

## CONSTRUCTION AND LABOR ORGANIZATION IN THE CHIMU EMPIRE

Carol J. Mackey and Alexandra M. Ulana Klymyshyn

Most information on the Chimu empire has been based on research centering on the capital city of Chan Chan and its environs. The "Proyecto Chimú Sur," directed by the authors, has expanded the field of investigation to the site of Manchan in the Casma Valley, a Chimú regional center. Thus far work at Manchan has included the mapping of eighty-five percent of the architecture and the excavation of fifty-three two-by-two meter cuts located in the adobe compounds and domestic cane-walled structures (fig. 1). Tentative conclusions reached on the basis of this research will continue to be tested in future excavations.

## Chan Chan and Manchan

The Chimú empire was one of the largest states in prehispanic Peru and extended some 1000 km. along the north coast of Peru from Tumbes south to the Chillón Valley. According to the Spanish chronicles, the area south of the Santa Valley, including Manchan and the Casma Valley, was conquered in the second of two phases of Chimú expansion (Rowe, 1948, pp. 39-42).

Chan ChanDescription

The capital of the empire, Chan Chan, is located in the Moche Valley. Covering an area of over 20 km.<sup>2</sup>, it is one of the largest prehispanic urban centers in Peru. Ten well-planned, monumental compounds dominate the central part of the city, which measures 6 km.<sup>2</sup> (Moseley, 1975b; 1975c). The compounds measure a maximum of 650 m. in length and are constructed primarily of adobes. The internal architectural features in these monumental compounds include courtyards, storerooms, niched rooms (audiencias), corridors, and burial platforms. The monumental compounds have been interpreted as the residences and mausoleums of the royal families, also serving as administrative buildings (Day, 1973). A second group of 35 so-called intermediate compounds is found within or near the core area of the site. These intermediate compounds are a quarter to a third the size of the monumental compounds. The internal architectural features are the same as in the monumental compounds except that the intermediate compounds do not contain burial platforms. The intermediate compounds both housed the lower nobility and served as administrative buildings (Klymyshyn, 1976).

In addition to the compounds there were domestic structures which housed the artisans and commoners who composed the majority of the population. These domestic structures were not of adobe, but had cane-and-mat walls on cobble foundations. These structures are located

mainly to the west and south of the core of the city (Topic, 1977).

### Construction

At Chan Chan the monumental and intermediate compounds differ in both construction materials and construction techniques. The monumental compounds were built primarily of adobes, although several of the compounds have tapia walls which here contain a considerable admixture of cobbles. The enclosure walls of the monumental compounds measure up to 9 m. in height and were built in segments over 4 m. long. Both the enclosure walls and the main interior walls have boulder foundations and are thicker at the base than at the top. The minor interior walls, which span shorter distances than the major ones, are both lower and thinner than the enclosure walls and neither have boulder foundations nor are they tapered, although they were often built in segments (Day, 1973).

Intermediate compounds are constructed only of adobes with no use of tapia. The walls are considerably lower than those in monumental compounds, probably no more than 5 m. high. Since the walls in intermediate compounds are less massive than those of monumental compounds, they do not have boulder foundations nor are they tapered. With few exceptions, these walls are not segmented (Klymyshyn, 1976).

In all of the compounds, both monumental and intermediate, adobes were laid up in courses of runner and header with the number of bricks depending on the thickness of the wall. All of the walls are solid adobes. The bricks were set in a silt mortar with some chinking. Clay plaster has been preserved on many of the walls, and in some cases there was successive replastering. Both the corners of rooms and door jambs are angular rather than rounded.

Wall decorations are very common at Chan Chan. The primary type of decoration is clay friezes. In the monumental compounds these are found on the walls of large and small courtyards, niched rooms (audiencias), and corridors. The motifs of these friezes are mainly representational with some geometric patterns. Most of the representations are of fish and birds (Fang, 1975). A few of the walls in monumental compounds still have traces of paint. In the intermediate compounds, clay friezes are less frequent and less elaborate with mostly geometric designs. In both kinds of compound entrances into courtyards are decorated with pilasters, though these are less elaborate and smaller in the intermediate compounds.

## Manchan

### Description

As mentioned, Manchan was the regional administrative center for the southern part of the Chimu empire. It is located at the margin of both prehispanic and present day cultivation in the Casma Valley. The total area of Manchan is 70 ha. making it one of the largest Chimu sites outside the capital (fig. 1). The chief architectural remains

consist of four separated and five agglutinated compounds constructed of adobes. Although no two compounds are identical, similar architectural features (courtyards, storerooms and rooms with niches) occur throughout the site. These compounds functioned as dwellings of the resident nobility and as administrative buildings.

In addition to the monumental compounds there are also cane-walled domestic structures at Manchan. These cane-walled structures consist of habitation rooms, kitchens and storage areas. Although some of these houses could have been used by families, many of the structures were probably intended for larger social groups. This interpretation is suggested by the presence of large domestic hearths (4.5 to 6 m. in length), the large size of the rooms, the quantity of large storage jars, and the well-planned nature of the structures (see Moore, 1982).

In the southern portion of the site there are two isolated adobe mounds and a stone-walled enclosure. At the base of the hills to the east and west there are a series of cemeteries contemporary with the site. The cemeteries are partially separated from the habitation areas by stones set in a semicircle which runs the entire width of the site (not shown in fig. 1).

Thus far the ceramic evidence indicates that Manchan was occupied from late in the Late Intermediate Period to the Colonial Period (approximately 1300-1600 A.D.). Ceramics belonging to earlier complexes than late Chimú have not been found.

### Construction

In general, the construction techniques used in the compounds at Manchan correspond to the intermediate rather than the monumental compounds at Chan Chan. The compounds were constructed primarily of adobes with the use of tapia limited to the walls on the eastern extreme of the site (not shown on fig. 1). Although formed in large blocks like those at Chan Chan, the tapia at Manchan does not contain the cobbles found at Chan Chan. The tapia walls were built in sections 2 m. long by 2 m. high and are slightly tapered (Thompson, 1962). Like the tapia walls the adobe walls are not preserved to their original height; at present the highest standing adobe walls are under 2 m. The outer walls of the compounds were probably no more than 5 m. in height at the time of construction. This figure is based on the amount of wall fall and on the construction of the walls, which do not have a stone foundation nor are they tapered as are the walls over 5 m. high at Chan Chan. In all of the adobe walls the bricks are set in mortar with a greater amount of chinking than found at Chan Chan. Clay plaster has been preserved on most of the walls.

The use of stone in wall construction is not frequent at Manchan. There are, however, a few stone walls and stones are sometimes incorporated in adobe walls. The most interesting example of such use is the boulders used as corner stones in one of the separated compounds.

The clay friezes found in Chan Chan are lacking in Manchan. However, at Manchan several fragments of painted walls have been found with traces of white, black, or red paint in Unit 1 (see fig. 1). A few of the entrances have pilasters and are baffled. Although the corners of rooms are angular, most door jambs have rounded corners.

#### Adobes

The adobes at Chan Chan were pressed into rectangular molds and sun dried. They were all made of silt. Different silts were used, however, and there is some correlation between types of silts and the segments in which the walls were constructed (Moseley, 1975a; 1975b). The bricks also vary in the amount and type of inclusions. The bricks in Chan Chan have been grouped into three types based on the ratio of width to height, with the absolute dimensions, but not the ratio, varying according to the size of the wall in which they were used. On the basis of the distribution of these bricks in both monumental and intermediate compounds, Alan Kolata (1978) was able to establish a chronological sequence for the construction of Chan Chan.

The adobes in Manchan were also mold made and sun dried. Finger marks from the compression of the adobe mixture into the mold are still visible on what would have been the open side of the mold. The silt for the adobes was brought either from the irrigation canals running along side of the site or from the Casma River approximately 1 km. to the north. There is very little variation in the silt used in the adobes and there is also no correlation between different silts and different areas of the site. The size of the bricks ranges from 31 x 13 x 9 cm. to 46 x 23 x 14 cm., with the average size being 37 x 19 x 12 cm. The average height to width ratio is 1:1.5, which corresponds to the earliest of the three brick phases identified by Kolata at Chan Chan (Kolata, 1978). This result, however, does not coincide with the dating of the ceramics from Manchan which are analogous to the late Chimu ceramics from Chan Chan (Topic, 1977; Mackey, ms.).

No markings of any kind, finger impressions or designs, were found on the adobes in Chan Chan. In Manchan, however, 12 marked bricks were found. Four of these, with geometric designs, were found by Lorenzo Samaniego during his excavations at Manchan in the early 1970's (Samaniego Román, n.d.). The following discussion is limited to the 8 bricks found by the authors during the 1981 field season. Although the size of these bricks varies, the average is the same as that of the unmarked bricks. The motifs on the bricks are both geometric and representational and are located on what would have been the open side of the mold. The representational designs include two fish (fig. 2, A and B), one bird (fig. 2, C), and a child's footprint (fig. 2, D). It is not possible to tell which species of fish or bird is being represented; as is common in Chimu art, the fish and birds are stylized. The only other known Chimu brick marked with a child's footprint is from the site of Chotuna in the Lambayeque Valley (Susan Bruce, personal communication). The geometric designs include dots and lines (fig. 2, E), a serpentine (fig. 2, F), and a mazelike abstract motif (fig. 2, G). All but one of

these designs were finger impressed in wet silt, while one of the fish (fig. 2, B) was incised after the adobe had partially dried.

Most of the marked adobes were found in the wall fall out of context. Half of them were found in the compound bisected by the Pan American Highway, while the remainder were distributed throughout the site. The location of the individual bricks is indicated by their respective letters on fig. 1. One brick was found still incorporated in the wall with the design facing up, indicating that it had been covered by further courses of bricks. The one with a foot imprint was found in the fill of a tomb. Almost all of the others were found in courtyards.

In addition to the marked bricks, three unbaked clay figurines were found. One of these (fig. 3) was imbedded into an adobe found in tomb fill. The fragment, which measures 12 x 8 cm., represents a human figure. The features of the face are indicated as is an arm which is crossed over the chest. A loosely woven cotton fabric is tied around the base of the head and covers part of the body. Under the fabric there is a press-molded necklace around the neck. This is the only known example of a Chimú, unbaked-clay figurine incorporated in a structural feature.

Although marked bricks have been found from the Lambayeque to the Casma valleys, and in sites dating from the late Early Intermediate Period to the Late Horizon, very little published information is available regarding them. In addition to a catalog of marked bricks from the Casma Valley compiled by Samaniego Román (n.d.), the other major treatment of the subject is that of Hastings and Moseley (1975) on the marked bricks from the Moche Pyramid Site. The marks from Moche were interpreted as maker's marks, and the authors identified over 100, mostly simple geometric designs (Hastings and Moseley, 1975, figs. 3, 4). It was also found that the distribution of the different makers' marks within the structures corresponds to the distribution of different silts and to the segments of the construction stages. The distribution of the marks was used to establish a construction sequence for the two pyramids as well as to construct hypotheses regarding the organization of labor (Hastings and Moseley, 1975; Moseley, 1975a).

In spite of the time difference, the best comparative material for the Manchan marked bricks is that from the Moche Pyramid Site since no marked bricks were found in Chan Chan. In contrast to the predominantly geometric motifs from the pyramid site, the Manchan marked bricks bear both geometric and representational motifs. On the other hand, while some 100 designs are known from the pyramids of the Sun and Moon, only 12 marked bricks have been found in Manchan, each with a different design. Since so few bricks have been found, and those mostly in wall fall, it is not possible to determine whether the Manchan bricks may have been used to mark off segments of walls. The one brick found still incorporated in a wall would have been covered by other bricks so the design would not have been visible, a fact which seems to rule out a purely decorative function for the bricks.

### Labor Organization

Architecture can be used to infer various kinds of socio-economic information. From the size of buildings, the materials used and the construction techniques one can arrive at the amount of labor and time involved and sometimes even the size of the labor group can be extrapolated. Moseley (1975a) postulated, on the basis of ethnohistoric information and architectural evidence, that a labor service with some characteristics of the Inca system of mit'a labor may have been initiated as early as Gallinazo culture. While the details of the Inca mit'a are based on ethnohistoric evidence, Moseley's hypothesis was based on archaeological data including the use and distribution of maker's marks on bricks, the construction of walls in discrete segments, and the distribution of different silts used in the manufacture of the bricks.

Although there are some differences in construction between Chan Chan and Manchan, it is likely that mit'a or a similar labor service was used at both sites. This inference is based on the size of the sites, the number and size of the adobe structures, the pattern of growth of the sites, construction techniques and materials, and the nature of the domestic structures.

#### Chan Chan

In Chan Chan the evidence for the use and coordination of a large labor force comes from the size of the structures and their construction. Of the 10 monumental compounds, the largest, Gran Chimú, covers an area of approximately 23.3 ha. Even though we do not have any accurate estimates on the length of time it took to construct each compound, the bonding of the enclosing and interior walls indicates that the outer walls were constructed first and in a single building stage. This means that for each compound well over 2000 m. of massive walls were being constructed at the same time. These walls were constructed in segments with different types of silt and using standardized bricks. Further, it would have been more efficient to break down the process of construction into a series of repetitive tasks, e.g., the laying of the boulder foundations, the making and transportation of the bricks, and the laying up of the adobes, each performed by a separate group.

Evidence that the laborers were brought in from the outside rather than living within the city lies in the sporadic rather than continuous nature of the construction phases and in the occupations postulated for the majority of the inhabitants. There is abundant evidence that the need for a large labor force was sporadic rather than continuous, since not all compounds were built at the same time during the 600 year occupation of the city (Conrad, 1974; Kolata, 1978). A much smaller number of workers would have been needed for the maintenance and remodeling of these structures. Thus it would have been far more efficient to bring in a labor force as needed rather than to keep a large labor force in the city at all times.

Based on the artifacts and other remains found in the domestic

structures, Topic (1977) postulated that the inhabitants were primarily artisans and other specialists. These specialists would not have been used for the construction of the compounds just as in the case of the artisans in the Inca empire who were exempt from mit'a labor (Rowe, 1946; Murra, 1956). However, Topic also identified structures which could have been used for the temporary housing of mit'a labor (Topic, 1977, pp. 114-115, 520-523). Based on this evidence, it seems clear that some form of labor service was in operation. Whether this labor service had all the characteristics of the Inca mit'a system is not possible to determine. Nonetheless, given the known forms of labor organization in prehispanic Peru, the mit'a system seems best to fit the evidence, especially given the socio-economic organization of the Chimu empire (Rowe, 1948; Klymyshyn, 1976; Netherly, 1977).

### Manchan

In spite of its smaller size, which required less time and less labor for its construction, some of the same sorts of evidence as those for the use of labor service in Chan Chan exist in Manchan. Of the 9 compounds at Manchan, the largest, Unit 1, covers an area of approximately 4.9 ha. As in Chan Chan the outer walls were built first and in one building stage. Thus about 800 m. of adobe wall was under construction at the same time. Although the walls at Manchan are not segmented, many of the same repetitive tasks needed to be carried out in the construction of the compounds as at Chan Chan. The adobes in Manchan are also mold made and standardized. There is also evidence that the compounds were not all constructed at the same time. The agglutinated compounds abut one another and the separated ones have later ceramics than the agglutinated ones. Thus, again the need for labor was sporadic rather than continuous.

When the marked bricks were first encountered they were thought to be analogous to the bricks at the Moche Pyramid Site. However, since the sample is so small, and the bricks were found in wall fall, they cannot at this time be used as one of the lines of evidence to support the hypothesis that a form of labor service existed at Manchan.

Evidence from the domestic structures indicates that they may have been used to house groups of laborers. Based on surface remains, there are approximately 22,500 m.<sup>2</sup> of domestic structures. In the area where walls are visible, two large hearths with multiple fire places were found during the 1981 excavations. There was no evidence that these hearths were used for craft production. Associated with the hearths were several large storage jars (Moore, 1982). One possible interpretation of the hearths and the jars is that food was being stored and prepared for groups larger than extended families.

### Conclusions

All the differences between Chan Chan and Manchan which have been presented are related to their different roles in the Chimu empire.

Chan Chan served as the capital and as such commanded a greater amount of both labor and tribute. Chan Chan is larger, contains more structures, and the structures themselves are larger and more elaborate. Manchan, on the other hand, served as a regional center and commanded proportionately less labor and tribute. The compounds in Manchan are more similar to the intermediate rather than to the monumental compounds in Chan Chan. These are expected differences between capitals and regional centers (see Conrad, 1978; Steponaitis, 1981).

In spite of these differences, a form of labor service analogous to the Inca mit'a system was used in both sites although to a lesser extent at Manchan. The main evidence for the use of labor service at both sites is the size of the compounds, the amount of labor needed to construct them, the standardization of the adobes, as well as the number of repetitive tasks involved in the construction.

At Chan Chan, the residences of groups of artisans and other specialists, who would not have performed labor service, have been identified. Dwellings which could have housed groups of laborers have been found at both Chan Chan and Manchan.

The results of the comparison of the construction materials and techniques used in Chan Chan and Manchan indicate that there are few differences between the two sites. What differences there were are related to the differences in the size of the structures. Since the structures at Manchan are smaller and their walls shorter and less massive, the boulder foundations and tapering found at Chan Chan are not present in Manchan. The only differences which need not be related to size are the segmentation of the walls and the correlation of these segments with adobes manufactured of different silts which were found in walls at Chan Chan but not at Manchan. Walls at both sites show traces of paint, but clay friezes are present only at Chan Chan.

The most important differences in materials are the more limited use of tapia and the presence of marked bricks in Manchan. The earliest known marked adobes are from the Moche Pyramid Site. In the Moche context there is strong evidence that these marks are makers' marks and are associated with the organization of labor and the construction of the pyramids. Since marked adobes are not found in sites post-dating Moche culture in the Moche Valley it seems that, although the use of marked bricks originated in this valley, the practice was continued elsewhere. Marked bricks from Chimu times have been found only in provincial sites: Chotuna in Lambayeque (Bruce, personal communication) and Manchan in the Casma Valley. Given the distance and the difference between the two sites, it is not clear whether these two examples are related. There are differences in both the motifs and the distribution of the adobes between Manchan and the pyramid site. However, since the sample from Manchan is so small, it is not possible to state the function definitively. Nonetheless, at this time it appears that the marked adobes are neither purely decorative nor directly related to labor organization.



## Acknowledgements

Support for the first year's research of the Proyecto Chimu Sur was funded by the National Science Foundation (Grant No. BNS 8023639). We would especially like to thank Lisa Euphrat-Saunders, Michael Jochim, Patricia Lyon, Jerry Moore, and Barbara Voorhies for their helpful comments and suggestions on this paper. We would also like to acknowledge Genaro Barr for drafting the map, Kurt Macher for the illustrations and Jean Ryan for the final preparation of the map for publication.

November 16, 1981  
revised December 11, 1981

## Editor's Note

While this article was in production, and after the authors had left for Peru to begin their second field season, further information on Chimu marked bricks appeared in an article by Izumi Shimada (1981). Reporting on the first two seasons of the Batan Grande-La Leche Archaeological Project in Lambayeque, Shimada mentioned the occurrence of marked adobes in the corner of Huaca Las Ventanas, Batan Grande and Mound II, Huaca Soledad (1981, figs. 9 and 20 respectively). [PJJ]

## BIBLIOGRAPHY

- 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.
- 1978 Models of compromise in settlement pattern studies: an example from coastal Peru. *World Archaeology*, vol. 9, no. 3, February, pp. 281-298. Henley-on-Thames.
- Day, Kent Collins  
1973 Architecture of ciudadela Rivero, Chan Chan, Peru. Ph.D. dissertation, Department of Anthropology, Harvard University, Cambridge.
- Fang, Madeleine W.  
1975 The Marine Theme of Chimu friezes. M.A. thesis, Department of Anthropology, University of California, Los Angeles, Los Angeles.
- Hastings, Charles Mansfield, and Moseley, Michael Edward  
1975 The adobes of Huaca del Sol and Huaca de la Luna. *American Antiquity*, vol. 40, no. 2, April, pp. 196-203. Washington.

- Klymyshyn, Alexandra Maria Ulana  
 1976 Intermediate architecture in Chan Chan, Peru. Ph.D. dissertation, Department of Anthropology, Harvard University, Cambridge.
- Kolata, Alan Louis  
 1978 Chan Chan: the form of the city in time. Ph.D. dissertation, Department of Anthropology, Harvard University, Cambridge.
- Mackey, Carol Joy  
 ms. Chimu ceramics. California State University, Northridge.
- Moore, Jerry Dennis  
 1982 Chimu socio-economic organization: preliminary data from Manchan, Casma Valley, Peru. *Nawpa Pacha* 19, 1981, pp. 115-128. Berkeley.
- 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 Secrets of Peru's ancient walls. *Natural History*, vol. LXXXIV, no. 1, January, pp. 34-42. New York.
- 1975c 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.
- 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.
- 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.
- Samaniego Román, Lorenzo  
 n.d. Catálogo de exposición de adobes pre-hispánicos de los valles de Sechín, Casma, Nepeña y Santa (Ancash-Perú). Mimeograph.

Shimada, Izumi

1981 The Batan Grande-La Leche Archaeological Project: the first two seasons. *Journal of Field Archaeology*, vol. 8, no. 4, Winter, pp. 404-446. Boston.

Steponaitis, Vincas P.

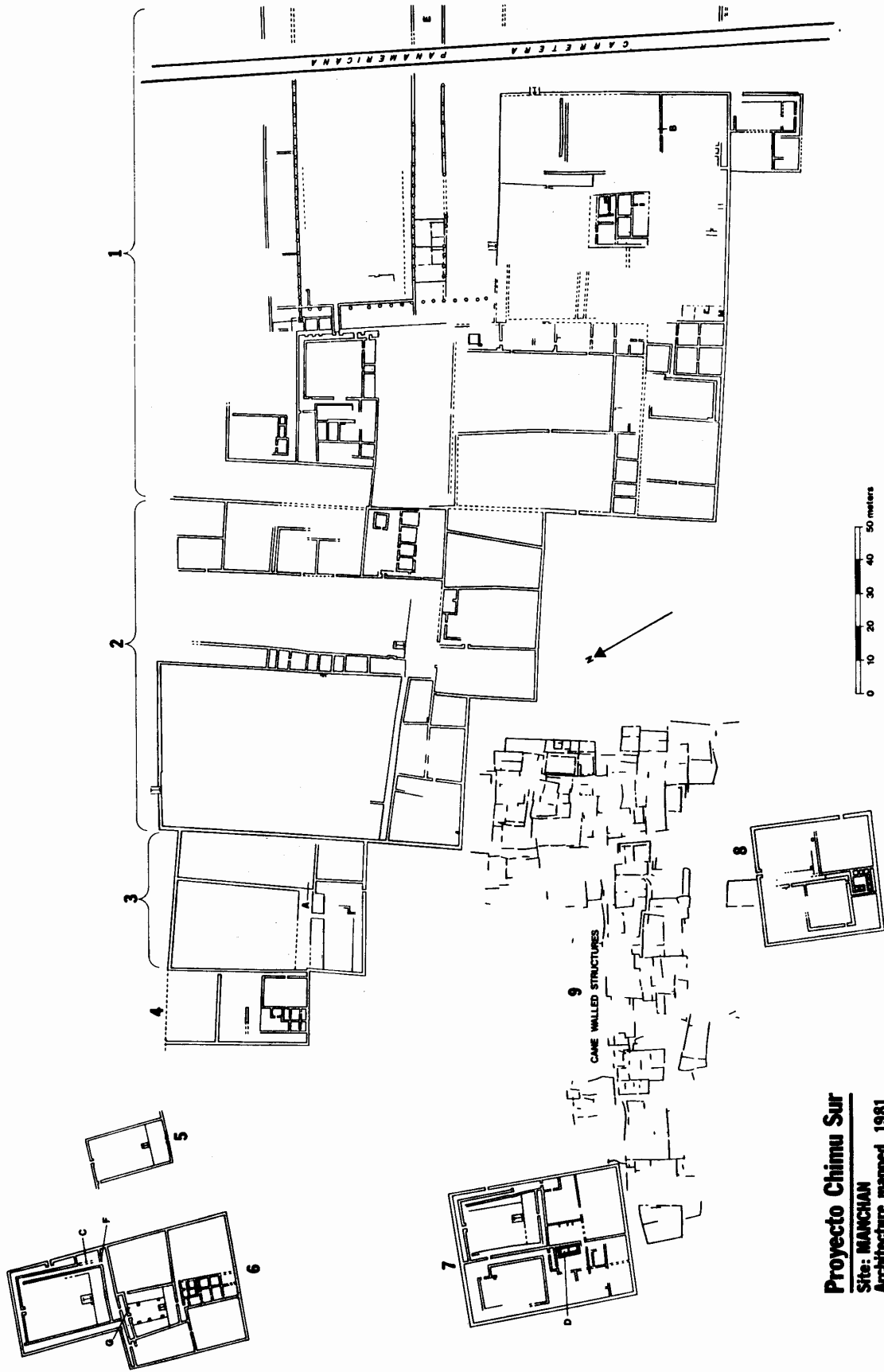
1981 Settlement hierarchies and political complexity in nonmarket societies: the Formative Period of the Valley of Mexico. *American Anthropologist*, vol. 83, no. 2, June, pp. 320-363. Washington.

Thompson, Donald Enrique

1962 Architecture and settlement patterns in the Casma Valley. Ph.D. dissertation, Department of Anthropology, Harvard University, Cambridge.

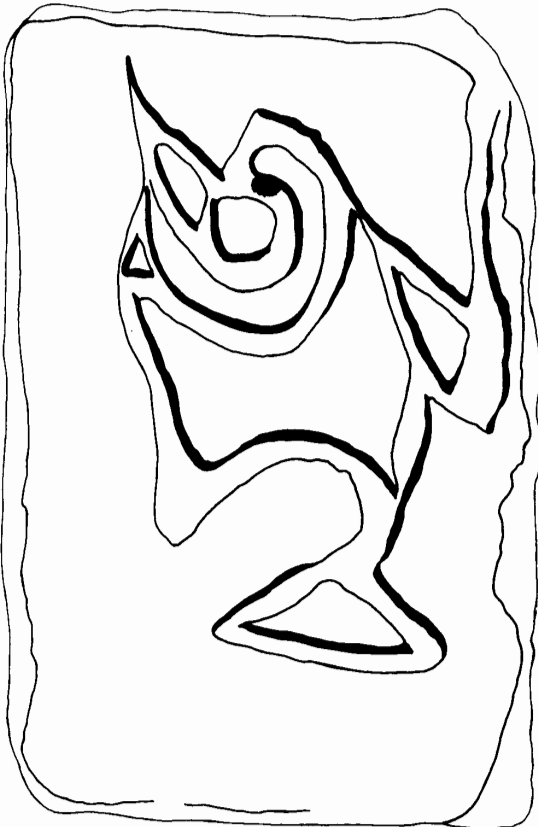
Topic, John Richard, Jr.

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

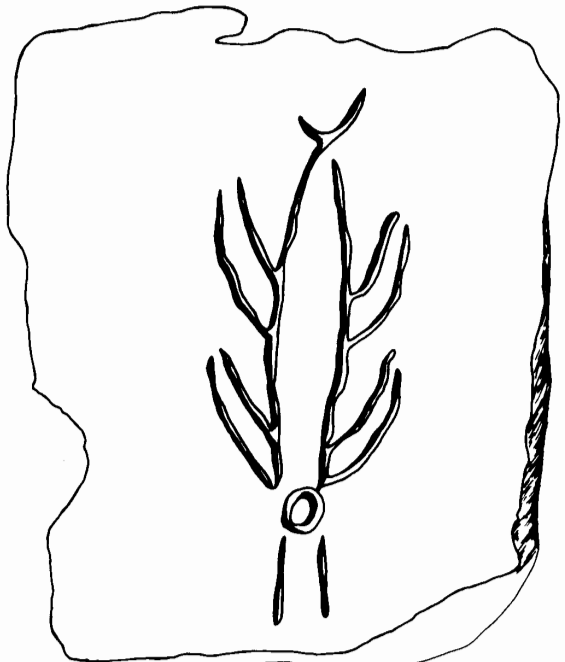


**Proyecto Chimú Sur**  
Site: MANCHAN  
Architecture mapped 1981

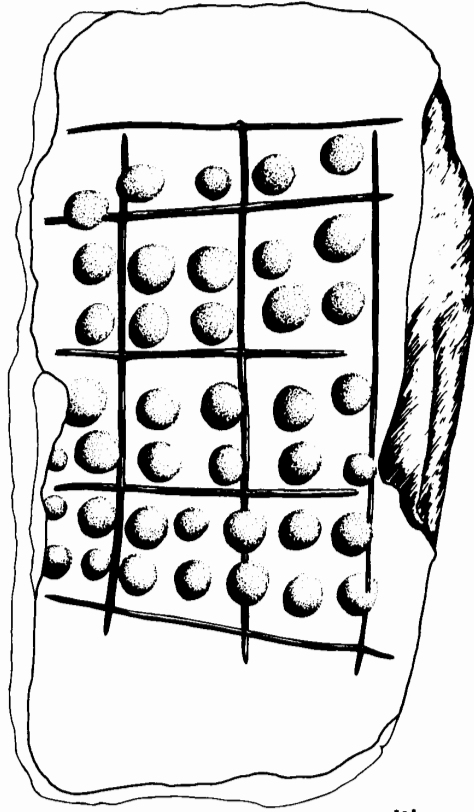
Fig. 1, map of site of Manchan indicating location of marked bricks shown in fig. 2.



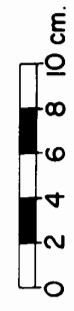
A



B



E



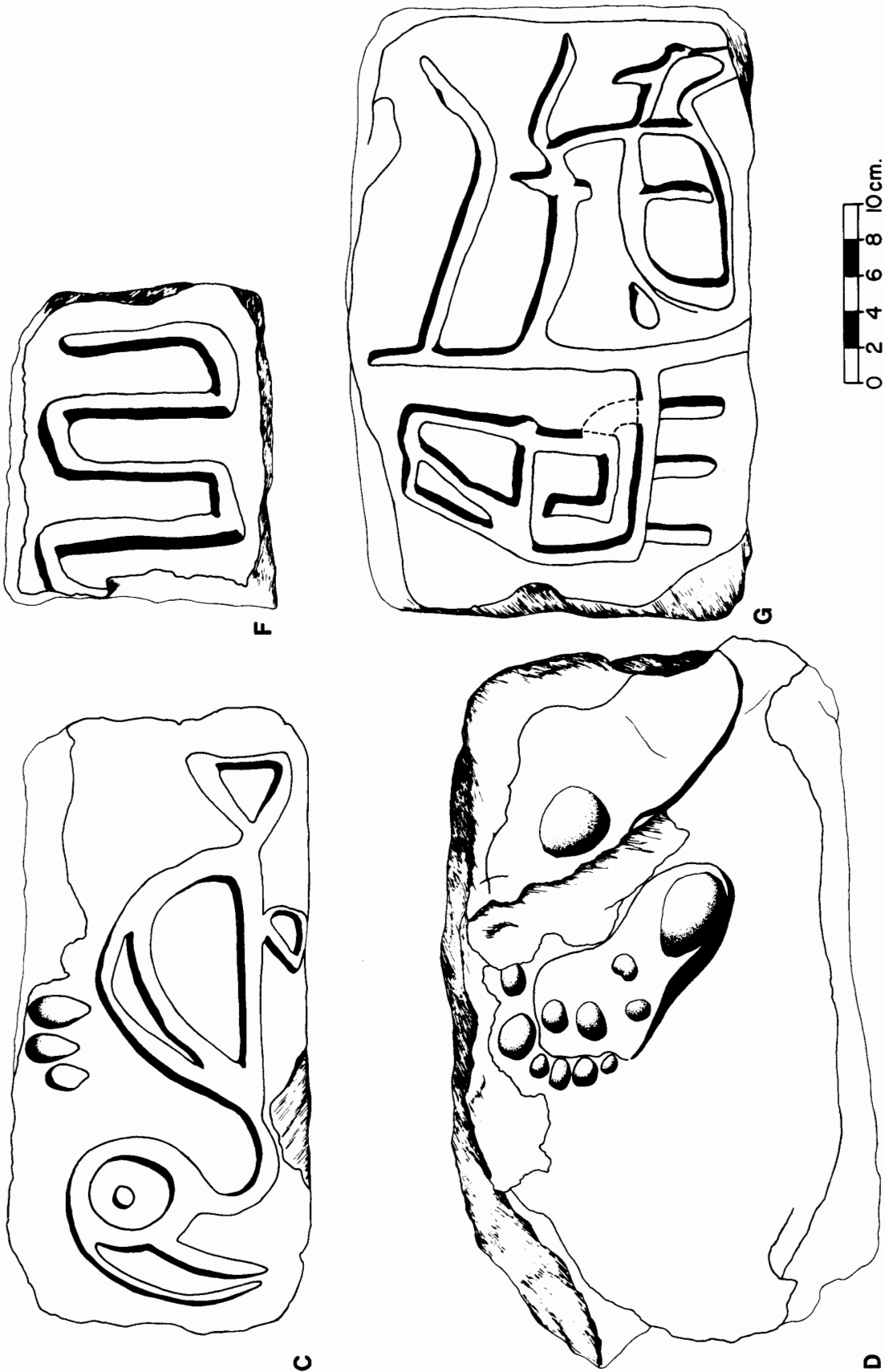


Fig. 2, representational and geometric designs on seven adobes from the site of Manchan. Letters A-G refer to locations shown on fig. 1.

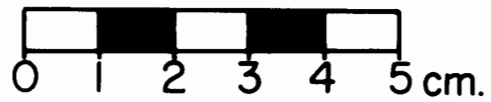
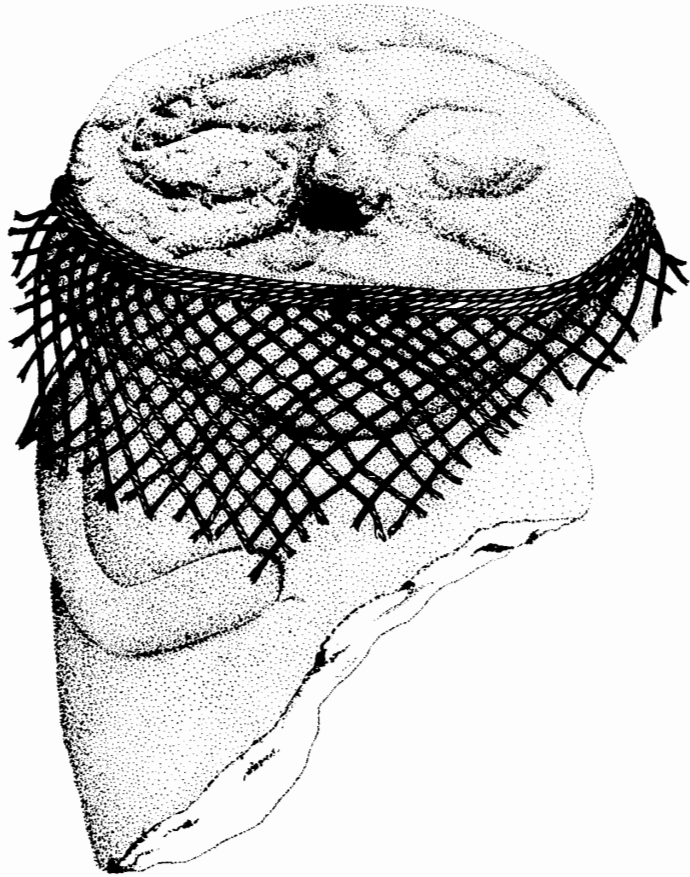


Fig. 3, unbaked clay figurine from Manchan, Casma Valley.