CHIMU SOCIO-ECONOMIC ORGANIZATION: PRELIMINARY DATA FROM MANCHAN, CASMA VALLEY, PERU

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Introduction

The socio-economic organization of the Chimu empire can be roughly characterized by reference to two basic principles. First, within Chimu communities there were socio-economic classes with distinctive roles in the production and consumption of goods and labor. The evidence for these classes comes from a variety of sources. First, ethnohistoric evidence indicates that Chimu mythology described separate creations for nobles and commoners (Rowe, 1948, p. 47; Netherly, 1977). Second, archaeological data, primarily from the Chimu capital of Chan Chan, demonstrate that different classes of individuals received different burial treatments (T. Pozorski, ms.; Donnan and Mackey, 1978; Conrad, 1974), lived in different types of structures (Klymyshyn, 1976; Topic, 1977), and engaged in different economic activities (Topic, 1977). Third, analogies drawn between Chimu and Inca social organization (Rowe, 1946; 1948) also support the view that Chimu society was stratified and that different groups of people engaged in distinctive patterns of consumption and production.

The second principle of Chimu socio-economic organization relates to inter-community differences. Chimu communities outside of Chan Chan were not merely scaled-down versions of the capital. Rather, separate communities played different roles in the overall system (Keatinge and Day, 1973). For example, Keatinge (1975) has argued that the inhabitants of the Chimu settlement at Cerro la Virgen engaged in farming state-established agricultural lands. In another article, Keatinge suggests that the sites of Quebrada Katuay and El Milagro de San José were centers for the "state administration, collection, and redistribution of the agricultural resources of the surrounding region" (1974, p. 79). These interpretations suggest that different Chimu communities occupied distinct functional roles in the Chimu economic system.

These two principles of socio-economic differentiation on the intra-community and inter-community levels provide a framework for viewing the Chimu economic system but provide little insight into the explicit nature of these differences. Morris (1978) has recently outlined a set of goals and approaches for the study of Andean exchange systems. While he recognizes the importance of understanding the physical and social structure of exchange, Morris emphasizes the need to understand the "nature of the units engaged in the exchanges" (1978, p. 317).

My goal is to contribute to our understanding of the lower economic class of the Chimu empire. Since the lower economic class was the basic source of labor and production in the Chimu empire (Keatinge and Day, 1973, pp. 291-292; Moseley, 1975a; Topic, 1977, p. 132), the

study of this class is essential for understanding Chimu economic organization. Recent investigations of lower class structures at Manchan, a late Chimu regional center in the Casma Valley, have resulted in data comparable to information from the lower class structures at Chan Chan (Topic, 1977). The investigations at Manchan included defining and mapping the extent of cane-walled structures, and excavating a single well-preserved cane structure (fig. 1). Clearly, the data are preliminary as are the suggested interpretations of the archaeological remains. However, there are sufficient data to warrant an initial consideration of intra-community and inter-community social and economic differences in the Chimu empire.

Intra-Community Differences at Manchan

Architectural differences

The presence of different socio-economic classes at Manchan is indicated by differences in architecture. Similar to Chan Chan, there are portions of Manchan which contain "small, irregular agglutinated rooms" or SIAR (Topic, 1977). These structures contrast sharply with the adobe compounds which contain the residences of presumably higher status and more affluent groups. The adobe compounds contain courts, storerooms, and structures which are thought to be analogous to the audiencias of Chan Chan (see Andrews, 1974). In contrast to the compounds which are made of substantial adobe walls and which exhibit complex architectural features (e.g., ramps, niched rooms, well-finished doorways and finely plastered walls and floors), the small, irregular rooms are relatively simple structures made of less substantial materials: cobbles and cane at Chan Chan, cane at Manchan. The differences in labor required to build a cane wall as opposed to an adobe wall are so great that quantification of labor investments is superfluous; it is clear that cane-wall construction requires less labor than does the construction of adobe walls. In short, differences in the construction of these different types of residence indicate the presence of two major socio-economic groups at Manchan.

Population estimates

Although population estimates for the upper class at Manchan are not yet available, there are some preliminary data on the number of people who occupied the cane-walled structures. Wall clearings at Manchan exposed an irregular area of approximately 7493 $m.^2$ which contained cane-walled structures. Since it was impossible to delineate precisely many of the structures, population estimates must be based on the total area with visible cane walls. Of course, such estimates assume that occupation of all these structures was contemporaneous; this assumption has not been conclusively demonstrated, but casual inspection of associated ceramics did not indicate grossly different periods of occupation in the different portions of the cane structures.

Topic estimated that at Chan Chan the relationship between the variables "number of people" and "square meters of SIAR" ranged between

25.7 and 12.9 $m.^2$ per person (1977, pp. 37-39). Using these figures results in a population estimate of between 292 and 581 inhabitants for the area of Manchan which exhibits visible cane walls.

In an attempt to obtain another perspective on the population of the Manchan cane-walled structures, I measured the area of a modern cane structure in the Casma Valley which is constructed in much the same way as the prehistoric structures were. Six individuals live in a building which has an area of approximately 70 $m.^2$ or roughly 12 $m.^2$ per person. In addition to the main living quarters, which contain a kitchen, sleeping areas, and a common room, the family also utilizes outbuildings as storerooms and work areas; these outbuildings have a total area of 265 $m.^2$. Though it is reasonable to think that the Manchan cane-walled structures also included storerooms and work areas, it is unlikely that such a large area was used by each prehistoric resident group as is used by the inhabitants of the modern cane structure. While the modern cane structure is similar in construction to the Manchan ones, the two classes of structures differ somewhat in their social and functional contexts. The modern cane structure is an isolated homestead while the prehistoric structures are congregated dwellings associated with a regional center. The modern structure has storerooms for both subsistence and cash crops, while storerooms were apparently present in the compounds at Manchan as well as within the area of cane structures. Thus the total area devoted to storage in the prehistoric cane structures was probably less than the total area devoted to storage in modern cane dwellings. However, at this time it is impossible to know what percentage of total floor area was devoted to storage and work areas in the prehistoric cane structures. As a guess, it may be that the inhabitants of these structures at Manchan utilized one-half the amount of storage and work area as is used by modern inhabitants of cane dwellings. If this guess is correct, then the total area used by a family of six, including living, work and storage areas, would equal 203 $m.^2$ or 34 $m.^2$ per person. Dividing the total area of known cane-walled structures (7493 $m.^2$) by this ratio results in a population estimate of 220 inhabitants of the portion of Manchan with visible cane walls.

It is obvious that measurements of a single family's buildings are inadequate to establish a clear relationship between area and population. It is also clear that the assumptions involved in qualifying the study of the modern structure in order to make it applicable to the prehistoric case are another source for potential error. However, it does introduce a note of caution when viewing the population estimates derived from Topic's (1977) ratios. Therefore, I believe that the population of that part of Manchan with cane walls visible today probably numbered somewhere in the lower half of the range of values derived from Topic's ratios, and thus estimate that between 280 and 420 individuals occupied this portion of the site.

Economic roles

The lower class at Manchan had economic roles distinct from those of the individuals who inhabited the compounds. The clearest evidence for economic differentiation is the distribution of milling stones.

The milling stones (batanes) are large, roughly rectangular blocks of granite which are not easily portable. A total of 47 batanes was observed at Manchan. Of this total, 27 (57%) were located in the area of visible cane walls discussed above; 11 (23%) were located in areas which, based on surface remains, are thought to represent cane-walled structures (Mackey and Klymyshyn, ms.), but do not exhibit visible cane walls; and 9 batanes (20%) are dispersed throughout the compounds.

The area with visible cane walls comprises 1% of the total area of the site of Manchan. The high density of milling stones in the cane-walled structures (equivalent to 39 milling stones per hectare) and the low density of milling stones in the compounds (less than 1 milling stone per hectare) may indicate that the inhabitants of the cane-walled structures were engaged in economic activities different from those engaged in by the compound inhabitants. Although other materials (e.g., clay or dyes) could have been ground on the batanes, the only materials recovered from excavation which could have been ground on the milling stones were various plant foods. If this proposed association between the milling stones and plant foods is correct, then it is probable that food grinding occurred almost exclusively in the cane-walled structure. This does not mean that food preparation occurred only in the cane-walled structures; it is unlikely that the inhabitants were a class of caterers. Abundant food remains and a number of small hearths have been found in the compounds (C. Mackey, personal communication; Moore, ms.a), probably indicating that food preparation occurred in the compounds. Thus, although it seems that food grinding was concentrated in the cane-walled structures, it is probable that food preparation occurred in both the cane structures and within the adobe compounds.

Excavations in the Manchan cane-walled structures recovered a wide variety of plant food remains, and this information sheds light on the probable use of the milling stones and, by extension, on the economic activities of the inhabitants of this portion of the site. Preliminary analysis of floral remains indicates that the dominant plant foods were maize, beans, guanábana, pacae, and algarrobo, with avocado, lima beans, ciruela del fraile, lúcuma, guayaba and squashes occurring less frequently; these plant remains represent a complex of grains, fruits and vegetables frequently found in Chimu sites (S. Pozorski, 1982; Begler and Keatinge, 1979). Of these plants only two, maize and algarrobo, would require extensive grinding. Since it is improbable that algarrobo was a staple crop, it is likely that the milling stones in the cane-walled structures were used for grinding maize.

Maize is today generally consumed as either roasting ears (choclos) or chicha, and is not generally ground into meal (Gillin, 1947, p. 46). Rowe (1946, p. 220) mentions only two Inca maize dishes, maize flour dumplings and maize flour cakes, which require ground maize. On the other hand, chicha manufacturing does involve the grinding of germinated, dried maize kernels (Nicholson, 1960). Since grinding is involved in chicha manufacturing and since milling stones are concentrated in the cane-walled structures, it is suggested that the inhabitants of the cane-walled structures engaged in chicha manufacturing.

Though there are minor regional variations in chicha making (Nicholson, 1960), the basic process is relatively uniform. It involves (1) germinating, drying and grinding maize kernels, thus making a malt; (2) boiling the malt for a lengthy period; (3) straining impurities from the brew; (4) allowing the brew to cool and ferment (Gillin, 1947, p. 53; Nicholson, 1960). The steps in the process which might leave archaeological indications are (1) malting, as possibly evidenced by milling stones; (2) boiling, indicated by charcoal, ash, hearths and burned vessels; and (3) straining, which might be indicated by basketry, cloth, or ceramic strainers (see Morris, 1979, p. 28). The evidence for grinding the germinated maize has been discussed above; additional evidence is discussed below.

Possible evidence for boiling the chicha brew was found during excavations in the cane-walled structures at Manchan. A very large hearth area (6.5 x 3.5 m.) was uncovered which consisted of a roughly rectangular cluster of adobes which were arranged to form a minimum of 6 separate hearths (fig. 2). Based on the stratigraphic relationships, these hearths were used contemporaneously, and based on the planned arrangement of the adobes, it appears that the hearths functioned as a unit. In short, this was a well-planned, multi-hearth cooking area and not simply a cluster of hearths each of which was used at a different time. Associated directly with the hearth was a late Chimu storage jar which indicates the date of the cooking area (fig. 3). Radiocarbon and archaeomagnetic samples were also collected from the hearth, but have not yet been analyzed.

The complete absence of slag and burned clay rules out the possibility that the hearths were used for processing raw materials. The absence of tools associated with metal working (see Donnan, 1973; Topic, 1977; Shimada, 1978, pp. 580-582) further eliminates a light industrial function for the hearths.

The cooking area is much larger than even a large extended family would require. Modern residents of the Casma Valley who use similar hearths often use a single hearth to cook for six to ten individuals. The cooking area could thus serve as many as sixty individuals, which is a sizeable portion of the estimated population of the cane-wall structures. The absence of a high density of cooking vessel fragments associated with the hearth may indicate that this was not a large communal cooking area. In addition, there are surface indications of other hearths, though of unknown size, in the area of visible cane walls. Though further work is necessary to determine if the other hearths are similar in size and complexity to the excavated cooking area, the presence of hearths in other portions of the area of cane-walled structures probably indicates that cooking occurred throughout that part of the site and was not a concentrated activity. In short, it is unlikely that the hearth was used for either industrial purposes, daily food preparation for an extended family, or for communal food preparation. Therefore it is suggested that the cooking area was used during the boiling stage in chicha making. The individual hearths could have been used to set the cooking vessels on. The close arrangement of the hearths would allow a small number of people to monitor the cooking of a large volume

of chicha. No basket strainers and relatively little cloth were found in association with the hearth; thus there is no evidence of the straining process.

The notion that chicha was manufactured in the area of cane-walled structures at Manchan clearly rests on a web of circumstantial evidence. The notion does, however, at least account for this evidence.

A final observation about chicha manufacturing in this portion of Manchan relates to the context of production. If in fact chicha was manufactured in the Manchan cane-walled structures, it was not manufactured in "preindustrial breweries" as Morris (1979) has described for the site of Huánuco Pampa. A wide range of domestic debris (flake debitage, food remains, cotton at various stages of processing, and so forth) was recovered from the stratum associated with the large cooking area described above. These remains clearly indicate the domestic, as opposed to "industrial," context of the hearth, and potentially the domestic context of chicha manufacturing, thus pointing to domestic production for nondomestic consumption.

Summary

The research in the cane-walled structures at Manchan has resulted in the following ideas about intra-community organization:

1. Based on the clear differences in architecture and its correlated labor costs, the cane-walled structures and the compounds indicate the presence of two separate socio-economic classes at Manchan.
2. Based on the distribution of milling stones, the inhabitants of the cane-walled structures were engaged in economic activities, perhaps maize grinding for chicha, which were different from the economic activities of the compound residents.
3. It is postulated that the inhabitants of the cane-walled structures were engaged in domestic production of chicha for nondomestic consumption.

Inter-Community Differences

Only the barest fragments of information are available about the Chimu inter-community differences and relationships. First, the distinctive nature of Chan Chan as capital of the empire (Rowe, 1948; Moseley, 1975b) and the presence of additional Chimu centers in other coastal valleys (Keatinge and Day, 1973; Mackey, ms.; Mackey and Klymyshyn, ms.) indicates that there were some hierarchical distinctions in administrative functions. Second, based on the absence of evidence for markets, it is thought that exchange between Chimu communities paralleled other Andean exchange systems in being a directed economy characterized by reciprocity and redistribution (Murra, 1956; 1962; Morris, 1978). Finally, as mentioned in the introduction, archaeological research in the Moche Valley indicates that certain communities had

specialized, productive functions which were integrated into the overall system (Keatinge, 1974; 1975; Keatinge and Day, 1973). Thus current information seems to indicate an inter-community structure characterized by an administrative hierarchy, a directed economy, and organized production.

Current research in the Casma and Sechín valleys is designed to test these notions and to examine how regions were incorporated into the Chimu political and economic systems (Mackey and Klymyshyn, ms.). This research included excavations in the cane-walled structures at Manchan (Moore, ms.b). Since it is generally held that the lower class was the basic productive class, a comparison between the SIAR at Chan Chan and the analogous cane-walled structures at Manchan provides some preliminary information about the nature of production at two levels of the Chimu system.

One basic difference between the inhabitants of the Chan Chan SIAR and the Manchan cane-walled structures is that the two groups appear to have differed in economic activities. Topic's extensive excavations in the Chan Chan SIAR resulted in data indicating that craft production was a major focus of lower class economic activity. The evidence indicates that metallurgy, cloth manufacturing, and possibly woodworking were crafts carried out in the SIAR (Topic, 1977, pp. 95-107). Topic suggests that the production of at least some of these crafts was organized in workshops which may have been supervised by craftsmen who oversaw the work of less-skilled laborers (1977, p. 113).

The excavations in the Manchan cane-walled structures were limited; the basic objective was to excavate the best preserved structure in order to document the range of activities occurring at the household level. Clearly, a single structure cannot be assumed to be representative of all the cane structures at Manchan. However, the structure which was excavated contained no definitive indications of craft production for nondomestic consumption. The only classes of recovered archaeological materials which could relate to craft production are raw cotton and cotton cloth, and chipped stone material which might have been used in woodworking. The absence of spindle whorls and loom parts suggests that cloth manufacturing was not a major activity. As to the chipped stone material, cursory inspection failed to reveal any acute edge angles which might indicate woodworking (Wilmsen, 1972; additional analysis of chipped stone is planned for 1982). In contrast to the Chan Chan SIAR in which Topic describes the evidence for craft production as straightforward and the evidence for subsistence activities as "meager" (1977, p. 96), the vast majority of archaeological materials found in the cane-walled structure at Manchan were agricultural products, ceramics, and fish and mollusk remains.

This comparison of preliminary data from Manchan with the data from Chan Chan may suggest that craft specialization was a minor economic activity among the lower class at the lower levels of the Chimu settlement hierarchy. It should be clear that other explanations could account for the apparent absence of craft specialization among the lower class at Manchan. First, craft specialization could occur in other

portions of the site and simply not be associated with lower class residences. Second, it is possible that craft specialization was a major activity in satellite communities in Manchan's rural hinterland. The third possibility is that future excavations will uncover evidence for craft specialization in the cane-walled structures at Manchan. I want to emphasize that the current data are very preliminary and it would be an error to ignore the limits of the data. On the other hand, the hypothesis that craft specialization was of particular importance at Chan Chan and of less importance at other Chimu communities is suggested by other lines of evidence. First, since Chan Chan was the capital of the Chimu empire and the residence of the Chimu king, royal demand for crafted items was restricted to Chan Chan. Second, the presence of a large noble class at Chan Chan (Klymyshyn, 1976) probably resulted in a great demand for craft items. Although demand for luxury items certainly was not restricted to Chan Chan, the Chimu capital can be viewed as having a virtually insatiable demand for craft items, a demand different in both quantity and quality from the demands present in other Chimu communities. Since demand for craft items probably differed at the various levels of the Chimu settlement hierarchy and since the Chimu economy seems to have been a directed economy, then it is reasonable to expect that the economic activities of the productive class, resident in the area of cane-walled structures, would reflect this differential demand.

Conclusion

Recent excavations in the area of cane-walled structures of Manchan have resulted in preliminary data which can be compared to that regarding the SIAR occupation of Chan Chan. Since the cane structures are considered to be the residences of the lower, productive class, such a comparison not only gives some insight into the way of life of a specific class of Chimu citizens, but illuminates the nature of the productive bases of the Chimu socio-economic system. On the intra-community level, I have argued that there were two socio-economic classes at Manchan and that the two classes differed in their economic activities; further, I have suggested that the inhabitants of the Manchan cane-walled structures engaged in the domestic production of chicha for nondomestic consumption. On the inter-community level, the comparison of the Chan Chan and Manchan data suggests the hypothesis that the significance of craft production for nondomestic consumption decreases at lower levels of the Chimu settlement hierarchy. Clearly more data are needed to test this hypothesis and in order to increase our understanding of the Chimu socio-economic system.

Acknowledgements

The excavations in the Manchan cane-walled structures were conducted as part of the Proyecto Chimu Sur, directed by Carol J. Mackey and Alexandra M.U. Klymyshyn. The Proyecto Chimu Sur is funded under National Science Foundation Grant No. BNS 8023639, and the excavations are authorized by the Instituto Nacional de Cultura Acuerdo No. 02/26.02.81. My deep thanks go to Drs. Mackey and Klymyshyn for allowing me to

participate in the Proyecto Chimu Sur and for making critical comments on this article. The article also profited from comments by Janine Gasco and Jeffrey Serena. I would also like to thank the staff of Na Balom, San Cristóbal de las Casas, Chiapas, México where an earlier version of this paper was written.

November 13, 1981
revised December 26, 1981

BIBLIOGRAPHY

Andrews, Anthony P.
1974 The U-shaped structures at Chan Chan, Peru. Journal of Field Archaeology, vol. 1, no. 3/4, pp. 241-264. Boston.

Begler, Elsie B., and Keatinge, Richard West
1979 Theoretical goals and methodological realities: problems in the reconstruction of prehistoric subsistence economics. World Archaeology, vol. 11, no. 2, October, pp. 208-226. London.

Conrad, Geoffrey Wentworth
1974 Burial platforms and related structures on the north coast of Peru: some social and political implications. Ph.D. dissertation, Department of Anthropology, Harvard University, Cambridge.

Donnan, Christopher Bruce
1973 A precolumbian smelter from northern Peru. Archaeology, vol. 26, no. 4, October, pp. 289-297. New York.

Donnan, Christopher Bruce, and Mackey, Carol Joy
1978 Ancient burial patterns of the Moche Valley, Peru. University of Texas Press, Austin and London.

Gillin, John Philip
1947 Moche: a Peruvian coastal community. Smithsonian Institution, Institute of Social Anthropology, Publication No. 3. Washington.

Keatinge, Richard West
1974 Chimu rural administrative centres in the Moche Valley, Peru. World Archaeology, vol. 6, no. 1, June, pp. 66-82. London.

1975 Urban settlement systems and rural sustaining communities: an example from Chan Chan's hinterland. Journal of Field Archaeology, vol. 2, no. 3, pp. 215-227. Boston.

Keatinge, Richard West, and Day, Kent Collins
1973 Socio-economic organization of the Moche Valley, Peru, during the Chimu occupation of Chan Chan. Journal of Anthropological Research, vol. 29, no. 4, Winter, pp. 275-295. Albuquerque.

Klymyshyn, Alexandra Maria Ulana
1976 Intermediate architecture in Chan Chan, Peru. Ph.D. dissertation, Department of Anthropology, Harvard University. Cambridge.

Mackey, Carol Joy
ms. Archaeological investigations in the southern part of the Chimu empire. Report submitted to the Instituto Nacional de Cultura, Lima, Peru, 1979.

Mackey, Carol Joy, and Klymyshyn, Alexandra Maria Ulana
ms. Political integration in prehispanic Peru. Research proposal submitted to the National Science Foundation, 1980.

Moore, Jerry Dennis
ms.a Excavations in Compound 04, Manchan. Unpublished report on excavations; ms. in author's possession.

ms.b The SIAR of Manchan: excavations in Unit 211. Unpublished report on excavations; ms. in author's possion.

Morris, Edward Craig
1978 The archaeological study of Andean exchange systems. In: Social archeology; beyond subsistence and dating. Edited by Charles L. Redman, Mary Jane Berman, Edward V. Curtin, William T. Langhorne Jr., Nina M. Versaggi, and Jeffery C. Wanser, pp. 315-327. Academic Press, New York, San Francisco, London.

1979 Maize beer in the economics, politics, and religion of the Inca empire. In: Fermented food beverages in nutrition. Edited by Clifford Felix Gastineau, William J. Darby, [and] Thomas B. Turner, pp. 21-34. Academic Press, New York, San Francisco, London.

Moseley, Michael Edward
1975a Prehistoric principles of labor organization in the Moche Valley, Peru. American Antiquity, vol. 40, no. 2, April, pp. 191-196. Washington.

1975b Chan Chan: Andean alternative of the preindustrial city. Science, vol. 187, no. 4173, 24 January, pp. 219-225. Washington.

Murra, John Victor
1956 The economic organization of the Inca state. Ph.D. dissertation, Department of Anthropology, University of Chicago, Chicago.

1962 An archaeological "restudy" of an Andean ethnohistorical account. American Antiquity, vol. 28, no. 1, July, pp. 1-4. Salt Lake City.

Netherly, Patricia Joan
1977 Local level lords on the north coast of Peru. Ph.D. dissertation, Department of Anthropology, Cornell University, Ithaca. University Microfilms International, BTK 78-07792, Ann Arbor.

Nicholson, G. Edward
1960 Chicha maize types and chicha manufacture in Peru. Economic Botany, vol. 14, no. 4, October-December, pp. 290-299. New York.

Pozorski, Shelia Griffis
1982 Subsistence systems in the Chimú state. In: Chan Chan: Andean desert city. Edited by Michael E. Moseley and Kent C. Day, pp. 177-196. School of American Research Advanced Seminar Series. University of New Mexico Press, Albuquerque.

Pozorski, Thomas George
ms. Survey and excavation of burial platforms at Chan Chan, Peru. A thesis presented to the Department of Anthropology of Harvard University in partial fulfillment of the requirements for the degree of Bachelor of Arts with Honors. Cambridge, 1971.

Rowe, John Howland
1946 Inca culture at the time of the Spanish conquest. Handbook of South American Indians. Bureau of American Ethnology, Bulletin 143, vol. 2, pp. 183-330. Washington.

1948 The kingdom of Chimor. Acta Americana, vol. VI, núms. 1-2, enero-junio, pp. 26-59. México.

Shimada, Izumi
1978 Economy of a prehistoric urban context: commodity and labor flow at Moche V Pampa Grande, Peru. American Antiquity, vol. 43, no. 4, October, pp. 569-592. Washington.

Topic, John Richard, Jr.
1977 The lower class at Chan Chan: a qualitative approach. Ph.D. dissertation, Department of Anthropology, Harvard University, Cambridge.

Wilmsen, Edwin Norman
1972 Lithic analysis in paleoanthropology. In: Contemporary archaeology; a guide to theory and contributions. Edited by Mark P. Leone, pp. 195-205. Southern Illinois University Press, Carbondale and Edwardsville; Feffer & Simons, Inc., London and Amsterdam.

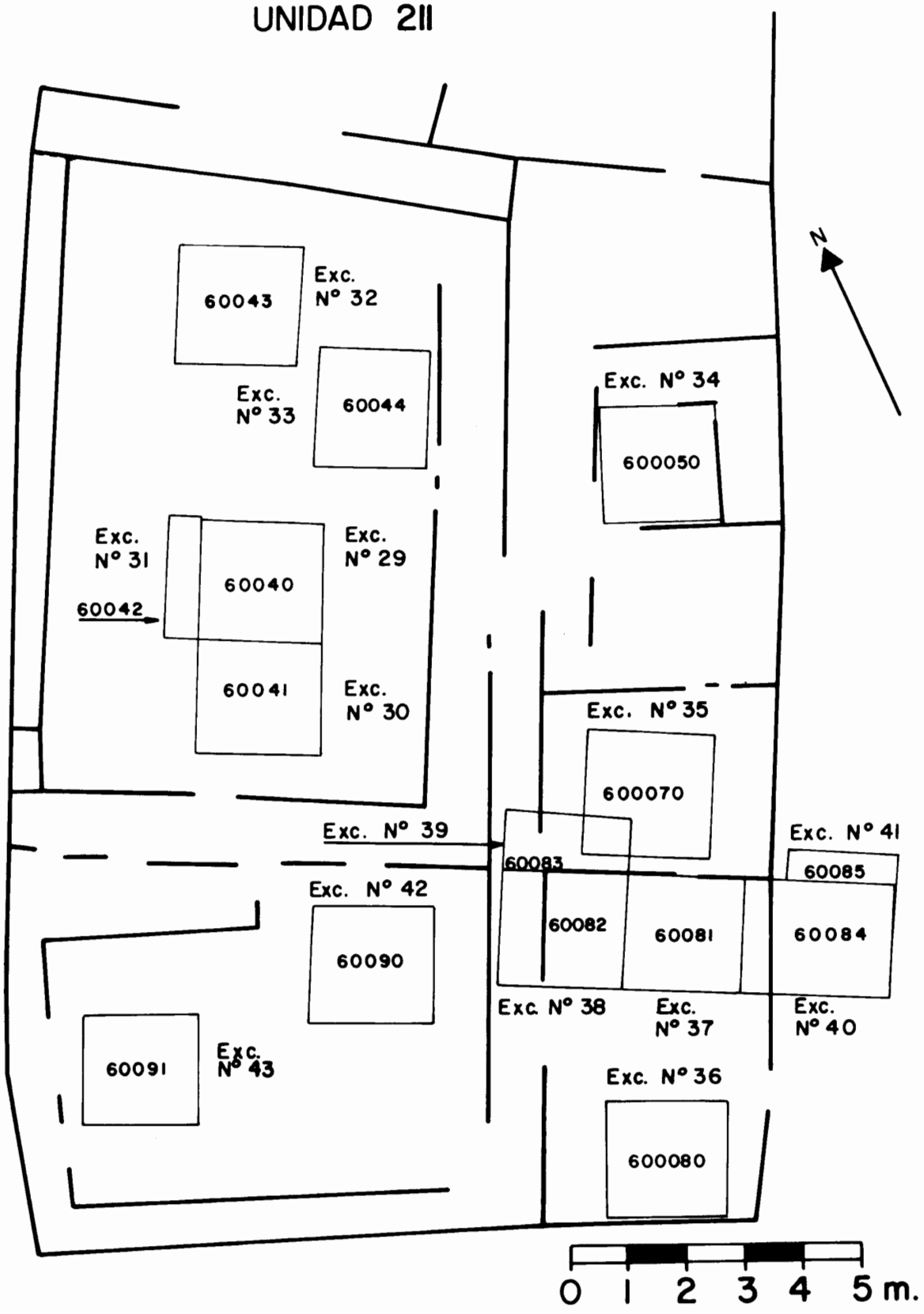
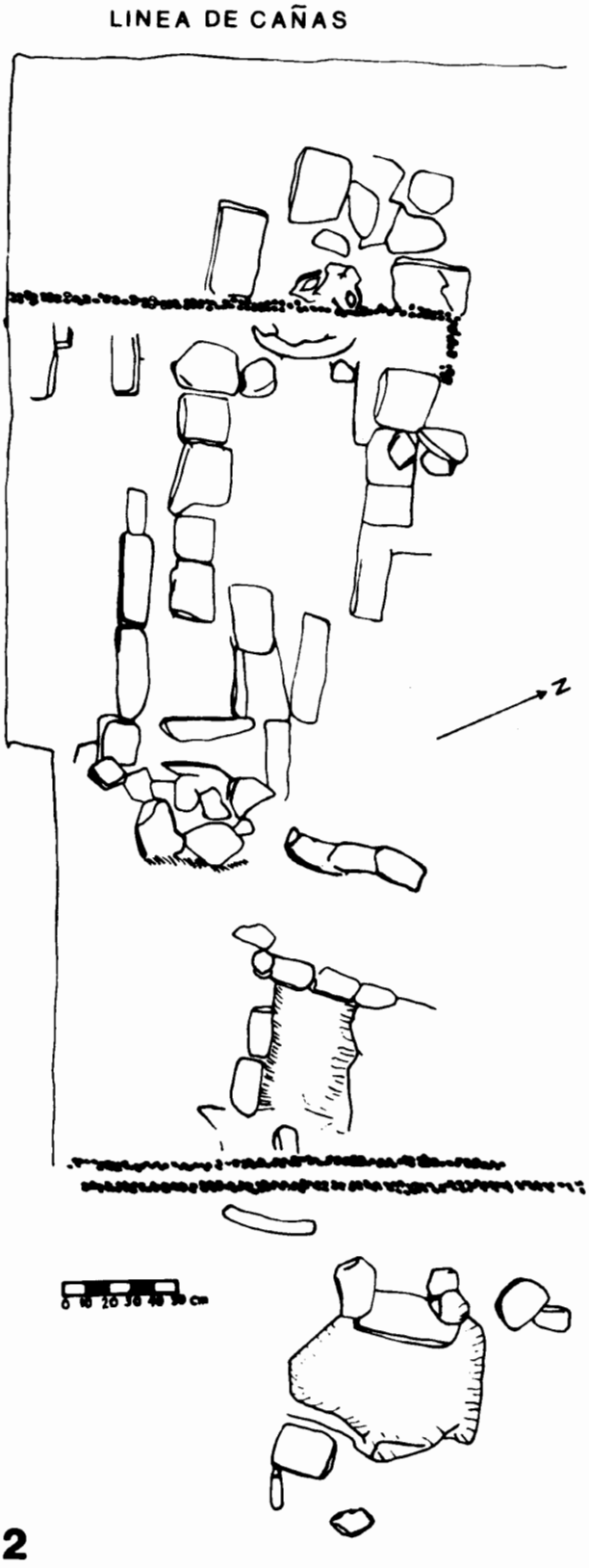


Fig. 1, plan of cane-walled structure at Manchan.



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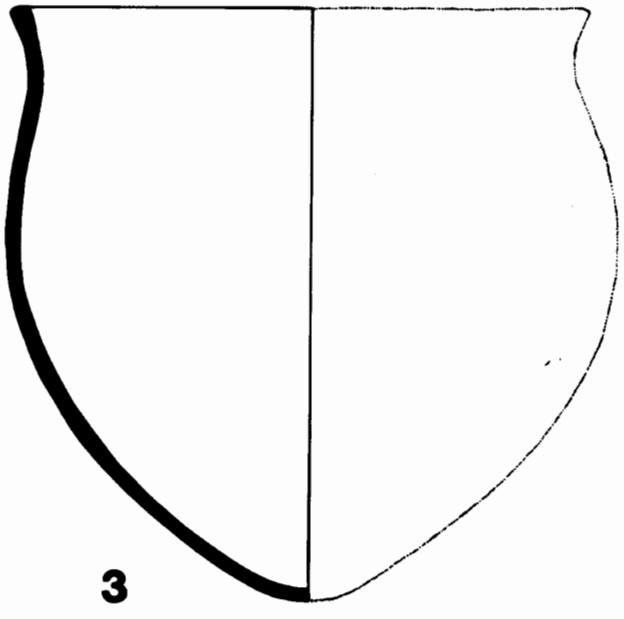

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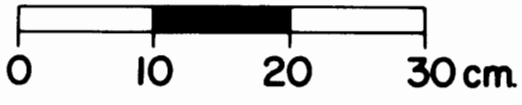

Fig. 2, plan of hearth area. Fig. 3, late Chimu jar associated with hearth area.