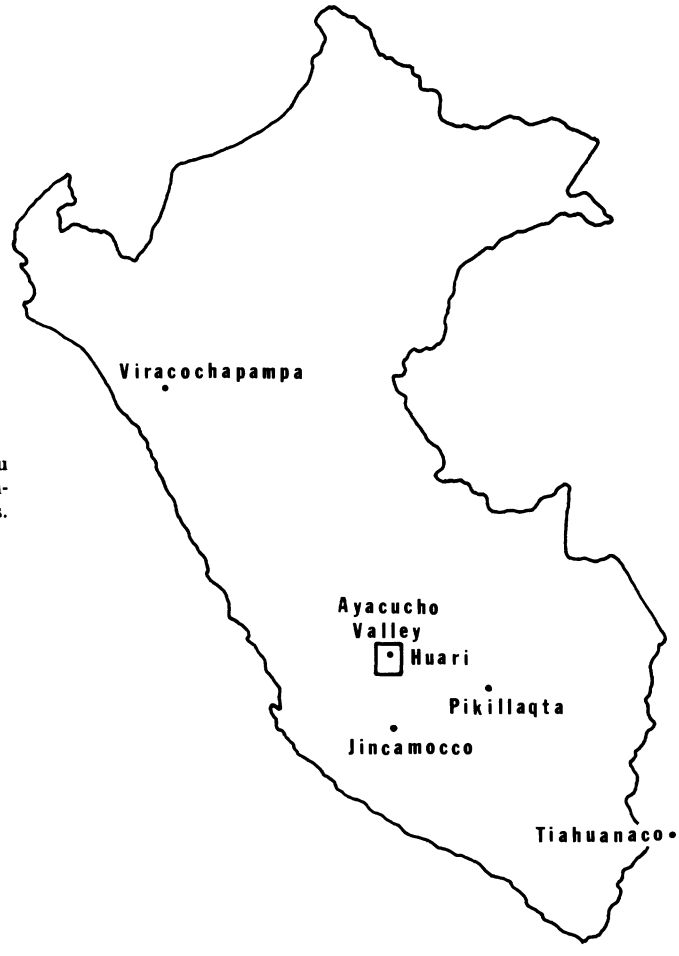

Figure 1. Outline map of Peru locating the Ayacucho Valley and principal Middle Horizon highland centers.

First, it must be shown that Huari settlements were distributed in a site size hierarchy with at least 3 tiers of administrative sites above the minimal community settlements. Settlements of at least the first 3 orders of magnitude must be shown to possess administrative architecture and/or artifacts. Further, the number of settlements in each descending rank order ought to increase. That is, a first-order center coexists with several second-order centers, a still larger number of third-order centers, and so on.

Second, it is suggested that information and decisions were transferred between settlements of different rank orders; information moved up through the hierarchy while decisions moved down. This implies that a communication network would have linked Huari settlements of different sizes. This network is most likely to be reflected in a system of roads and travel facilities. The size of and functions fulfilled by a site should correlate with its geographic position within the communications network—larger and more important centers lying at nodes of communication routes from smaller centers, and the capital lying at the center of the entire network. Finally it must be shown that decisions made in higher-order settlements affected behavior in lower-order settlements. This may be manifest in the adoption of standardized measures, architectural patterns, artifact forms and art styles, but it may appear in other activity changes as well.

KNOWN HUARI CENTERS

In comparison with Inca settlements, few Huari sites are known and even fewer have been studied. However, there are some marked similarities between the size and distribution of the known Huari settlements and later Inca centers.

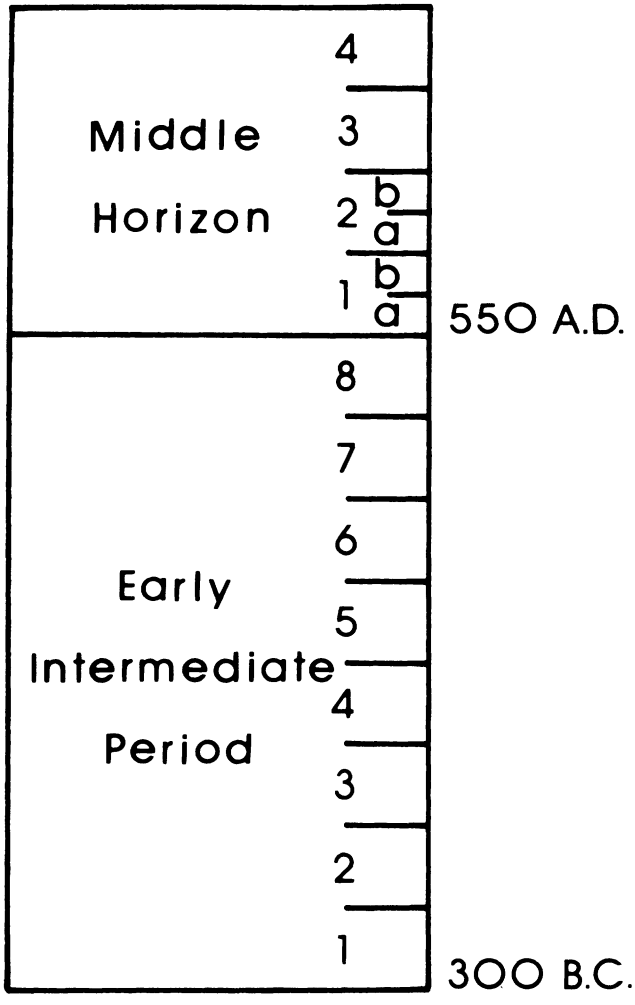

Figure 2. Chronological chart for the Ayacucho Valley and Peruvian Andes.

By A.D. 700, or terminal Middle Horizon 1b, Huari itself was the largest site known in the Peruvian Andes. Another central Andean settlement at Tiahuanaco may have been comparably large (Parsons 1968; Ponce 1969), but it lies across a sharp stylistic frontier (Rowe 1956) which may have been a political boundary. Research at Huari is only now beginning to reveal the changes in its size through time, but our provisional estimates of its area range between 260 and 400 ha. Three-hundred ha seems to be a conservative estimate for terminal Middle Horizon 1.

In spite of the paucity of archaeological surveys in the Andean highlands, 2 other large and impressive sites have been recorded and attributed to Huari on the basis of overall configuration and room form (Rowe 1963; Menzel 1964; and Lanning 1967). They share many specific architectural features with Huari, are significantly smaller, and have ceramic styles indicating that they were constructed between Middle Horizon 1b and 2a (Sanders 1973; Thatcher 1975).

Viracochapampa is a walled rectangular enclosure of 33 ha in the northern highlands near modern Huamachuco (McCown 1945). Pikillaqta is a similarly walled rectangle of about 60 ha in the Lucre Basin just south of Cuzco (Sanders 1973). Both are within the known distribution of Huari ceramic styles and might represent second-order Huari administrative centers equivalent to Inca provincial capitals. However, since excavated materials from the 2 sites are too scarce to demonstrate that they are intrusive Huari constructions, we have operationalized and quantified

Table 1. Room Shape Factors for 20 Rooms per Site.

Marca Huamachuco	Viracochapampa	Pikillaqta	Jincamocco
.05	.19	.50	.40
.24	.35	.53	.40
.25	.43	.54	.42
.25	.50	.54	.50
.31	.50	.63	.50
.38	.50	.71	.53
.38	.55	.73	.57
.40	.56	.80	.58
.40	.60	.80	.65
.43	.71	.80	.67
.43	.75	.80	.69
.50	.76	.81	.74
.50	.80	.86	.76
.56	.80	.89	.77
.57	.86	.90	.78
.60	.88	.90	.80
.67	.93	.93	.83
.75	1.00	.94	.89
.88	1.00	1.00	.90
1.00	1.00	1.00	1.00

Analysis of variance testing the hypothesis of no difference in room shape factors (39 degrees of freedom, 0.01 level of significance)

	Marca Huamachuco	Viracochapampa	Pikillaqta
Viracochapampa	$F = 7.9245$ = reject		
Pikillaqta	$F = 23.66$ = reject	$F = 2.25$ = supported	
Jincamocco	$F = 8.836$ = reject	$F = 0.0465$ = supported	$F = 4.26$ = supported

an architectural indicator that has been intuitively employed for many years. This measure of architectural variability is the "room-shape factor," which is the width of a room divided by its length. A sample of 20 rooms (19% sample fraction) was selected randomly from the map of Viracochapampa as well as its immediate antecedent and neighbor Marca Huamachuco (17% sample fraction). If room-shape factors for the 2 sites proved to be very similar, it would indicate a single, continuous local tradition. If they proved significantly different, a rupture in tradition would be indicated, and this rupture might best be explained by Huari intrusion at Viracochapampa. Room-shape factors for the 2 sites were plotted in histograms and found to approximate normal curves. Analysis of variance produced an F significant to the 0.01 level (see Table 1). The null hypothesis of no difference in room-shape factors between Viracochapampa and Marca Huamachuco must be rejected, supporting the inference that Viracochapampa represents an intrusive Huari settlement.

No Early Intermediate period sites have been mapped in the Lucre Basin or its adjacent areas, so Pikillaqta was compared with Viracochapampa. A sample of 20 room-shape factors (approximately 10% sample fraction) produced an F not significant at the 0.01 level of confidence, supporting the hypothesis that Viracochapampa and Pikillaqta belong to the same tradition; comparison of Pikillaqta with Marca Huamachuco produced an F significant at the 0.01 level (Table 1).

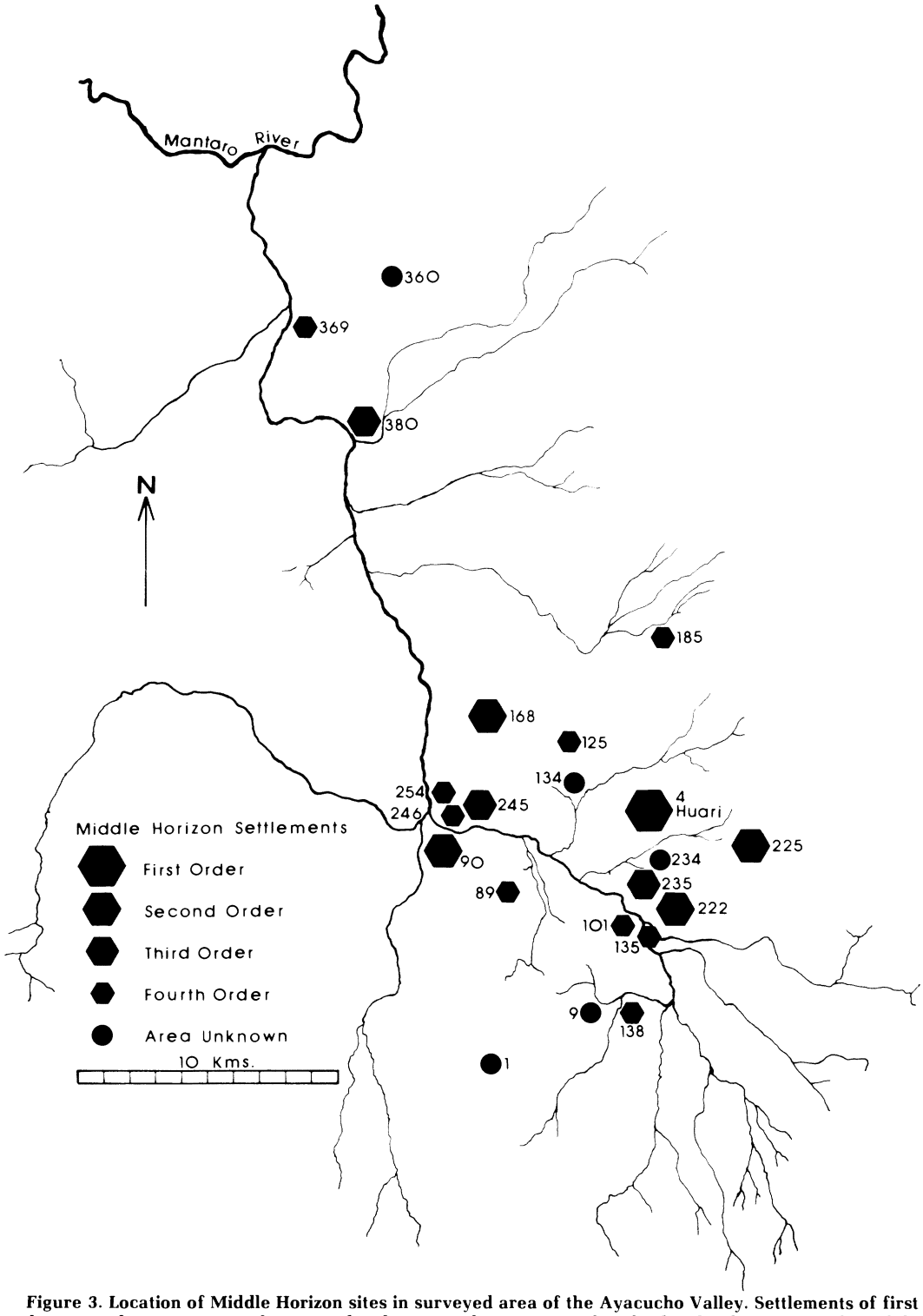

Figure 3. Location of Middle Horizon sites in surveyed area of the Ayacucho Valley. Settlements of first order range from 256 to 512 ha, second order range from 32 to 64 ha, third order from 8 to 16 ha, while fourth-order settlements are smaller.

Table 2. Middle Horizon Sites in the Ayacucho Valley, Rank Ordered by Area.

Site number	Site name	Site area in Ha
4	Huari	300
168	Molinoyoq	60
90	Simpapata	48
225	Quinua	40
222	Yayarumi Pampa	40
245	La Compañia I	15
235	Cerro Churu	15
380	Incaraqay	8
125	Pacayacasa I	6
126	La Compañia II	6
135	Chaqo	6
254	La Compañia III	5
101	Muyurina	5
138	Totora	4
89	Trigoloma	3
185	Ichupata	2
369	Tororumi	1
1	Aya Urqo	?
9	Tunasniyuq	?
134	Pacayacasa II	?
360	Pampay	?
234	Mituqasa	?

The surface preservation at Huari is so poor that with only 75 ha of the site mapped, there are not enough rooms with all walls visible to provide an adequate sample of room-shape factors for comparison. Still, the quantitative similarity between Viracochapampa and Pikillaqta and their difference from Marca Huamachuco support the interpretation that they are provincial administrative centers or second-order sites within a Huari hierarchy. Furthermore, Sanders' (1973) description of Pikillaqta includes barracks-like quarters and extensive warehouse facilities similar to the administrative architecture of Incaic Huánuco Pampa. These probably provided residences and subsistence for corvee laborers; official travelers, including the military; and a resident body of craft specialists, while higher status administrators may have been housed around the large rectangular plazas.

One other large settlement has been reported in the highlands, which may represent a Huari provincial administrative center. This is Hatun Wallay near modern Lircay in Huancavelica (Tello 1942), but even its size remains unknown. Smaller rectangular enclosures, including Jincamocco (Figure 5), Cerro Churu (Figure 12), and Incaraqay (Figure 13) are discussed below. They may represent third-order administrative centers but, by analogy with Inca sites, they seem more likely to have been specialized travel facilities fulfilling lodging, storage, and transshipment functions.

Large Middle Horizon settlements such as Pachacamac and Cajamarquilla are known on the coast of Peru, but although they exhibit ceramic evidence for Huari influence, they lack the great rectangular perimeter walls that characterize Viracochapampa and Pikillaqta. It may be that they furnished already densely occupied centers into which Huari administration could move. This is reminiscent of the Inca occupation of the coast, and within the 75 ha of Cajamarquilla, there is a large trapezoidal enclosure that might have housed Huari administrators. Even though these coastal centers are similar in size to second-order Huari highland sites, their administrative relationships with Huari remain to be explained.

AYACUCHO VALLEY SETTLEMENTS

Known Huari settlements in the Peruvian highlands seem to represent first and second-order centers in a complex administrative hierarchy. However, data are not available on the contemporary

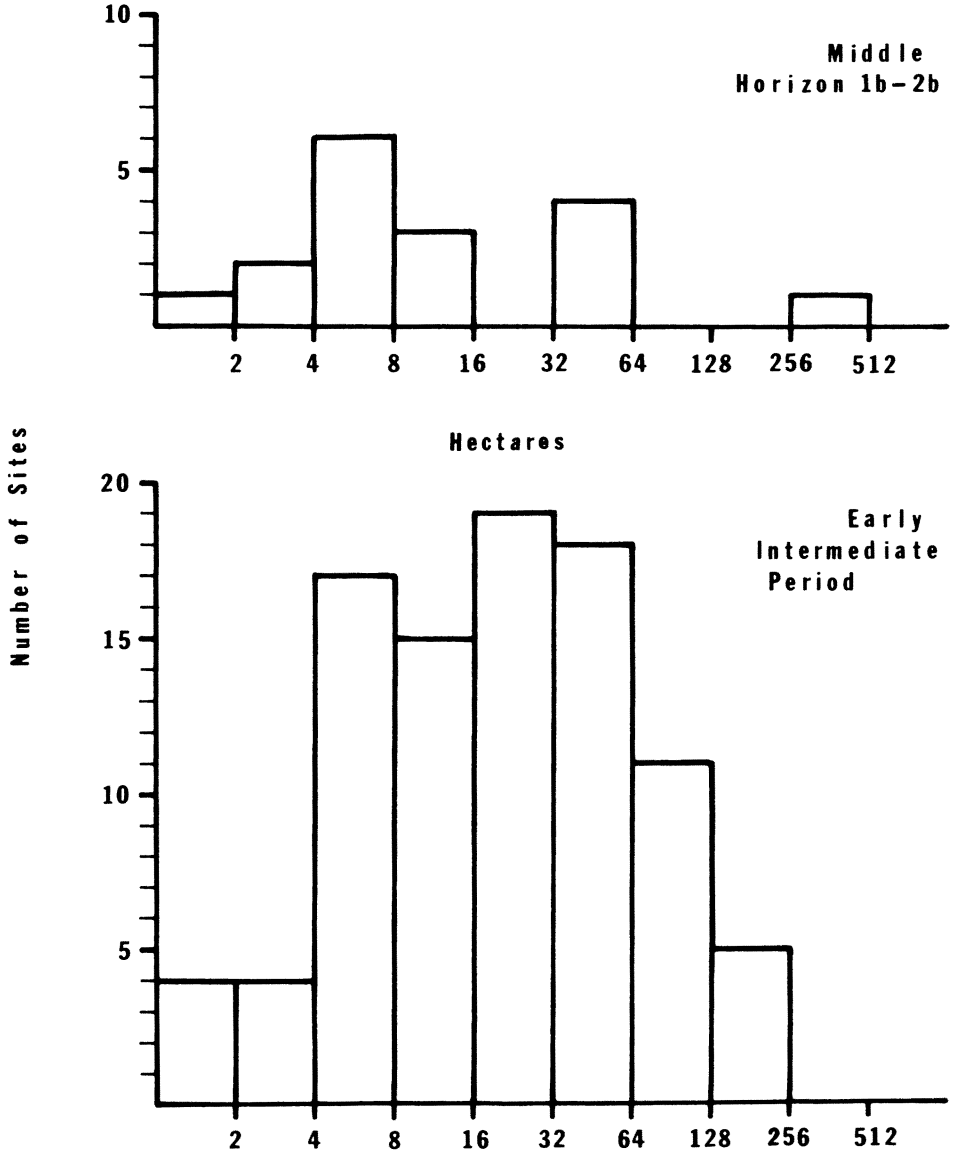

Figure 4. Contrasting distribution of settlement sizes for the Middle Horizon and Early Intermediate Period in the surveyed area of the Ayacucho Valley.

centers of local origin which are required to document third-order centers and minimal communities. Only the intensive settlement survey from the area of Huari itself provides sufficiently complete information.

Preliminary results of a systematic settlement survey of about 1000 km^2 of the Ayacucho Valley have been made available by the Ayacucho Archaeological-Botanical Project (MacNeish 1969; MacNeish et al. 1970; MacNeish et al. 1975; MacNeish, personal communication), and a catalog of Ayacucho sites, combining the findings of MacNeish's project with those of the Universidad de Huamanga, has also been published (Benavides 1976). These survey data reveal a complex, multimodal site size distribution around Huari during the Middle Horizon.

In an interpretative summary, MacNeish employs time units somewhat different from those us-

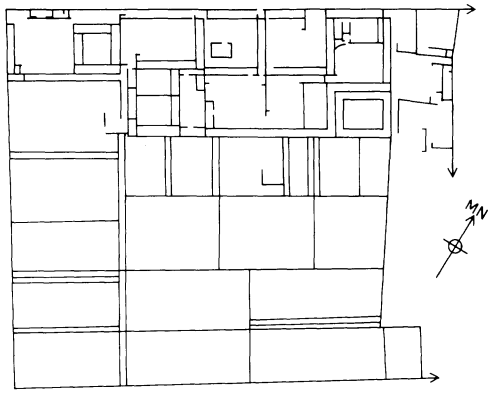

Figure 5. Map of Jincamocco. The preserved area measures about 130 x 160 m but the enclosure continued to the northeast. Excavations in the northwestern section provide architectural details unavailable for the rest of the enclosed area.

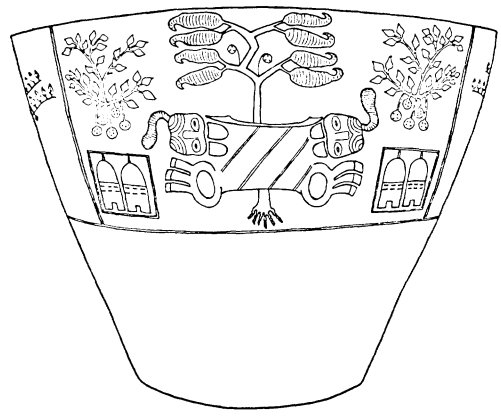

Figure 6. Large urn from a Middle Horizon 1b offering found on the Peruvian coast to Pacheco, Nazca. The decorations represent highland Andean food plants and rectangular enclosures with steeply pitched roofs.

ed by most Andean archaeologists (MacNeish et al. 1975). His Period 12, from A.D. 650-850, includes the last part of Middle Horizon 1b, all of Middle Horizon 2, and perhaps some of Middle Horizon 3, but it must suffice as our Middle Horizon time unit as well.

Twenty-seven archaeological sites are reported for the period. They were classified as 1 true city, 7 administration towns, 2 small administrative centers, 7 hamlets, 6 open camps, and 4 caves (MacNeish et al. 1975). The typology suggests the 3 administrative tiers diagnostic of a state, but the criteria for site classification were primarily architectural, largely ignoring area, and were not completely explicit in the preliminary reports.

With the aid of unpublished settlement-location maps kindly supplied by Dr. MacNeish, the catalog of Ayacucho sites, our own notes, and air photographs of most of the survey area, the Middle Horizon sites were reordered according to area. Cave occupations were deleted. The "administration town" of Conchopata (Chakipampa) was moved back to the previous time period on the basis of its predominantly earlier ceramics and Menzel's demonstration that it was abandoned late in Middle Horizon 1b (Menzel 1964). And 5 hamlets and open camps for which area data could not be found were omitted. This reduced the sample of sites to 17. Within the survey area of

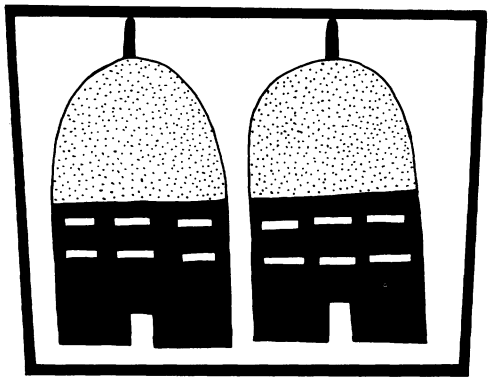

Figure 7. Sketch of a rectangular enclosure with two interior buildings represented on a Pacheco offering urn.

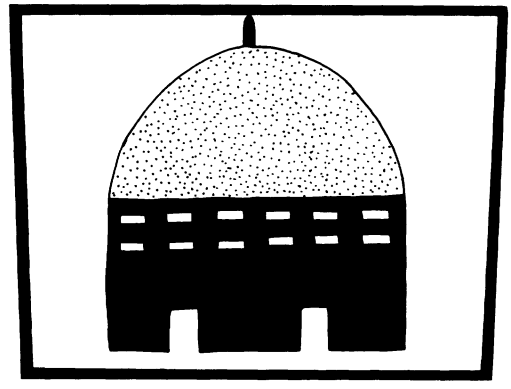

Figure 8. Sketch of an alternative representation of a rectangular enclosure with single interior building entered by two doors, also found on Pacheco offering urns.

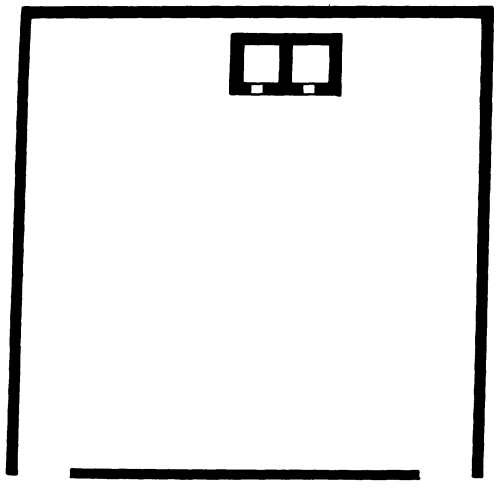

Figure 9. Map of a rectangular enclosure about 25m^2 constructed at Jargampata, near Huari, Middle Horizon 2a. It contained a single rectangular building entered by two doors, with two multistoried rooms.

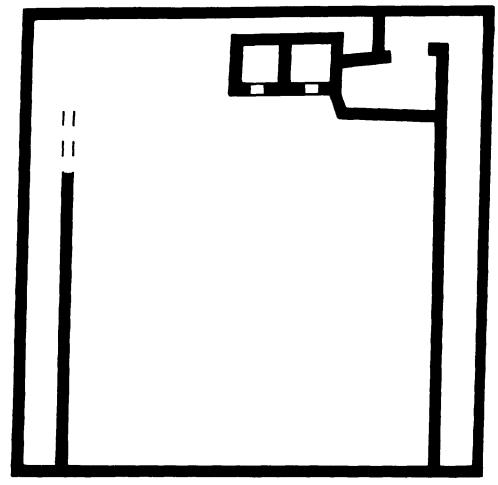

Figure 10. Map of the Jargampata enclosure as modified in Middle Horizon 2b.

about 1000 km^2, these 17 sites total 564 ha, with individual settlements ranging from 300 ha in extent (Huari) to a single ha in area.(Figure 3, Table 2).

Site sizes were plotted on a histogram, but because of the wide range of variation in area, a logarithmic area scale was employed (Figure 4). This histogram demonstrates that Huari was the single first-order site in the survey region with an area falling in the range between 256 and 511 ha. Four second-order centers fall in the range between 32 and 63 ha. Third-order centers are not easily distinguished from minimal communities on the basis of size distribution alone, but we visited and mapped 2 of the 8 to 15 ha sites that have large rectangular enclosures clearly visible on air photographs (Figures 12 and 13). These findings strongly support the interpretation that third-order administrative settlements are located in the 8 to 15 ha size, although further research may reveal that some sites in the 4 to 7 ha size also included low-level administrative functions.

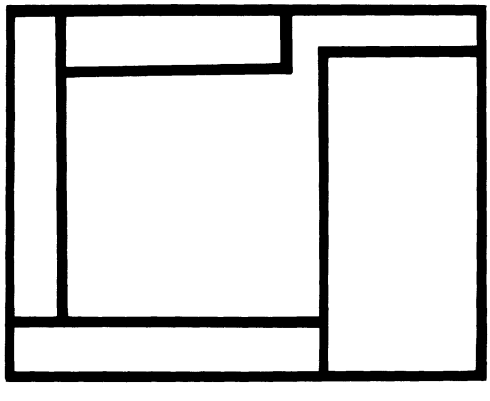

Figure 11. Map of one of the numerous rectangular enclosures measuring about 30 x 40 m, constructed within the perimeter walls of *Viracochapampa* between Middle Horizon 1b and 2b (After McCown 1945: Fig. 13).

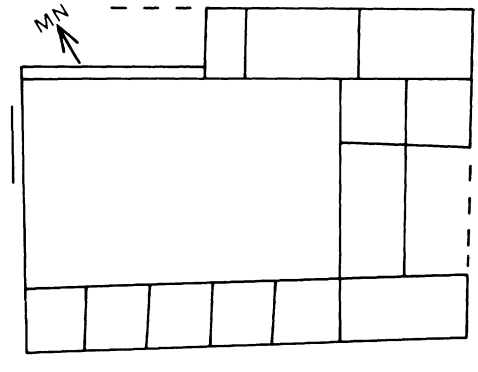

Figure 12. Map of Cerro Churu, a walled rectangular enclosure at settlement 235 in the Ayacucho Valley. This Middle Horizon enclosure measures about 180 x 250 m.

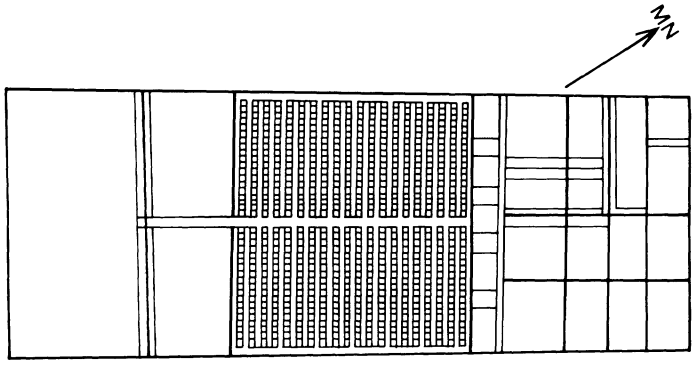

Figure 13. Map of Incaraqay, a walled enclosure of about 180 x 430 m at settlement 380 in the Ayacucho Valley.

Second-order centers in the Ayacucho Valley survey area distribute in a rhomboidal pattern around, and control access to, the Huari center. Third-order centers and minimal communities are well represented in the regional sample, but their distribution and frequency are not in accord with the specified test implications (Figure 3).

Since the chronology and seriation of Ayacucho Valley settlements is still being elaborated, it is not yet possible to examine changes in antecedent settlement distributions in terms of 200-year periods comparable to that for Middle Horizon settlements. However, area data were compiled for the Early Intermediate period sites which appear on the Ayacucho Archaeological-Botanical Project maps (MacNeish, personal communication). Six caves were deleted, and area information was available for only 93 of the remaining 119 sites. Two very large sites were also dropped because they appear to represent agricultural facilities with no substantial settlement, and Conchopata (Chakipampa) was added to the Early Intermediate period sample as noted above. Finally, the Huari site was divided into 2 settlements of 100 and 150 ha during this period, reflecting a conviction that Middle Horizon Huari represents a coalescence of 2 or, more probably, several earlier communities.

The final sample of 93 sites, or 77.5% of the open habitation settlements recorded for the Early Intermediate period, total 3255 ha occupied between about 300 B.C. and A.D. 650. Site size distribution in histogram form (Figure 4) fails to reveal the multimodality of the Middle Horizon, and even though the size tiers could be obscured by changes through time, the data do not support more than 2 rank orders in settlement hierarchy. The most frequent Early Intermediate period site size is 16 to 31 ha, a size completely absent in the Middle Horizon. Furthermore, the high number of large settlements and scarcity of small ones imply active competition among approximately equal units. Although changes in administrative structure probably began before A.D. 650, the Early Intermediate period does not seem to have been a time of political centralization in the Ayacucho Valley.

INFORMATION TRANSFER AMONG HUARI SITES

Pikillaqta is probably the best preserved Middle Horizon site in the highlands which can now be ascribed to Huari. It is a completely walled rectangle, entered from the north or south by a road with high walls on both sides. To the south, only a few hundred meters of the old road remain before it is intersected and obliterated by the modern road from Cuzco to Urcos, but it apparently passed through a breach in the great wall at Rumi Collca and continued on. To the north, the road is soon lost on the steep hill descending toward Huacarpay. However, this road gives the impression of a principal north-south highway on which Pikillaqta was located.

Viracochapampa is similarly divided by a walled road running straight through the site, but today nothing remains of it beyond the site perimeter.

Lumbreras (1974:162-163) has noted that several Huari sites, especially those in the central highlands, lie adjacent to the later Inca highways. This, and ethnohistorical claims that the Incas only improved or rebuilt the roads, led him to suggest that Inca roads followed earlier routes in use during Huari times.

No Huari roads can definitely be identified today, other than those passing through Pikillaqta and Viracochapampa. The site of Jincamocco is, however, of interest in this context. It is a small, rectangular enclosure in southern Ayacucho (Figure 5) and possesses configurations of Huari architecture (Rowe 1963) and Middle Horizon sherds in Huari style. Room-shape factors from a sample of 20 rooms (48% sample fraction) were compared with those of Pikillaqta and Viracochapampa, and both tests yielded F values not significant at the 0.01 level of confidence, supporting the null hypothesis and the identification of the Jincamocco enclosure as a Huari construction (Table 1).

This site is remarkably similar to the Inca site of Tunsucancha, reported by Morris (1967). Tunsucancha was a roadside waystation or *tambo* on the Cuzco-Quito highway. It included a rectangular enclosure divided into rooms and a row of 24 *qollca* or circular storehouses. Jincamocco also includes a rectangular enclosure of similar dimensions with interior divisions and a row of 17 circular structures (not illustrated in Figure 5). Furthermore, an ancient road is visible from Jincamocco, probably the Inca highway which connected Andahuaylas and Nazca. When this site was described by Spanish *visitador* Luis de Monzon (1881) in 1586 he stated that it was already in ruins and had been built long before by local people for the "viracochas." He also used the term *dormida,* synonymous with *tambo* or inn, and mentioned an ancient highway with a low wall on either side near the site. Analysis of recent research at Jincamocco is still going on, but it probably was a Huari *tambo* or waystation on a main highway between the central highlands and the south coast.

In addition to evidence for roads and waystations, communication among Huari sites is indicated by the standardization of architectural forms revealed by quantitative analysis of room-shape factors. Qualitative comparisons are also striking. Rectangular enclosures painted on Middle Horizon 1b Huari offering pottery from Pacheco, Nazca (Figure 6), apparently represent either walled rectangular enclosures containing 2 multistoried buildings with steeply pitched roofs, center poles, and front doors (Figure 7), or a single, larger multistoried building with 2 front doors (Figure 8). An essentially identical enclosure was built 25 km east of Huari at the site of Jargampata, in the neighboring San Miguel Valley, early in Middle Horizon 2a (Figure 9). At the beginning of Middle Horizon 2b this rectangular enclosure was modified (Figure 10), becoming remarkably similar to the units built at Viracochapampa (Figure 11) in Middle Horizon 1b or later. Similar rectangular enclosures belong to third-order settlements in the Ayacucho Valley. One was located on Cerro Churu (Figure 12), about 3 km south of Huari, and Incaraqay was surveyed in the north end of the Ayacucho Valley near Huanta (Figure 13).

The particular specialized functions of these great rectangular enclosures remain obscure. Their depiction on the Pacheco offering urns along with many of the foods that regularly appeared on Inca tribute lists, their strategic locations through the highlands, and their probable association with a highway system make it likely that they functioned within a collection and redistribution system involving information, food, and manufactured goods (Isbell 1977). Partial mapping at Huari reveals several very large rectangular enclosures which may have been the apexes of the communication channels that linked the entire system.

The construction of the relatively small rectangular enclosure at Jargampata (Figures 9 and 10) also apparently occasioned significant behavioral change at that location, although the artifacts upon which these inferences are based represent a very small sample fraction of the site and may not, therefore, be entirely representative. The frequency of exotic pottery imported from Huari rose from .5% to over 6%, and various new design themes appeared on local ceramics. In some cases, these new themes can be traced to Huari antecedents (Isbell 1977).

Even more interesting are changes in the relative frequencies of vessel shapes, which are assumed to be determined primarily by function. The relative frequency of different shapes in a trash deposit varies with the nature of the activities which contributed to the deposit. When

deposits contain significantly different shape-frequencies, they must contain trash generated by significantly different sets of activities.

Ten Jargampata excavation samples from the rectangular enclosure and a shallow depression outside its southwestern corner contained a sufficient quantity of pottery for analysis. These 10 samples were arranged into 3 major time periods by qualitative seriation and stratigraphic association (Isbell 1977). Shape frequencies were then calculated by considering each rim sherd or other diagnostic vessel fragment that could not be assigned to the same pot as other sherds as representing a vessel of a particular shape. A total of 812 reconstructed shapes included the following 10 categories:

1. necked jars
2. closed forms
3. open bowl forms
4. miniature vessels
5. spoons
6. colanders
7. press molds
8. ceramic disks
9. scraper-polishers
10. exotic vessels (probably imported)

The low frequency of some shapes made it necessary to combine categories 5 through 9, leaving only 6 classes for comparison.

Each of the composite samples represents a different time. Sample A, from the depression outside the rectangular enclosure, is stylistically the earliest, and contains trash predating the construction and/or occupation of the enclosure. Sample B includes refuse from within the enclosure, representing its occupation. Sample C is from a reoccupation of the rectangular enclosure after it had fallen into ruins, and is the stylistically latest sample (Table 3).

The chi-square statistic demonstrates that samples A and C could have been selected from 1 population of shape frequencies, but each differed significantly from sample B. (The null hypothesis was rejected at the .01 level of confidence.)

These data from ceramic shape frequencies indicate that samples A, B, and C represent 3 slightly different activity times, t_1, t_2, and t_3 respectively. In t_1, at one locus on the site, a particular activity pattern existed. During t_2, the Huari-style rectangular enclosure was constructed and occupied, with an associated activity set significantly different from that indicated for t_1. At the end of t_2, Huari collapsed, and the rectangular enclosure was abandoned. In t_3 part of the enclosure was reoccupied by people with the same ceramic tradition, but no exotic pottery. Vessel shape frequencies indicate a return to an activity set indistinguishable from that of t_1.

Even though much of Jargampata remains unsampled, the available ceramic inventory indicates that some behavioral patterns changed significantly with Huari presence in Middle Horizon 2, only to return to the earlier pattern after the collapse of Huari.

Table 3. Vessel Shape Frequencies by Sample.

Shape Categories	1	2	3	4	5-9	10	Total
Sample A	88	2	88	0	4	1	183
Sample B	143	9	274	5	12	19	462
Sample C	85	6	69	3	4	0	167

Chi-square test of hypothesis of no difference in vessel shape frequencies (5 degrees of freedom, 0.01 level of significance)

	Sample B	Sample C
Sample A	$\chi^2 = 21.69$ = Reject	$\chi^2 = 7.63$ = Supported
Sample B		$\chi^2 = 29.51$ = Reject

EVALUATION

If Huari achieved state administration, its settlements should possess at least 4 size modes. At the macroregional level a large, first-order and several substantial second-order centers are documented. Their sizes imply at least 2 lower orders or tiers of settlements which, however, have not been documented. In the Ayacucho region, first and second-order centers are also very well documented. Below them is a group of sites, ranging in size from 1 to 15 ha, which do not easily separate into distinct size nodes without considering administrative architecture as additional criteria. Test implications are supported, but they will not be indisputably confirmed without further study of third- and fourth-order Huari communities and their administrative relationships with larger centers.

Huari settlements of the first 3 orders of magnitude do possess architecture recognizable as administrative. Huge enclosures at Huari can be compared with the planned enclosures of Viracochapampa and Pikillaqta, which are similar to smaller examples at Incaraqay, Cerro Churu, Jincamocco, and Jargampata. However, administrative architecture in sites of the first 3 orders has not been adequately demonstrated in the same region—Ayacucho, for example. Furthermore, other administrative artifacts must be identified to support the administrative functions inferred for the rectangular enclosures.

The number of Huari settlements of second rank order is clearly more than those of first rank order. However, on the macroregional scale, third-order sites are almost unknown, while in Ayacucho there are fewer third-order centers than second-order ones. Current data are therefore in contradiction with this test implication, although a review of Inca data demonstrates a similar tendency.

Huari roads appear to be a reality, even though their routes are still largely unknown. Furthermore, Huari seems to have maintained travel facilities along its highways for the convenience of those involved in communications.

The present state of knowledge of Huari settlement distribution and communication routes makes it impossible to adequately evaluate the relationship between site size and position in the communications network. In Ayacucho, first- and second-order centers follow the expected pattern, but it is difficult to tell how third- and fourth-order settlements were linked to the larger communities. Beyond Ayacucho, other Huari centers occupy strategic positions, but their regional contexts remain unknown. The data do not necessarily contradict the test implications, but they are inadequate for confirmation.

Standardized room shapes and architectural plans, imported goods, and Huari designs on local products all demonstrate the impact of Huari and its decisions upon lower-order communities. Furthermore, the construction of a rectangular enclosure at Jargampata appears to have occasioned a significant behavioral change, which lasted only as long as the Huari presence. This provides confirmation of the final test implications, but it is a confirmation based upon very limited samples.

CONCLUSION

The hypothesis that Huari society was administered by a state government during the Middle Horizon is supported but not indisputably confirmed. Evidence generally supports the existence of 4 site size modes with administrative architecture present in the first three, but data from several regional surveys would provide more satisfactory confirmation. The frequency of lower order sites does not confirm our expectations. This may be a sample error due to the restricted area for which survey data are available; more research will be required.

A Huari communications network is well documented, and there is some indication that site size corresponds with position within the communication network. Finally, preliminary data do support our expectation that decisions made in higher order centers affected behavior in lower order centers.

Provisionally Huari may be considered to have achieved state government, but investigations of its political subsystem must continue. The confirmation of statehood that this review of Middle

Horizon information provides for Huari is greater than that available for any other prehistoric Andean political unit except the Incas. But this does not insure that Huari was *the* pristine Andean state. The criteria of statehood and the test implications outlined above should be applied to other prehistoric polities such as Moche, although a preliminary review of published data for that area has failed to provide significant confirmation (Brewster 1976), and it will probably be necessary to conduct further investigations on the north coast designed to collect appropriate data.

It is still premature to discuss the process of state formation at Huari and to make comparisons with the conclusions reached by Wright and Johnson (1975) concerning pristine state formation in Mesopotamia. However, we would like to make an observation concerning population growth and pressure, the factors most frequently cited as responsible for disequilibrium and change in prehistoric sociocultural systems.

Site area during the approximately 950 years of the Early Intermediate period totals 3255 ha for the 1000 km^2 surveyed in the Ayacucho Valley. This represents a mean of 3.43 ha per year. If we suppose that some population growth took place, and that there were fluctuations within the growth curve, a more refined chronology should produce some periods with averages considerably lower and others significantly higher. The 200-year Middle Horizon time unit produced 564 ha of occupied area in the same 1000 km^2 survey zone. This represents a mean of 2.82 ha per year.

The average area occupied during the Middle Horizon was significantly less than the average during the Early Intermediate period, and was probably a great deal less than during Early Intermediate period highs. Even though population density, length of site occupation, and other variables intervene between site area and population size, these preliminary data on site area make it unlikely that demographic pressure forced subsistence agriculturalists off farm lands and into occupational specialties in larger centers such as Arnold (1975) has proposed for the origin of Huari. Migration into Huari seems to have left the rural countryside relatively empty. Furthermore, the lack of positive correlation between demographic growth and state formation in Ayacucho is consistent with the Mesopotamia data discussed by Wright and Johnson (1975).

Finally it is interesting that absolute population size in the Mesopotamian survey areas differs dramatically from that indicated for the highland Peruvian survey area. Wright and Johnson (1975) indicate that 8.5 ha is the greatest average occupied area per 100 km^2 achieved in their survey areas during pristine state formation. Furthermore, their first-order centers reached only 25 ha in size. These figures contrast with an average of 56.4 ha per 100 km^2 in the Ayacucho survey area, and an estimate of 300 ha of occupied area for first-order Huari!

Acknowledgments. We wish to thank Dr. Richard S. MacNeish for providing unpublished data from the Ayacucho Archaeological-Botanical Project. Thanks are also due to Pat Knobloch, Christine Brewster, Keith Kintigh, Edmundo Pinto, and Robbe Stimson who assisted in the collection of field data. A preliminary version of this paper was presented at the forty-first annual meeting of the Society for American Archaeology.

REFERENCES CITED

Adams, Robert Mc. C.
1966 *The evolution of urban society.* Aldine, Chicago.

Arnold, Dean E.
1975 Ceramic ecology of the Ayacucho basin, Peru: implications for prehistory. *Current Anthropology* 16(2):183-205.

Benavides Calle, Mario
1976 *Yacimientos arqueológicos en Ayacucho.* Universidad Nacional de San Cristobal de Huamanga, Ayacucho.

Brewster, Christine
1976 An examination of the evidence of a stage level of organization in an Early Intermediate Period culture on the north coast of Peru. Mimeographed, Department of Anthropology, State University of New York at Binghamton.

Childe, V. Gordon
1950 The urban revolution. *Town Planning Review* 21(1):3-17.

Fried, Morton H.
1960 On the evolution of social stratification and the state. In *Culture in history: essays in honor of Paul*

Radin, edited by Stanley Diamond, pp. 713-731. Columbia University Press, New York.
1967 *The evolution of political society*. Random House, New York
Hyslop, John
1976 An archaeological investigation of the Lupaca Kingdom and its origins. Ph.D. dissertation, Columbia University.
Isbell, William H.
1977 *The rural foundation for urbanism: economic and stylistic interaction between rural and urban communities in eighth-century Peru*. University of Illinois Press, Urbana.
Johnson, Gregory A.
1973 *Local exchange and early state development in southwestern Iran*. University of Michigan Museum of Anthropology, Anthropological Paper 51.
Kirchhoff, Paul
1949 The social and political organization of the Andean peoples. In *Handbook of South American Indians*, edited by J. H. Steward, Bureau of American Ethnology Bulletin 143, Vol. 5:293-311.
Krader, Lawrence
1968 *Formation of the state*. Prentice-Hall, Englewood Cliffs.
Lanning, Edward P.
1967 *Peru before the Incas*. Prentice-Hall, Englewood Cliffs.
Lumbreras, Luis G.
1969 *De los pueblos, las culturas y las artes del antiguo Peru*. Monclos-Campodonico, Lima.
1974 *The peoples and cultures of ancient Peru*. Smithsonian Institution Press, Washington, D.C.
McCown, Theodore D.
1945 Pre-Incaic Huamachuco: survey and excavations in the region of Huamachuco and Cajabamba. *University of California Publications in American Archaeology and Ethnology*, 39(4):223-400.
MacNeish, Richard S.
1969 *First annual report of the Ayacucho archaeological-botanical project*. Phillips Academy, Andover, Mass.
MacNeish, Richard S., A. Nelken-Terner, A. Garcia Cook.
1970 *Second annual report of the Ayacucho archaeological-botanical project*. Phillips Academy, Andover, Mass.
MacNeish, Richard S., Thomas C. Patterson, and David L. Browman
1975 *The central Peruvian prehistoric interaction sphere*. Phillips Academy, Andover, Mass.
Menzel, Dorothy
1959 The Inca occupation of the south coast of Peru. *Southwestern Journal of Anthropology* 15(2):125-142.
1964 Style and time in the Middle Horizon. *Ñawpa Pacha* 2:1-106.
Monzon, Luis de
1881 Descripción de la tierra del repartimiento de los Rucanas Antamarcas de la corona real, jurisdicion de la ciudad de Guamanga—año de 1586. *Relaciones geográficas de Indias*, 1:197-215. Publícalas del Ministerio de Fomento, Peru.
Morris, Craig
1966 El tampu real de Tunsucancha. *Cuadernos de Investigación, Anthropología* 1:95–107.
1967 Storage in Tawantinsuyu. Ph.D. dissertation, University of Chicago.
1971 The identification of function in Inca architecture and ceramics. *Proceedings of the 39th International Congress of Americanists* 3:135-144.
1972a State settlements in Tawantinsuyu: a strategy of compulsory urbanism. In *Contemporary Archaeology: A Guide to Theory and Contributions*, edited by M. P. Leone, pp. 393-401. Southern Illinois University Press, Carbondale, Ill.
1972b El almacenaje en dos aldeas de los Chupaychu. In *Visita de la provincia de León de Huánuco en 1562*. Vol. 2: *Documentos para la historia y etnología de Huánuco y la Selva Central*, 2. by Ortiz de Zuñiga, Iñigo. Universidad Nacional Hermilio Valdizan, Huánuco.
1974 Reconstructing patterns of non-agricultural production in the Inca economy: archaeology and documents in institutional analysis. In *Reconstructing Complex Societies*, edited by Charlotte B. Moore, pp. 49-66. Supplement to the Bulletin of the American School of Oriental Research No. 20.
Morris, Craig and Donald E. Thompson
1970 Huánuco Viejo: an Inca administrative center. *American Antiquity* 35:344-362.
Murra, John V.
1956 The economic organization of the Inca state. Ph.D. dissertation, University of Chicago.
1962 An archaeological restudy of an Andean ethnohistorical account. *American Antiquity* 28:1-4.
1968 An Aymara kingdom in 1567. *Ethnohistory* 15(2):115-151.
1972 El control vertical de un máximo de pisos ecológicos en la economia de las sociedades Andinas. In *Visita de la provincia de León de Huánuco en 1562*. Vol. 2: *Documentos para la historia y ethnología de Huánuco y la Selva Central*, 2. by Ortiz de Zuñiga, Iñigo. Universidad Nacional Hermilio Valdizan, Huánuco.
1975 *Formaciones económicas y políticas del mundo andino*. Instituto de Estudios Peruanos, Lima.

Murra, John V. and Craig Morris
1976 Dynastic oral tradition, administrative records and archaeology in the Andes. *World Archaeology* 7:267-279.
Parsons, Jeffrey R.
1968 An estimate of size and population for Middle Horizon Tiahuanaco, Bolivia, *American Antiquity* 33:243-245.
Proulx, Donald
1976 The Early Horizon of north coastal Peru: a review of recent developments. *El Dorado* 1(2):1-15.
Ponce Sangines, Carlos
1969 La ciudad de Tiwanaku. *Arte y Arqueología* 1:5-32.
Rowe, John H.
1946 Inca culture at the time of the Spanish conquest. In *Handbook of South American Indians*, Vol. 2, *The Andean civilizations*, edited by Julian Steward, pp. 183-330. Smithsonian Institution, Washington, D.C.
1956 Archaeological explorations in southern Peru, 1954-1955. *American Antiquity* 22:135-151.
1963 Urban settlements in ancient Peru. *Ñawpa Pacha* 1:1-28.
1967 What kind of a settlement was Inca Cuzco? *Ñawpa Pacha* 5:59-76.
Sanders, William T.
1973 The significance of Pikillaqta in Andian culture history. *Occasional Papers in Anthropology* (No. 8.) Department of Anthropology, Pennsylvania State University.
Service, Elman R.
1975 *Origins of the state and civilization*. W. W. Norton, New York.
Tello, Julio C.
1942 Orígen y desarrollo de las civilizaciones prehistóricas Andinas. Actas y trabajos científicos del 27 Congreso Internacional de Americanistas 1:489-720.
Thatcher, John P.
1975 Early Intermediate Period and Middle Horizon 1b ceramic assemblages of Huamachuco, north highlands, Peru. *Ñawpa Pacha* 10-12;109-128.
Willey, Gordon
1971 *An introduction to American archaeology*. Vol. 2: *South America*. Prentice Hall, Englewood Cliffs.
Wright, Henry T. and Gregory A. Johnson
1975 Population, exchange, and early state formation in southwestern Iran. *American Anthropologist* 77:267-289.