

THE DISTRIBUTION OF VAULTED ARCHITECTURE AT DZIBILCHAULTUN, YUCATAN, MEXICO

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This presentation compares the distribution of vaulted buildings, constructed during the two consecutive "late Classic" (Early Period I and Pure Florescent) phases at the northern lowland Maya archaeological site of Dzibilchaltun, Yucatan, Mexico. The results of this comparison show that the vaulted architecture of the first phase is far less concentrated in space than that of the second phase. More construction took place away from the center of the site during the three century duration of the first phase of the late Classic than during the two or three centuries of the second phase. Two interpretations of the contrast are offered: 1) if energy expended in vaulted construction is considered a measure of wealth, the contrast would indicate increased concentration of wealth in space through time. This suggests a greater emphasis on stratification during the late Classic. 2) If the amount of construction at any location is considered a measure of the importance of that place, the concentration of vaulted building construction through time may reflect increased importance of a central place. One would expect such a phenomenon to be characteristic of an accelerated trend towards urbanization.

Dzibilchaltun is situated on flat Karst plain some 21 kilometers from the north coast of Yucatan, approximately halfway between the port city of Progreso and the state capital, Merida. The Middle American Research Institute of Tulane University sponsored almost ten years of research at the site under the direction of the late Dr. E. Wyllys Andrews IV (Andrews 1960, 1965, 1968). As part of this research, George E. Stuart, John W. Cottier, John C. Sheffler, and I (Stuart *et al.* 1965) compiled a map of 19 square kilometers of the site showing the location of some 8,500 pre-Columbian structures. An aerial photograph of Dzibilchaltun showing the area covered by the map is presented in Figure 1. This was released by the Middle

American Research Institute in 1965; discussions of the implications of the map have appeared in various publications (Andrews 1968: 47; Willey and Bullard 1965: 370-72; Sanders and Price 1968: 160).

Two hundred thirty-seven late Classic vaulted buildings were found in the area surveyed for the map. Instead of thatched roofs, these buildings were covered by masonry vaults-the "Maya arch." In terms of energy cost, the vaulted buildings were the most expensive architectural forms created by the ancient Maya. It is the spatial distribution of this special class of architecture that concerns this paper.

Collapsed vaulted buildings form conspicuous mounds at least two or three meters high and from five to over a hundred meters long. When they fell, the heavy vault masonry filled the rooms they covered with rubble extending almost as high as the spring course of their vaults. Protruding from mounds of rubble formed in this manner are walls, jambs, and corners. Careful observation of such structural features allows a surveyor to record the group plans of vaulted buildings without excavating the structures. While groundplans recorded in this fashion might contain errors in the exact placement of doors and especially interior partitions, the number of vaults in a building and their total length can usually be determined with accuracy.

The total length of the vaults in a building, termed "vault length" in this paper, was recorded for most of the structures at the site. Where destruction of buildings by stone robbers made such measurement impossible, a modal length of 16 meters was assumed. Vault length then is an indication of the size of any building. The vaulted buildings at Dzibilchaltun contained over 540 rooms; if these rooms were placed end to end the sum of the vault lengths would equal 4,642 meters.

Andrews (1965) describes the two kinds of vaulted architecture at Dzibilchaltun. During Early Period Phase II, the first of the late Classic manifestations at the site, such buildings were made with true masonry walls and corbelled slab vaults. Most of the limestone blocks used in the walls and vaults were only crudely shaped; careful shaping and dressing was reserved for jambs, lintels, moulding blocks and blocks used at corners. Facade decoration consisted of designs carved in the thick coat of stucco that covered the exterior walls. During the second late Classic phase, designated the Pure Florescent Phase, concrete-veneer walls and vaults were formed from carefully squared and dressed blocks and vault stones. Facade ornamentation was achieved by forming a mosaic from specially carved limestone decorative blocks. Thus, even when the buildings were encountered in a

complete state of ruin, the differences in the kinds of blocks used in their walls and vaults allowed secure identification of their period of construction.

One hundred fifty Early Period Phase II and 73 Pure Florescent Phase vaulted buildings were found in the area mapped at Dzibilchaltun. Fourteen other structures exhibited features transitional between these two styles of architecture; these were placed in a "Transitional Early Period - Pure Florescent" category. Excavations at the site encountered evidence of three other vaulted buildings constructed during the Black-on-cream Phase (Andrews 1968). These structures are the only known vaulted buildings at the site that are not late Classic.

The location of the 237 late Classic and three Black-on-cream vaulted structures at Dzibilchaltun is recorded in Figure 2; each symbol on that chart indicates the period of construction for the building it represents.

The late Classic vaulted structures at Dzibilchaltun were clustered in 94 groups or complexes. The location and size of these complexes are shown in Figure 1. The buildings in these groups or complexes were erected on the same terraces or platforms, but sometimes finding the retaining walls marking the platform edges was difficult. This was especially true at the center of the site. The vault lengths of the Early Period Phase II and Pure Florescent structures in each group or complex was totaled; the circle in Figures 2 and 3 are proportional to the amount of Early Period Phase II and Pure Florescent architecture, respectively, in each complex. Thus Figure 1 illustrate the distribution of Early Period Phase II and Pure Florescent Phase vaulted architecture through the mapped areas of Dzibilchaltun.

Figures 2-4 show that both Pure Florescent vaulted buildings and Pure Florescent vaulted architecture (buildings weighted by size) are far more concentrated in space than the Early Period Phase II buildings or amount of architecture. In general, these figures also show that the buildings and architecture erected during both phases are clustered at the center of the site and are widely spaced in areas away from the center. Table 1 and Figure 4 present these contrasts more precise terms.

The center of the late Classic vaulted buildings was determined by averaging the coordinated, then the distance of each building from that centroid was computed. The center of the vaulted buildings is located at J349ø671, or 349 meters north of the "J" grid line

on the map of Dzibilchaltun and 671 meters east of the "φ" grid line. This location is about 100 meters south and 100 meters west of the center of Cenote Xlacah, which is situated on the west side of the great plaza where the site's three principal *sacbeob* or causeways intersect.

Table 1 compares the distance from the center of the vaulted buildings to the Early Period, Pure Florescent and Transitional vaulted buildings. Note that the median distance from the center for the Pure Florescent vaulted structures is 362 meters, less than half the median distance of 860 meters for the Early Period Phase II buildings. Comparison of the mean distances results in a similar contrast; the mean distance for the Early Period Phase II buildings is 1,048 meters and the mean distance for the Pure Florescent structures is only 545 meters. In general then, the Pure Florescent structures are twice as close to the center of the site as the Early Period structures.

Figure 4 illustrates the cumulative percentage of the total Early Period and Pure Florescent vaulted architecture within concentric circles with their centers at the weighted centroid of all late Classic vaulted architecture and their radii being the distance indicated on the abscissa scale. The weighted centroid of all late Classic vaulted architecture was determined by multiplying the coordinate for each building by its vault length, summing the resulting weighted coordinates and dividing by the sum of the vault lengths of all 237 buildings. The curve formed by the asterisks in Figure 4 shows that about 70 percent of the 1,584 meters of vault length contained in the 73 Pure Florescent vaulted buildings on the map of Dzibilchaltun is within 500 meters of the weighted centroid of all late Classic vaulted architecture. The curve formed by the circles indicated that about 45 percent of the 2,730 meters of Early Period Phase II vault length is found within 500 meters of the centroid. A circle about 1,200 meters in radius would have to be drawn about the centroid to circumscribe 70 percent of the Early Period vaulted architecture. All these figures demonstrate the contrast between the distribution of Early Period Phase II and Pure Florescent vaulted architecture, a finding best illustrated by comparing Figures 2 and 3.

Architecture is the result of energy applied by people to modify space. In general, the importance of a given location to the members of a society is reflected by the amount of energy expended in that location. This study of the spatial distribution of vaulted architecture shows that, as the late Classic advanced, a greater percentage of the

total amount of energy used in vaulted construction was expended at the center of the site. From this one may conclude that the center of the site became progressively more important through time. Such a change would be expected in a society characterized by trends towards stronger urbanism.

Buildings constitute a very conspicuous form of wealth controlled by the social groups whose activities are housed in them. Vaulted buildings were particularly expensive in terms of energy spent in their construction. Indeed such buildings may well have been the most important form of wealth in the prehistoric Maya lowlands. Thus a study of the distribution of vaulted ruins at Dzibilchaltun may be considered an analysis of the spatial distribution of wealth.

The conclusion of this analysis is clear: there seems to have been a progressive concentration of wealth in space through time. The largest groups of vaulted architecture at the center of the site were almost exclusively the places where wealth in the form of expensive buildings accumulated during the last part of the late Classic stage.

In general, these findings support the position that increased social differentiation was an important trend during the late Classic stage in the Maya lowlands. Stratification seems to have increased at that time. Contrasts between communities like Dzibilchaltun and satellite communities became more pronounced. During the late Classic stage Maya society evolved toward greater complexity — a trend paralleled in the history of many other civilizations.

REFERENCE CITED

ANDREWS, E. W. IV

- 1960 Excavations at Dzibilchaltun, northwestern Yucatan. *Proceedings of the American Philosophical Society* 104: 254-256.
- 1965 Archaeology and prehistory in the northern Maya lowlands: an introduction. In *Handbook of Middle American Indians*, Wauchope, general editor. Volume 2, *Archaeology of Southern Mesoamerica*, Part One. Austin, Texas: University of Texas Press.
- 1968 Dzibilchaltun, a northern Maya metropolis. *Archaeology* 21: 36-47.

SANDERS, W. T. and B. J. PRICE.

- 1968 *Mesoamerica: the evolution of a civilization*. New York: Random House.

STUART, G. E., SHEFFLER, J. C., KURJACK, E. B. and J. W. COTTIER

- 1965 Map of Dzibilchaltun, Yucatan, Mexico. Prepublication distribution by the Middle American Research Institute, New Orleans: Tulane University.
- WILLEY, G. R. and W. R. BULLARD
- 1965 Prehistoric settlement patterns in the Maya lowlands. *In* Handbook of Middle American Indians, R. Wauchope, general editor. Volume 2, Archaeology of Southern Mesoamerica, Part. One. Austin, Texas: University of Texas Press.

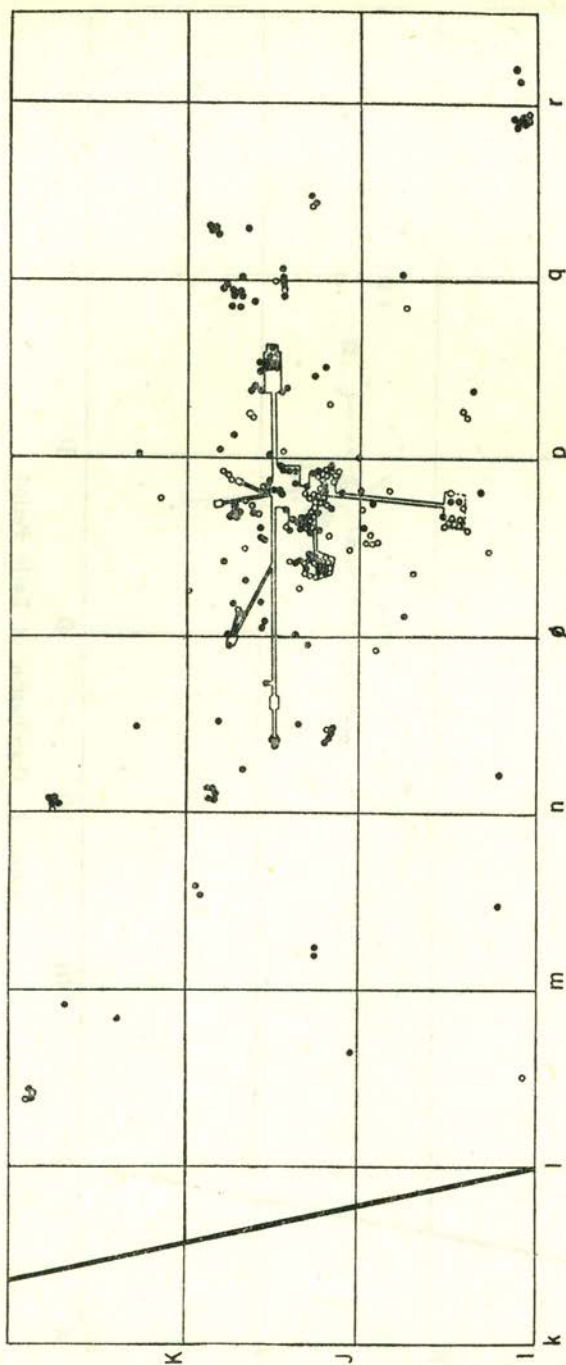


FIGURE 1. Distribution of vaulted buildings.

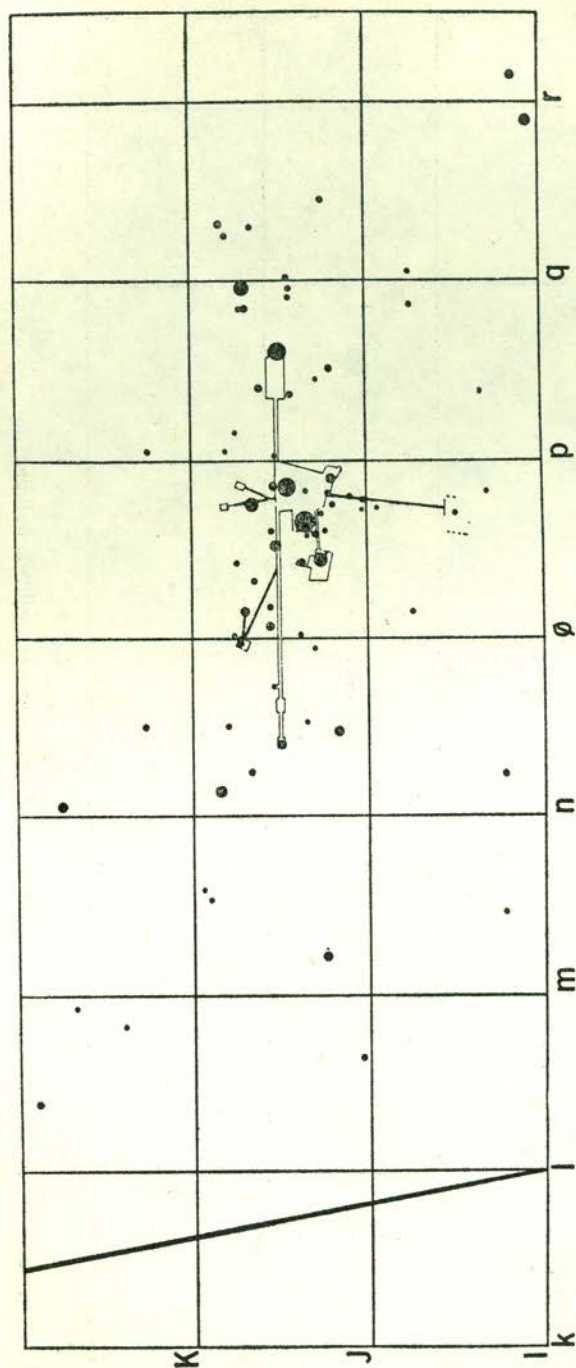


FIGURE 2. Distribution of Early Period.

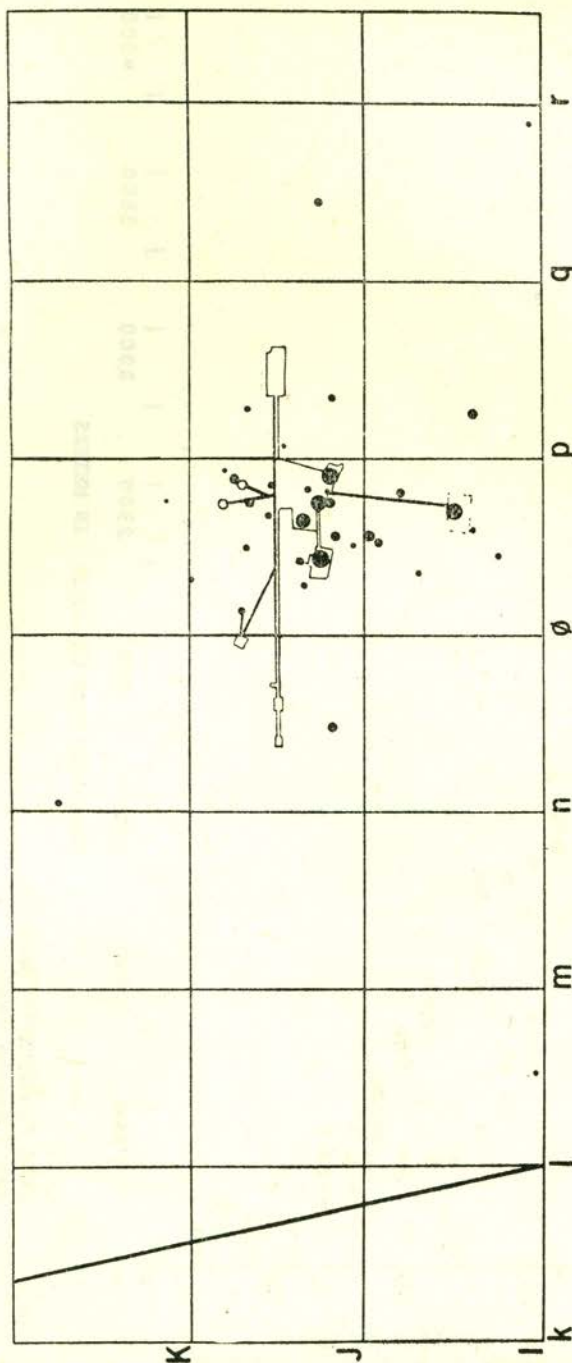
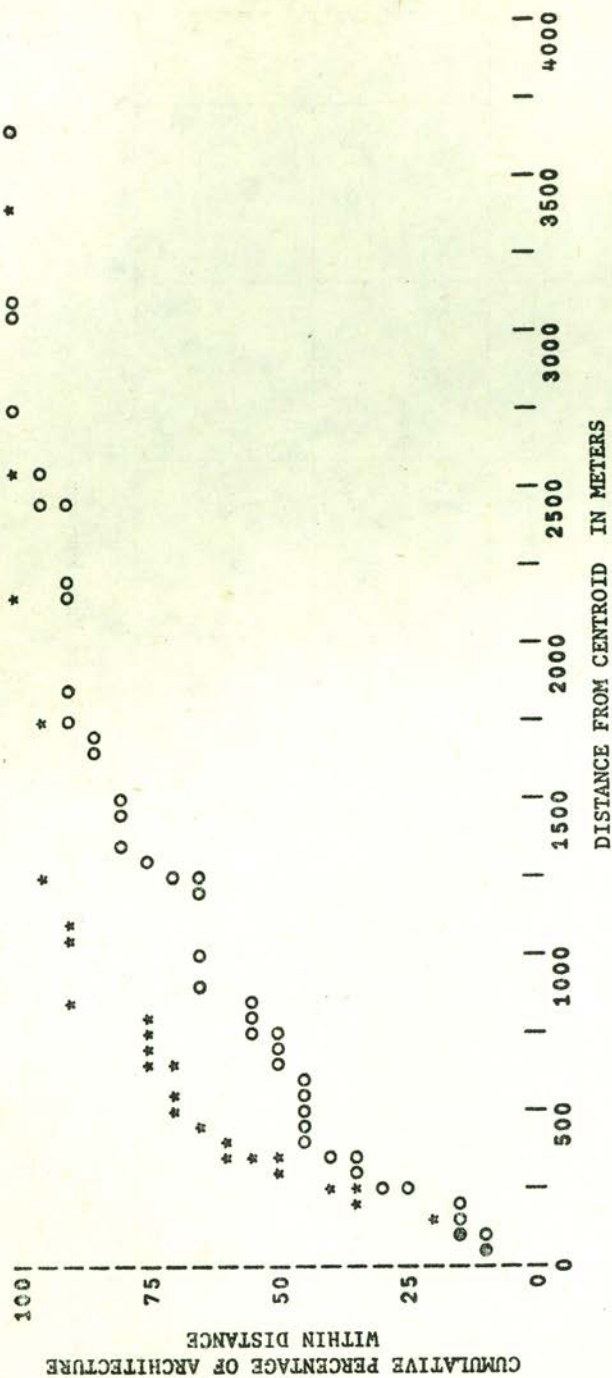


FIGURE 3. Distribution of Pure Florescent.



PURE FLORESCENT CURVE *
EARLY PERIOD CURVE O

FIGURE 4. Contrasts in the cumulative percentage of Pure Florescent and Early...

TABLE I

	<u>EARLY PERIOD</u>	<u>TRANSITIONAL</u>	<u>LURE FLORESCENT</u>
NUMBER OF BUILDINGS	150	14	73
<u>DISTANCE OF STRUCTURES IN METERS FROM J3498671</u>			
MEAN DISTANCE	1,059	983	555
MEDIAN DISTANCE	829	570	354
STANDARD DEVIATION	870	1,211	571

Comparision of the distances between.