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Summary Report on the
Belize River Archaeological Settlement Survey
Field and Laboratory Research 1983-1987

By

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The origins and development of civilizations have posed some of the most pressing philosophical and social issues during the past centuries. Recently, with more refined scientific techniques of analysis, major strides have been made toward understanding the variables involved in cultural evolution (Boserup 1965, 1981; Fried 1967; Sauvy 1969; Service 1962, 1975; among a few). Archaeological studies are in a unique position to address the problem of the evolution of cultural complexity as they focus on the diachronic remains of past societies.

The development of the central lowland Maya of eastern Mesoamerica (Figure 1) has long perplexed scholars of ancient civilizations. The Maya do not fit the expected classifications, because they developed in a tropical as opposed to arid setting and exhibit a dispersed as opposed to a nucleated settlement pattern (Service 1975; Sanders and Price 1968). These same factors, a tropical jungle environment and dispersed settlement, have conspired together to hinder regional research in the area. Despite these obstacles, significant steps in expanding the regional data base have been made in the past decades in and around Tikal (Ford 1981, 1986; Fry 1969; Puleston 1973, 1983) and in the southern lakes area around Yaxha (D. Rice 1976; D. Rice and P. Rice 1980; P. Rice 1984).

The Classic period Maya (see Table 1) have been largely defined on the basis of shared stylistic complexes of material remains, which indicate widespread and regular interaction among the different environmental areas of the central lowland Maya region. Recent research, however, focusing on the residential and administrative center distribution within the region, has revealed differences in settlement patterns, suggesting variation in adaptive strategies of Maya populations at the local level. The diversity exhibited in these data, embracing no more than a 30 km radius around the major center of Tikal, suggests that there is still much to understand of the variability in regional organizations (Ashmore 1981b; Sabloff 1983). It is increasingly apparent that an analysis of the central lowland

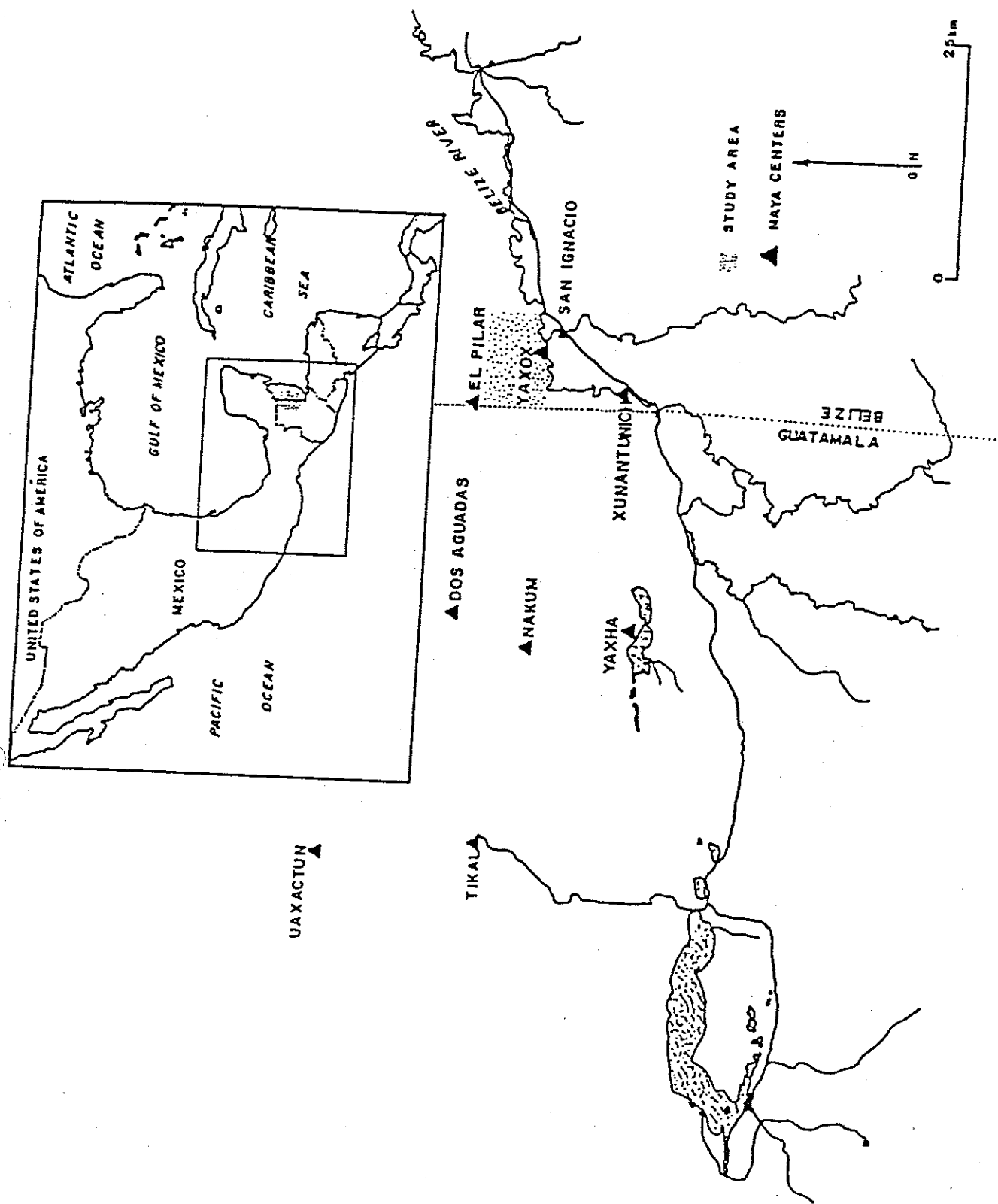


Figure 1: The Central Maya Lowlands with the Belize River Archaeological Settlement Survey Area Indicated.

Table 1: CHRONOLOGICAL SEQUENCE FOR THE PETEN MAYA

| POSTCLASSIC | | 1000 AD | |
|-------------|-------------|---------|---------------|
| C | TERMINAL | 900 AD | TEPEU 3/EZNAB |
| L | | 800 AD | |
| A | MIDDLE LATE | | TEPEU 2 |
| | | 700 AD | |
| S | EARLY LATE | | TEPEU 1 |
| | | 600 AD | |
| S | | 500 AD | |
| I | | 400 AD | TZAKOL |
| C | EARLY | | MANIK |
| | | 300 AD | |
| P | | 200 AD | |
| R | | 100 AD | |
| E | LATE | | CHICANEL |
| | | 0 | |
| C | | 100 BC | |
| L | | 200 BC | |
| A | | 300 BC | |
| S | MIDDLE | | MAMON |
| | | 400 BC | EB |
| S | | 500 BC | |
| I | | 600 BC | |
| C | | 700 BC | |

Maya must include, as an integral part, the explanation of local processes of development before the regional system can be elucidated. To this end, the Belize River Archaeological Settlement Survey was initiated in the Belize River area, only 50 km from Tikal.

The archaeology of the Belize River area promises to cast light on Maya development in several important ways. First, evidence suggests that the upper Belize valley was one of the first areas to be occupied within the central lowlands and, as a geographical link from the Caribbean to the interior (McKillop 1980; Healy *et al.* 1984), served early on as an avenue for population expansion into the core area (Puleston and Puleston 1971, 1972; D. Rice 1976). Second, the upper Belize valley is situated in a logistically advantageous locale at the terminus of the navigable portion of the river and within a two-day walk of the core area around Tikal. Third, from the excavations at Barton Ramie within the Belize River area, occupation appears to have been relatively continuous throughout the course of prehistory, and its duration brackets the rise and decline of the Classic period Maya (Willey *et al.* 1965; Gifford *et al.* 1976). Under my direction, the Belize River Archaeological Settlement Survey (BRASS) project was established upon this base. Proposed analysis of the BRASS data gathered in the upper Belize River area will address the economic development of the local area, will contribute to an understanding of the area's relationships to other areas of the central Maya lowlands, and will help explain the evolution of complex societies.

Furthermore, initial study of the BRASS data has pointed to provocative differences within the Belize River area which have not been documented in other areas. Settlement of the interior mountains shows distinct affinities with the core area around Tikal, while settlement in the valley is significantly different. These variations imply organizational differences which appear to relate to environmental characteristics of the area and may mark the eastern margin of the Late Classic Maya political domain. Materials from the excavations of middens at residential units and structural fill at the

administrative centers within these zones were collected to illuminate the development of local and regional organizational ties. Because the BRASS data provide clues to the Belize River area's economic and political organization, they will be used to reconstruct the local Belize River area developments and to compare with developments in other areas in the central lowlands.

The foundation for the detailed analyses of the BRASS data has been established. All the collections have been sorted and cataloged, and the diagnostic ceramic material has been described and chronologically assessed for both residential units and administrative centers. On the basis of my initial work, the in-depth artifactual analyses can proceed. Results of the proposed analyses of these data will provide critical information on the organization of procurement, production, and distribution of resources in the Belize River area. Analyses of these data will have significant impact on our interpretations of the development of the Classic period Maya and, once published, will follow my earlier Tikal-Yaxha core area study as an important contribution to the study of the evolution of the ancient Maya in and complex societies in general.

BACKGROUND

Scholars studying Classic Maya development have established that early expansion of pioneer farmers moved from coastal areas up river valleys into the interior (Puleston and Puleston 1971, 1972; D. Rice and Puleston 1981; Voorhies 1982; see also Adams 1977). Subsequently, population growth has been documented in all investigated areas from initial occupation in the Middle and Late Preclassic (from c. 1000 BC, Table 1) through the Late Classic periods (Ashmore 1981, Ford 1986; Fry 1969; Puleston 1973; D. Rice 1976). Administrative centers emerge in the Late Preclassic, and the first dated monuments mark the beginning of the Early Classic period in the interior core and the lakes areas to the south (D. Rice 1976; Marcus 1977). Not until the Late Classic is wealth differentiation and

centralization documented in the more peripheral zones, such as the Belize River area (Bullard and Bullard 1965; Rathje 1970). This is, however, based on a limited data set; the BRASS data modify this assessment, as will be amplified below.

The Late Classic period witnesses acceleration of building at centers all over the central lowland area, although activity was concentrated at Tikal in the heart of the core area. Settlement shifts from a more nucleated pattern around Early Classic centers to a more dispersed pattern oriented towards the large center of Tikal have been documented between Tikal and Yaxha (Ford 1981, 1986). Tikal's dramatic influence is also recorded iconographically (Marcus 1976), and interpretations suggest that this was one of the most important centers in the central lowland region (Adams and Jones 1981).

Notable local variations in settlement chronology and patterns (Ashmore 1981b) are evident for the three major hydrographic areas of the central lowland region: the riverine, lakes, and core areas. Administrative center size and composition also vary among the areas. Major centers of the core area generally were composed of more than 20 courtyard complexes (e.g., Tikal, Uaxactun), centers of the lakes areas averaged from 10 to 20 courtyards (e.g., Yaxha, Tayasal), and the centers of the eastern riverine area had only around 5 courtyard complexes (Adams and Jones 1981:305).

Development of ceramic style and manufacturing techniques provide additional insights into the changes observed during the Classic period. While ceramic traditions for the entire Classic period bear similarities in formal characteristics, there is greater diversity in paste compositions of the Early Classic ceramics than the Late Classic ceramics (P. Rice 1981; Shepard 1939). Volcanic ash pastes, which are a major component of specific Late Classic period ceramic wares (e.g., Gifford *et al.* 1976:255-271), appear uniform throughout the central lowland area (Ford and Glicken in press; Jones 1984; P. Rice 1981; Simmons and Brem 1979; Shepard 1937, 1939, 1940). Compositional homogeneity of paste characteristics

can be used to infer localization of and specialization in ceramic production (Bishop *et al.* 1982; Fry 1979, 1980; P. Rice 1981, 1984b; Stross and Asaro 1984).

Despite this general uniformity detected in pastes of the Late Classic period, vessel forms exhibit considerable variation. A cursory comparison of the Late Classic jar forms described in the core area studies of Uaxactun (Smith 1955), Tikal (Culbert n.d.), and the Tikal-Yaxha area (Ford 1981, 1986) with jar forms described in the Belize River valley study of Barton Ramie (Gifford *et al.* 1976) is informative. Core area sites display little variation in jar forms, having 3 to 4 large-mouth forms and 2 narrow-mouth forms. Barton Ramie exhibits considerably greater variety, having 13 wide-mouth jar forms and 6 narrow-mouth jar forms. While there is overlap in vessel forms between the core area and the Belize River area, the latter stands apart from the core area standard forms. The greater variety in the forms of the Belize River valley suggests less standardization and therefore more pottery makers than in the core area.

These data suggest regional variations in economic and political relations among distant hierarchically organized communities during Classic times. However, the scope of these relations and the structural level at which they were operating are not clear. Does the stylistic uniformity which characterizes the central lowland region reflect economic and political cohesion? Are ties between communities restricted to interaction among the elite or inclusive of all social groups? Are the developments in the Late Classic period examples of the process of increasing specialization within an economically interdependent hierarchical system or of economically independent communities interacting reciprocally? To answer these questions, settlement pattern data in all the areas of the central lowlands are needed. While settlement and excavation data from the core and lakes areas have been growing (cf. Ashmore 1981), and the analyses of these data have enhanced our knowledge of the region, comparative data from the more peripheral areas, such as the Belize River

area, must be analyzed for a balanced picture of the economic organization of the central lowlands as a whole.

THE UPPER BELIZE RIVER AREA

The upper Belize River area (see Figure 2) can be characterized geographically into 1) the open undulating valley east of the confluence of the eastern and western branch of the Belize River and 2) the constricted valley and mountains to the west (Jenkin *et al.* 1978; Wright *et al.* 1959). The center of Baking Pot (Bullard and Bullard 1965; Ricketson 1929) and the settlement of Barton Ramie (Willey *et al.* 1965) are only a few kilometers down river in the open valley area. Prior to my initiation of the BRASS project, our knowledge of the Belize River area was limited to the valley (Willey *et al.* 1965; see also Puleston 1973:54-55; Fedick 1985). From the available literature, there was the impression that settlement in the Belize River area, too, was restricted to the valley bottom (Hammond 1981:172; Willey *et al.* 1965:571-573). The BRASS study explicitly focused on the valley and the interior beyond the valley, and the BRASS data have dramatically altered the view of settlement in the area (Ford 1985, in press).

Belize River Archaeological Settlement Survey. The BRASS project was designed to investigate settlement-environment relationships in the peripheral upper Belize River area. Each of these survey transects was located to include identified environments of the area and oriented to crosscut the valley and bisect a local center (see Figure 3).

I directed the majority of the survey, undertaken in two five-month seasons (1983 and 1984), which encompassed five major activities: 1) transit mapping of the four centers, 2) establishment of two 5-km baselines and one 10-km baseline to serve as the axes of the transects, 3) settlement survey of 125 meters on each side of the baseline, 4) mapping of all cultural remains within the 250-meter-wide transect, and 5) test excavation in middens of a stratified random sample of residential units based upon distance from the river (Ford 1985, in press). In 1985, further settlement survey was conducted around the identified

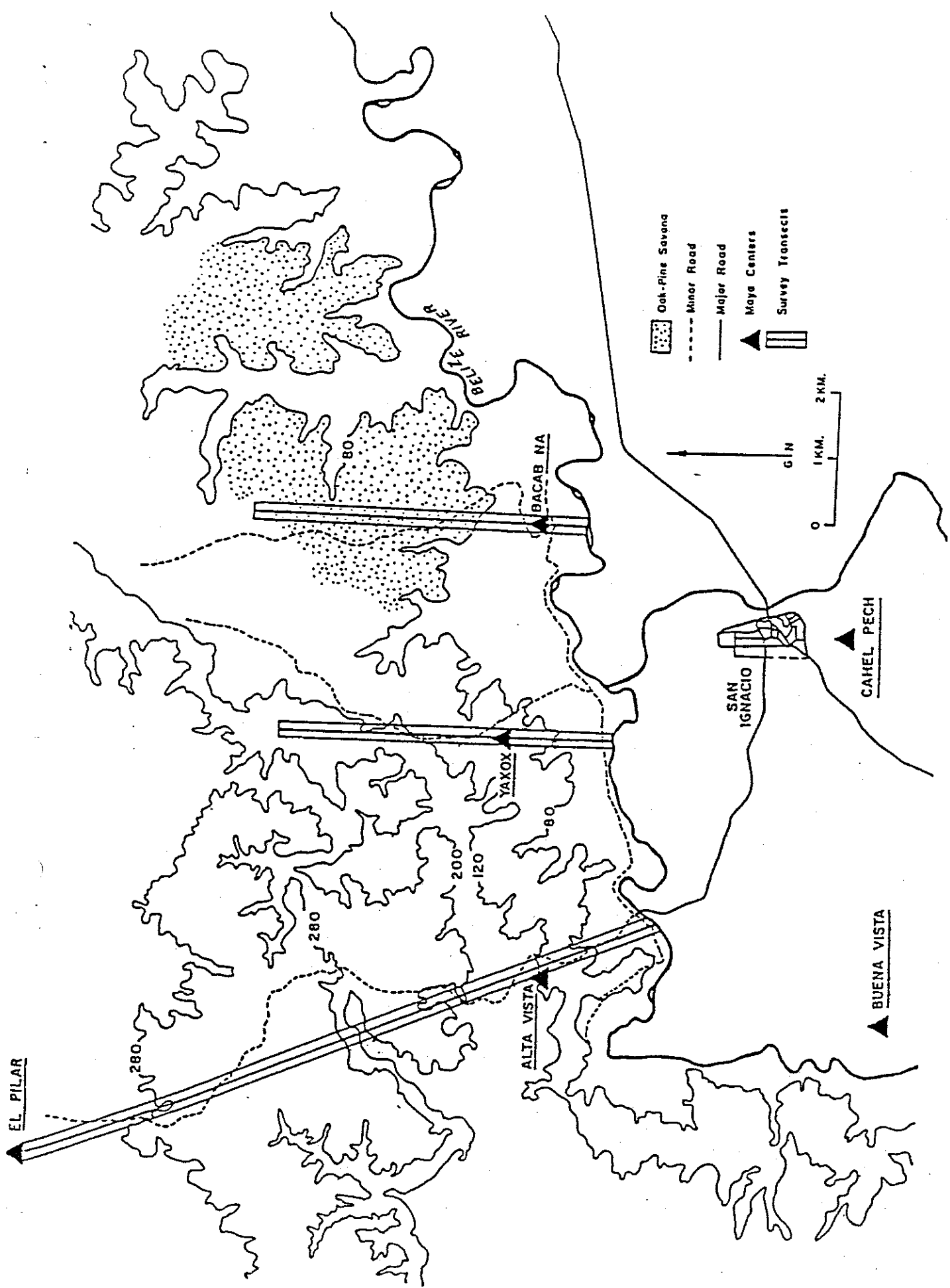


Figure 2: The Belize River Area with the Survey Transects Indicated.

BELIZE RIVER ARCHAEOLOGICAL SETTLEMENT SURVEY
PERCENTAGE OF OCCUPATION BY PERIOD

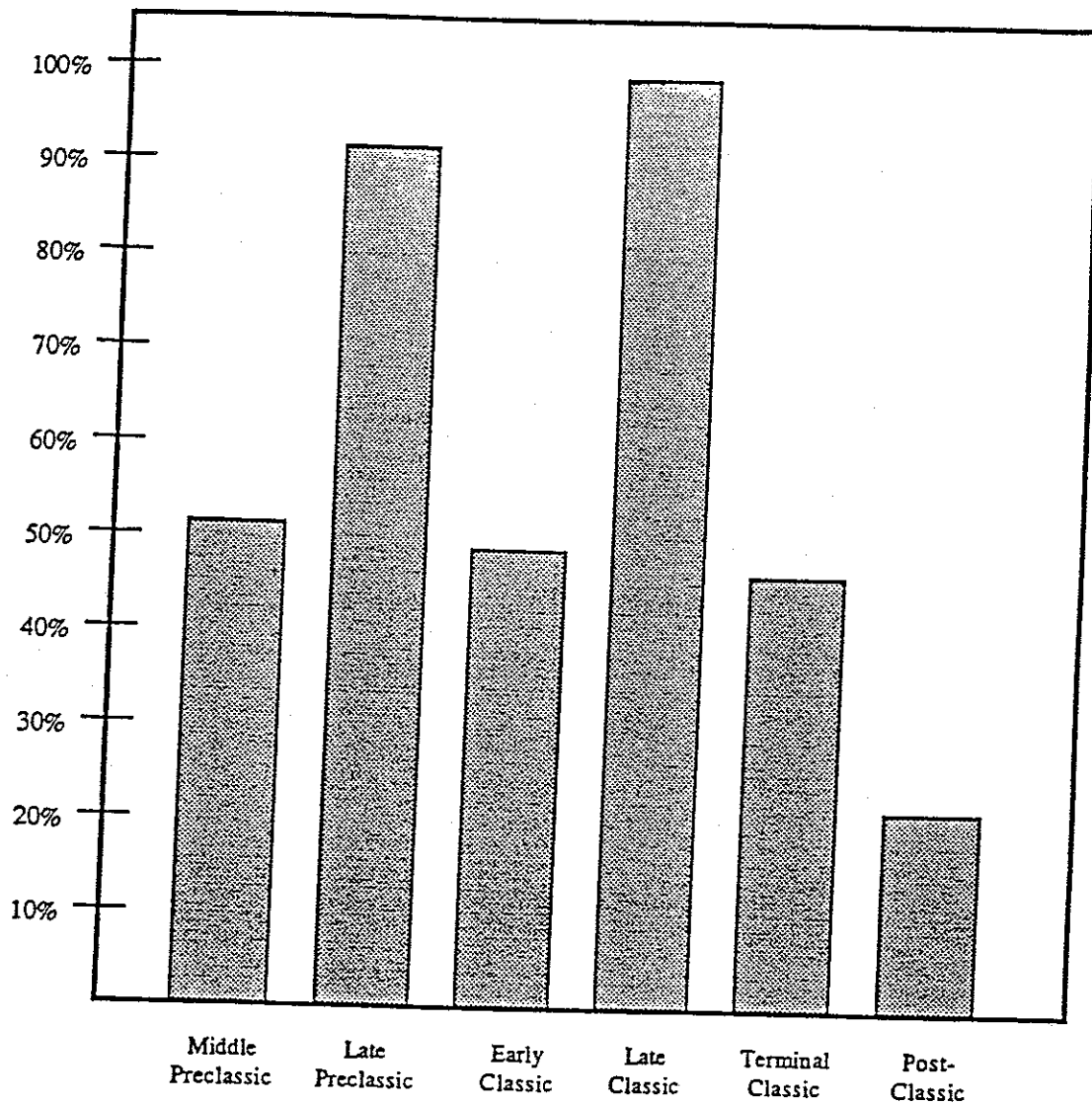


Figure 3

obsidian production site of El Laton, 4.5 km south of El Pilar. The recently completed 1986 season focused on the development of centralization in the area by examining construction sequences exposed in the looters' trenches¹ at the four centers: El Pilar, Alta Vista, Yaxox, and Bacab Na.

A total of 500 hectares was covered in three settlement survey transects. The cultural remains mapped within the three transects comprised 348 residential units including an obsidian blade workshop and a chert tool workshop, several midden scatters, chultuns (dry food storage pits in the limestone bedrock), limestone quarries, and two chert quarry and tool-production sites. All recorded archaeological remains were mapped with reference to the transect baselines and the baselines were tied into known geographical features.

The subsurface testing phase included examination of 48 residential unit middens, or ancient trash deposits, located adjacent to the randomly selected residential units. Five residential units were tested in the Bacab Na Transect, 15 from the Yaxox Transect, and 29 from the El Pilar Transect. These tested units composed the 12.5% stratified random sample of residential settlement, selected by grouping eight residential units by distance from the river and selecting one in each group (see Ford 1986:28). These excavations yielded data relevant to identifying residential chronology and use at each site. Excavations at the four centers included structure fill exposures in 14 looters' trenches, and 18 plaza test pit excavations and were conducted to reconstruct the chronology at the administrative centers of the area. In addition to these excavations, tests were made at the two identified chert quarry and tool production sites. One site was located 2.5 km north of

¹ Illicit excavation to "loot" or rob ancient Maya tombs and votive caches for sale on the illegal antiquities market is an escalating problem destroying the archaeological record in the region.

the river, adjacent to the Yaxox Transect, and the other site was located immediately to the west of the center of El Pilar.

All excavated material from the residential units and centers was screened and collections retained by 1/4" mesh screens in test excavations and column samples and 1/2" screen in looters' trench extensions were processed and cataloged in the field laboratory. Diagnostic ceramics were sorted chronologically in the field laboratory and final assessments were assigned in the course of later analysis. The cataloged data, settlement descriptions, and chronological assessments were entered into computer files for the purposes of the preliminary analyses (1984-1986).

COMPLETED ANALYTICAL FOUNDATION

Preliminary Belize River Area Settlement Chronology. Initial occupation in the Middle Preclassic period includes the valley and mountain zones (Figure 4). Growth is clear from the Middle Preclassic to the Late Preclassic, during which time occupation nearly doubles and the majority of all residential zones are occupied. By the Late Preclassic, major public building began at the mountain center of El Pilar and the valley center of Yaxox. The fact that there is Late Preclassic fill at El Pilar and Yaxox pushes back the initial period of centralization in the area from the Late Classic, around 600 A.D. (see Bullard and Bullard 1965) to the Preclassic, around 250 B.C. The full implications of these data will be examined in the proposed analysis.

The Early Classic shows a currently unexplained decline in the number of sites occupied which may relate to a limited understanding of Early Classic ceramics (Willey and Mathews 1985; Lincoln 1985) or a change in adaptation either at the subsistence level or the political level (e.g., Ford 1986:62-64, 80-82, 92). Still, the BRASS data appear to be quite different from the Barton Ramie data, where most sites occupied in the Late Preclassic

BELIZE RIVER ARCHAEOLOGICAL SETTLEMENT SURVEY
PERCENTAGE OF OCCUPATION BY PERIOD
FOR THE VALLEY AND MOUNTAIN ZONES

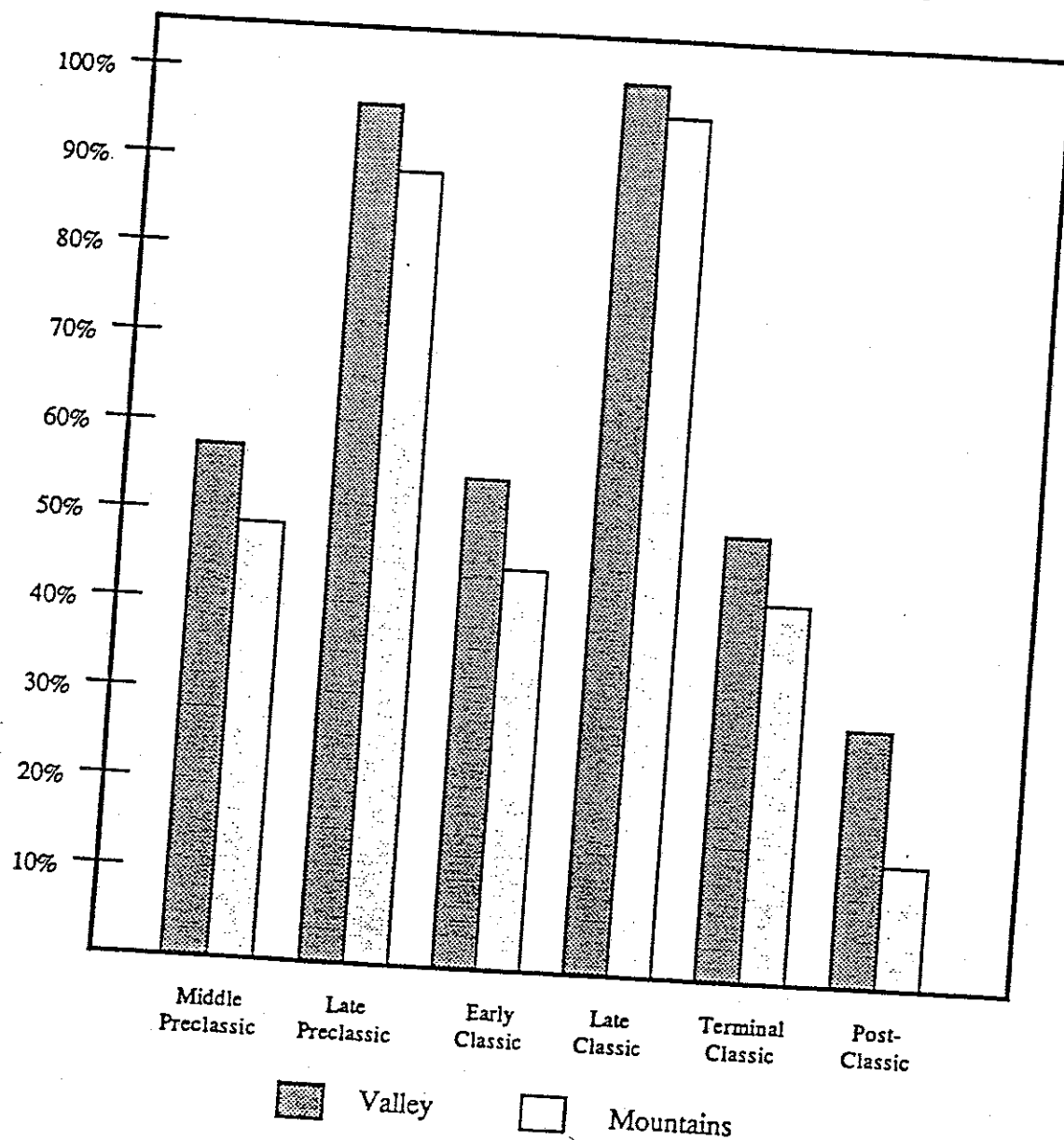


Figure 4

continued to be occupied in the Early Classic period (Willey *et al.* 1965). Despite the decline in number of sites, building is clearly evident during the Early Classic at El Pilar and possibly at Yaxox (pending further analysis).

There is marked growth in the Late Classic, with 98% of the residential sites occupied. This growth appears to correlate with the major building activity at centers in the valley (cf. Bullard and Bullard 1965), including large public construction undertakings at all the centers of the BRASS study area.

The expected decline in settlement during the Terminal Classic and Postclassic periods is exhibited in the BRASS settlement data. Only 48% of the tested residential sites exhibit occupation during the Terminal Classic, about half that of the Late Classic period. Even so, ceremonial building construction continues into the Terminal Classic period at El Pilar and Yaxox. Postclassic occupation is even less than that of the Terminal Classic, dropping to 21% of the total residential sites with settlement concentration in the valley. Coinciding with the valley settlement focus, there is some evidence of construction at Yaxox during this period.

Belize River Area -- Regional Comparisons. The Belize River area exhibits relatively high settlement density when compared with densities of the lakes and core areas (Figure 5). Despite these high densities, residential composition is much simpler in the Belize River area than in the core area. The standard residential unit in the core area consists of two or more structures, and only 30% of all residential units are solitary structures (Ford 1986, in press). This is not the case in the Belize River area, where over 80% of all residential units are solitary structures (Figure 6).

This difference in settlement composition between the core and periphery is equally evident in the cumulative construction labor investments² estimated for ancient Maya resi-

² Construction labor investment in ancient Maya residential units is a cumulative computation based upon area and height of mapped structural remains. Structures are individually

STRUCTURE DENSITY COMPARISON BETWEEN THE CORE
AREA AND THE BELIZE RIVER AREA

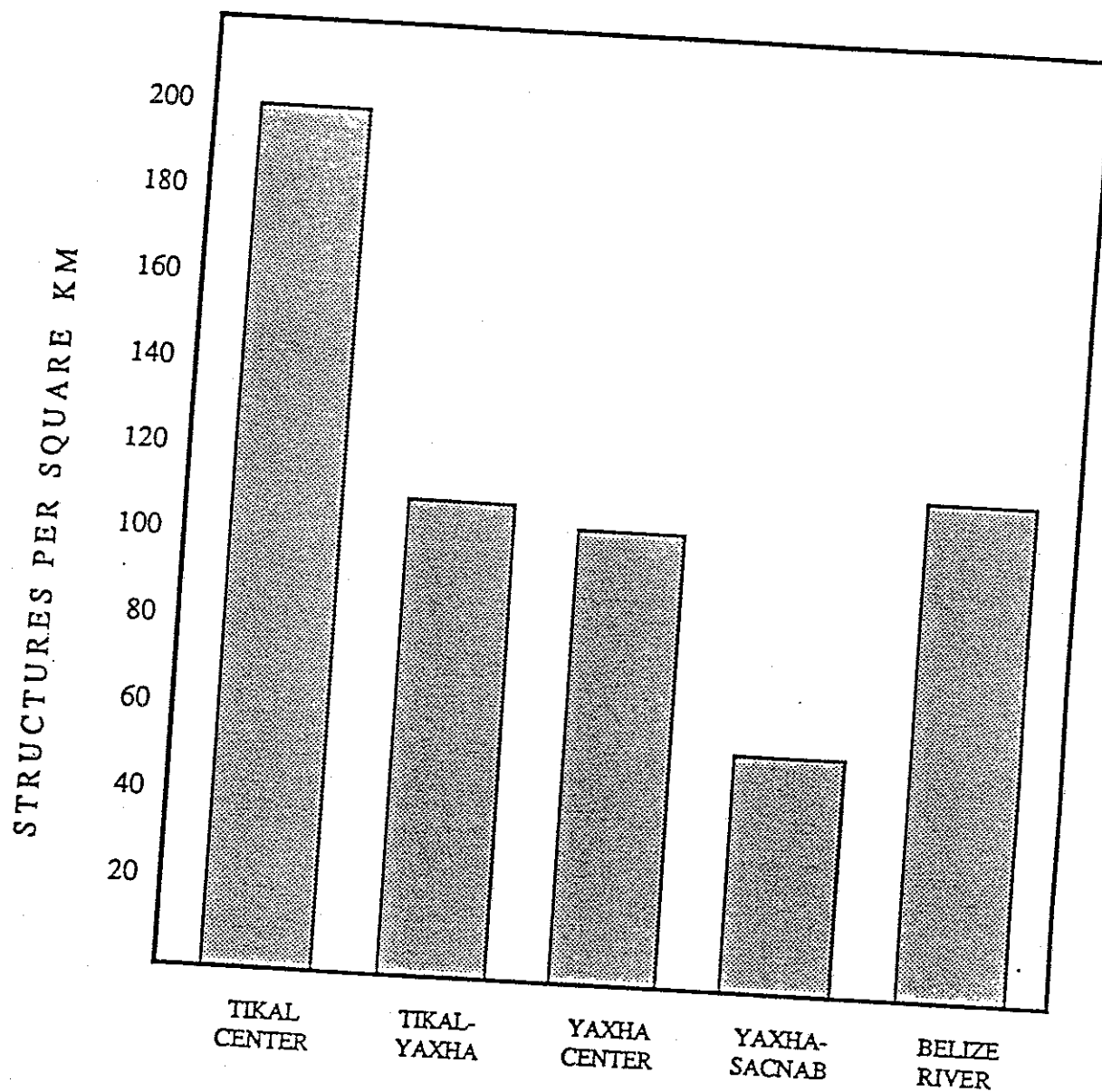


Figure 5

PERCENTAGES OF SOLITARY STRUCTURES
IN THE CORE AREA AND THE BELIZE RIVER AREA

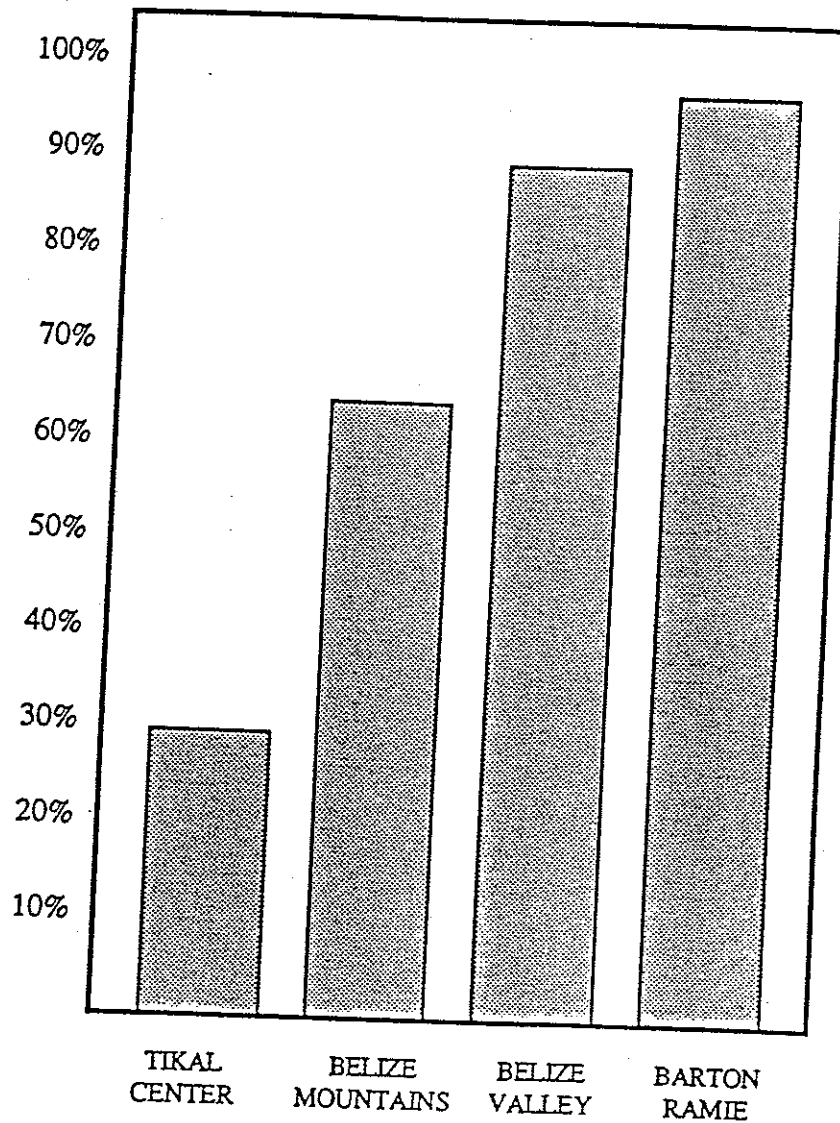


Figure 6

dential units (Arnold and Ford 1980; Ford and Arnold 1982). The average Belize River area construction labor investment for residential units is less than one half the average of the core area, and the highest labor investment in the Belize River area is one third that of the core area (Appendix I, Table 1).

Residential unit labor investments have been ranked based on their distribution at the center of Tikal (Ford and Arnold 1982) and in the Tikal-Yaxha intersite area (Ford 1981:158-162). These ranks provide a relative indicator of residential wealth (Ford and Arnold 1982:440). The wealth ranks from low to high are as follows:

Wealth Rank 1: 1-500 construction labor-days

Wealth Rank 2: 501-2,500 labor-days

Wealth Rank 3: 2,501-6,500 labor-days

Wealth Rank 4: 6,501-11,000 labor-days

Wealth Rank 5: 11,001-20,000 labor-days

Comparison between the core area and peripheral Belize River area reveals significant residential wealth rank differences. The highest labor investment ranks drop out as one moves from the core to the Belize River area (Figure 7). These data on residential composition and wealth demonstrate a fundamental difference in the organization of the domestic unit between the core and Belize River area.

Belize River Area -- Local Variations. Much of the same variation seen in the comparison of the core area with the Belize River area can be found within the Belize River area itself. A settlement density gradient exists from the western El Pilar Transect, where densities are highest, to the eastern Bacab Na Transect (Figure 8) and Barton Ramie area, where densities are lowest (cf. Willey *et al.* 1965). Mountain zones have higher considered and summed together for residential units composed of several structures. If units are situated on an artificially raised plaza, the labor investment in the plaza is included in the total labor investment calculation. The calculated result is a relative estimate of residential value and household wealth.

COMPARISON OF RESIDENTIAL UNIT WEALTH RANK BASED ON
CONSTRUCTION LABOR INVESTMENT IN THE CORE AREA
AND THE BELIZE RIVER AREA

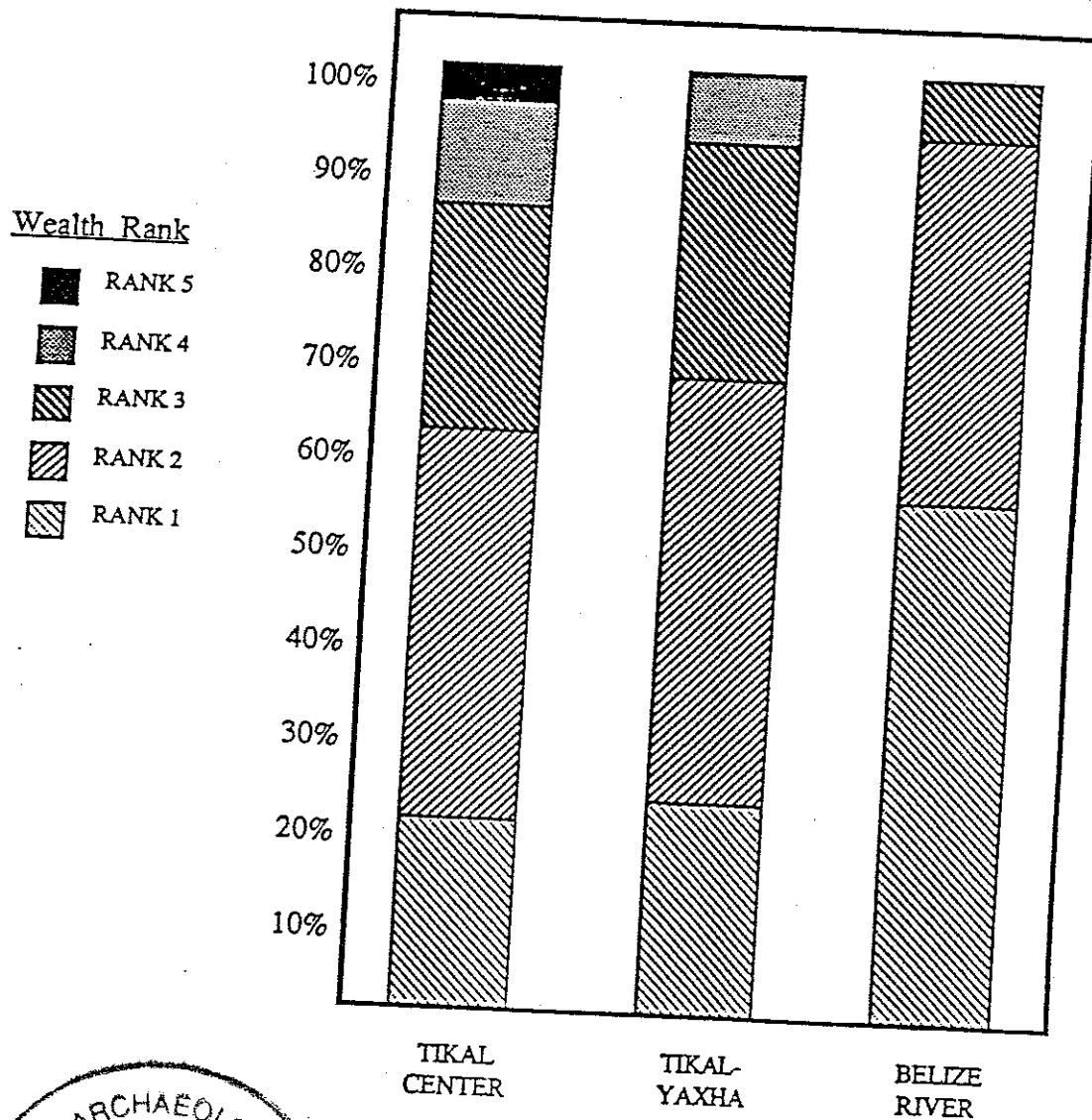


Figure 7



STRUCTURE DENSITY BY SURVEY TRANSECT
IN THE BELIZE RIVER AREA

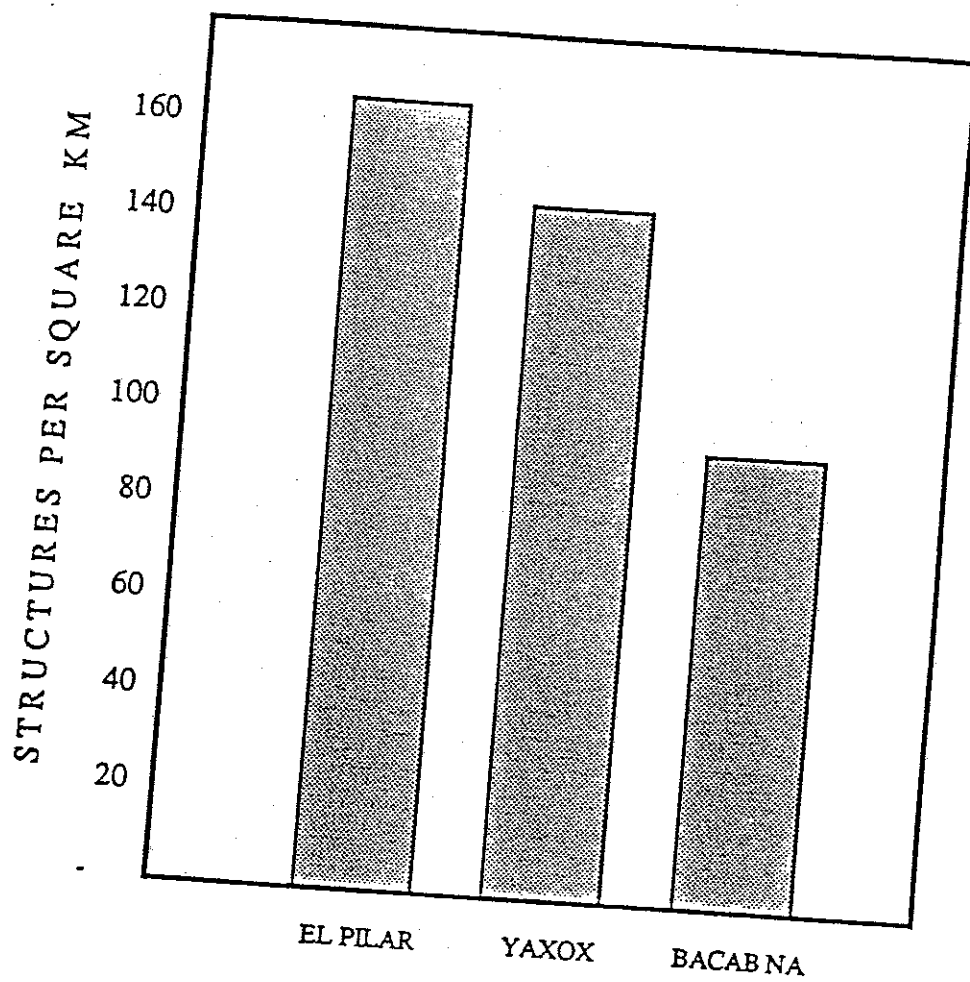


Figure 8

structure densities than the valley, and the eastern inland savanna zone has no settlement at all (Appendix I, Table 2).

The difference between mountain and valley zones extends to aspects of residential unit composition. While the majority of the residential units in the entire Belize River area are composed of single solitary structures, they make up less than 65% of the residential units within the mountain El Pilar and Yaxox transects, but over 90% within the valley Bacab Na Transect and Barton Ramie area (see Figure 6). These distinctions among the environments can be also seen in the average number of structures per unit (Appendix I, Table 3).

The average labor investments of the mountain and valley zones demonstrate differences in distribution of wealth, with greater differentiation in the mountains than in the valley (Figure 9). Wealth distribution in the mountain zone reflects a pyramidal structure, with many small residential units at the base and few large residential units near the top. This is the type of distribution noted for the core area (see Figure 7). Distribution of wealth in the valley, where a single mode is found, consists of many medium sized units and few small and large residential units. Even though settlement densities are lower in the eastern open valley in which the Bacab Na transect and Barton Ramie area are located, wealth, as interpreted from labor investment, was more evenly distributed in the valley (cf. Willey 1956) than in the mountain zone (Ford 1985).

A significant aspect of the future analysis will examine number of related factors which may account for the contrast between the mountain and valley zones. The differences between the zones may be an actual reflection of social organization and wealth distribution within the respective zones may relate to the intensity of residence use in the different zones, or may be a consequence of differing subsistence adaptations within each zone. Assessment of administrative center chronology and careful examination of midden constituents and density proposed as part of the analysis can provide answers to

COMPARISON OF RESIDENTIAL UNIT WEALTH RANK BASED ON
CONSTRUCTION LABOR INVESTMENT IN THE BELIZE RIVER AREA

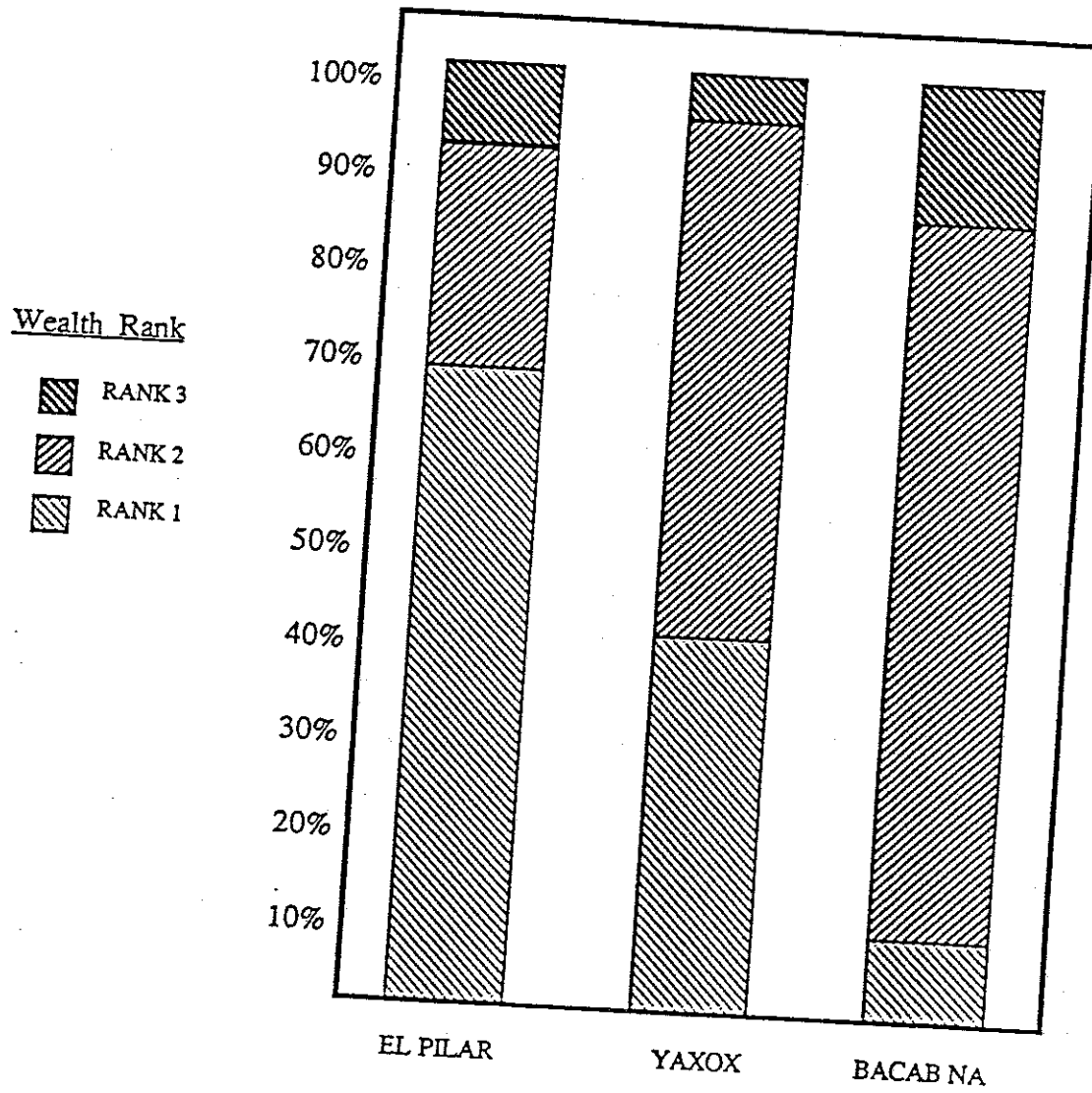


Figure 9

these questions. A comparison between midden composition and residential unit size may be employed to interpret the types of domestic uses of structures. Also, comparison of these patterns with the soil characteristics of the zones will assist in understanding the subsistence adaptations in the different areas. The soils/settlement analysis is currently underway by Scott Fedick (Fedick 1985), a Ph.D. student under my direction at Arizona State University (see Fedick letter). Beyond subsistence adaptations, the basis for the broader variations discussed here cannot be fully resolved without the *future* detailed analysis of the midden remains.

Hierarchical Ordering in the Belize River Area. Separation of mountain and valley zones seen in the examination of residential settlement chronology, density, size, and composition can be seen in differences in the administrative centers recorded and mapped by the BRASS project. There is little differentiation between the valley centers of Yaxox, Alta Vista and Bacab Na (Figures 10, 11, 12). All fall within the expected range of the lowest hierarchical levels based upon Adams and Jones' (1981) ranks of courtyard counts and are consistent with the ranks of other Belize valley centers (Adams and Jones 1981: Table 1). The mountain center of El Pilar, with 15 courtyards, (Figure 13) is in dramatic contrast to valley centers and ranks equally with most major centers of the core area around Tikal.

Residential settlement density and composition in the vicinity of El Pilar share much in common with the core area (Appendix I, Table 4), with high residential unit labor investments (average 1705 construction labor-days, see Table 1 for core area averages) and few solitary structures (27%) in comparison to the overall area. Furthermore, settlement density around El Pilar is 292 str/sq. km., significantly greater than the overall mountain settlement density of 173 str/sq. km. This pattern of settlement aggregation around a center is found in the core area, but not in the Belize valley proper (Appendix I, Table 5). This evidence suggests a long building sequence and prominence in the area's hierarchy.

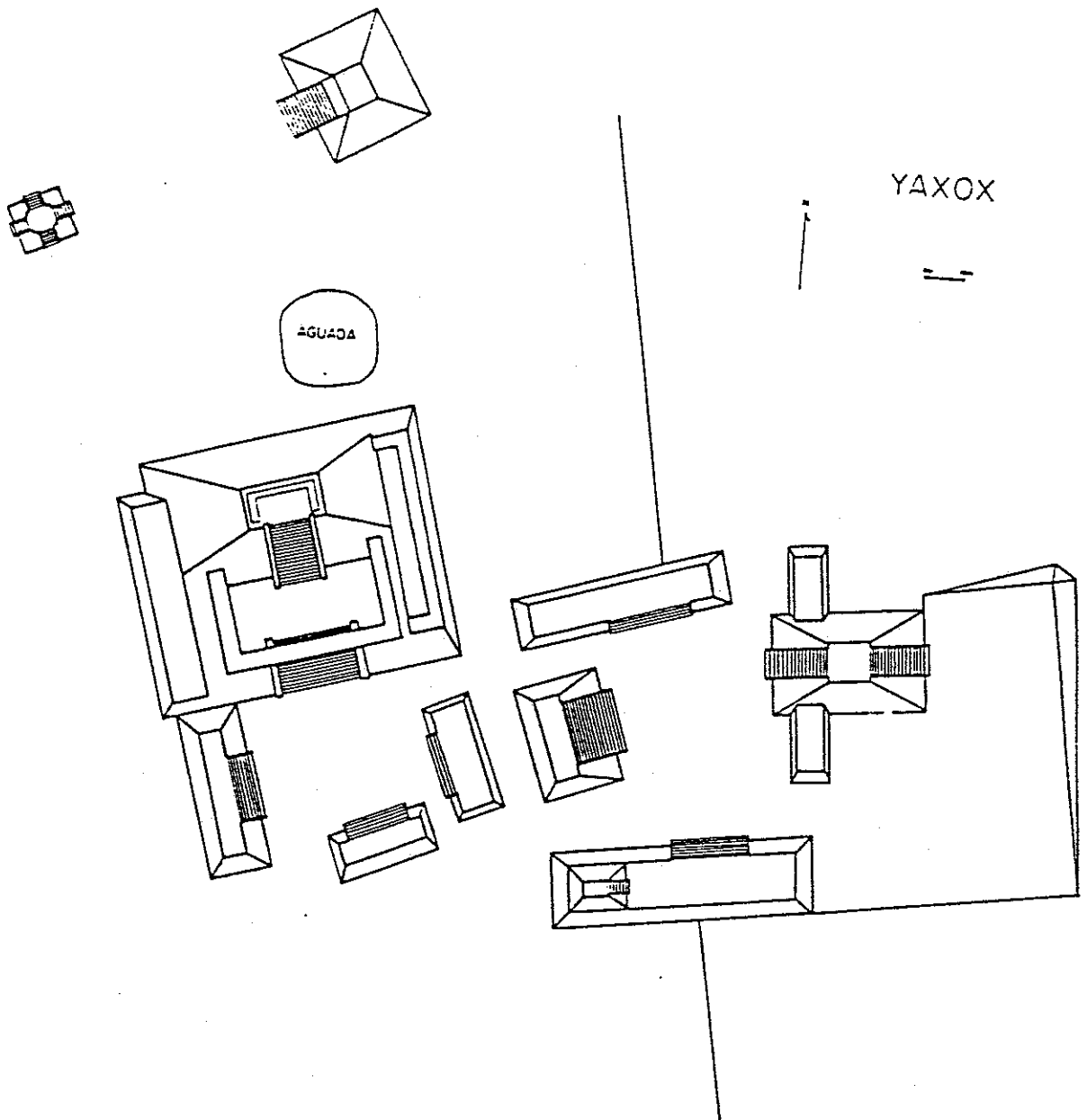


Figure 10: The Valley Center of Yaxox

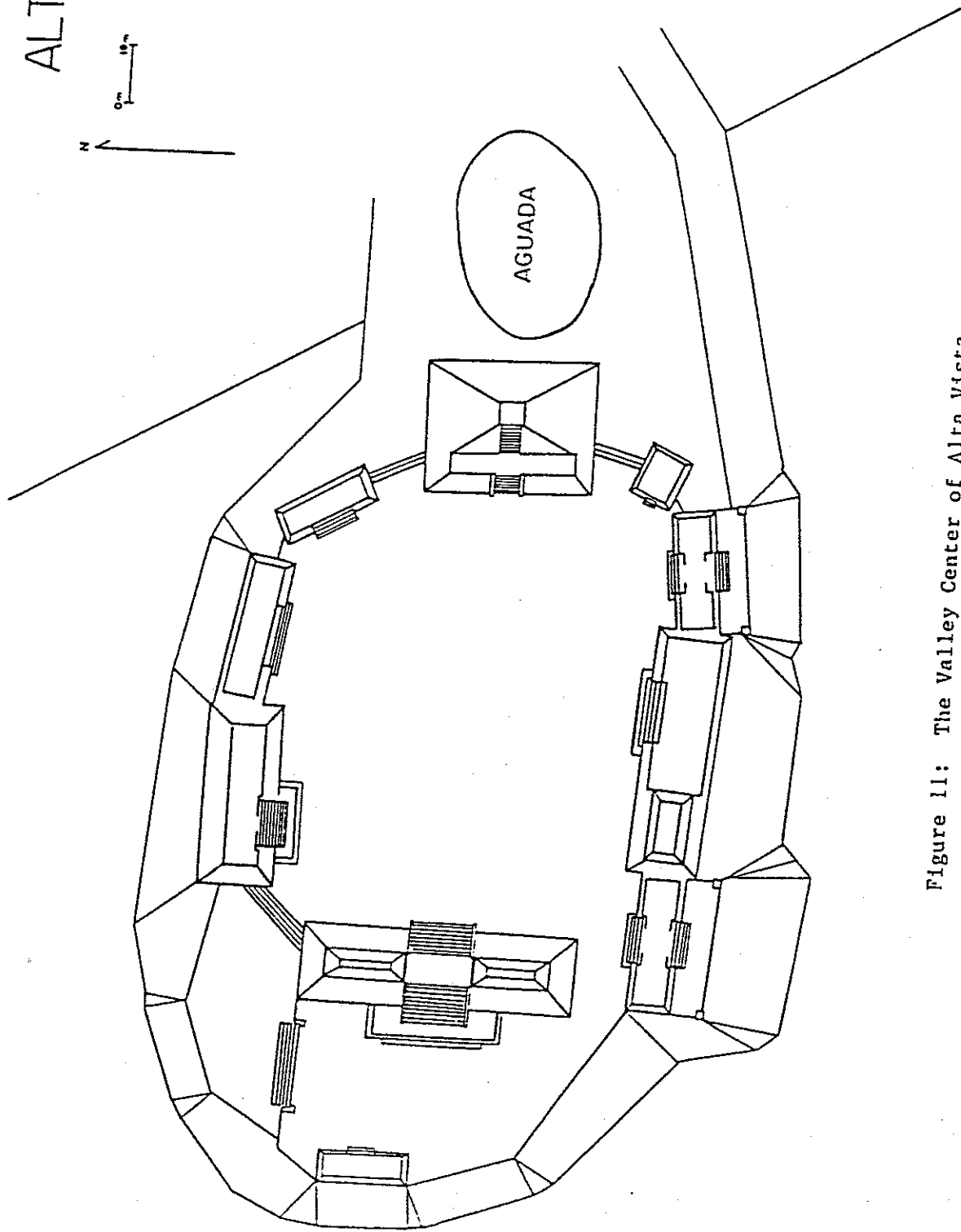


Figure 11: The Valley Center of Alta Vista

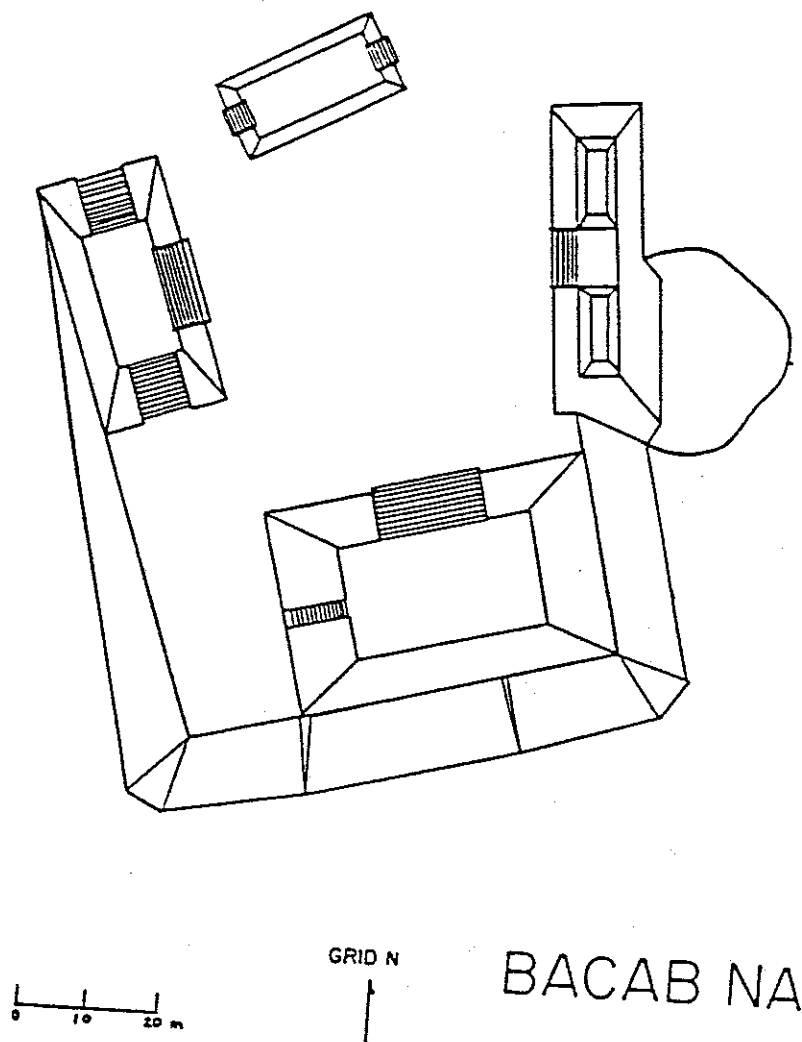


Figure 12: The Valley Center of Bacab Na

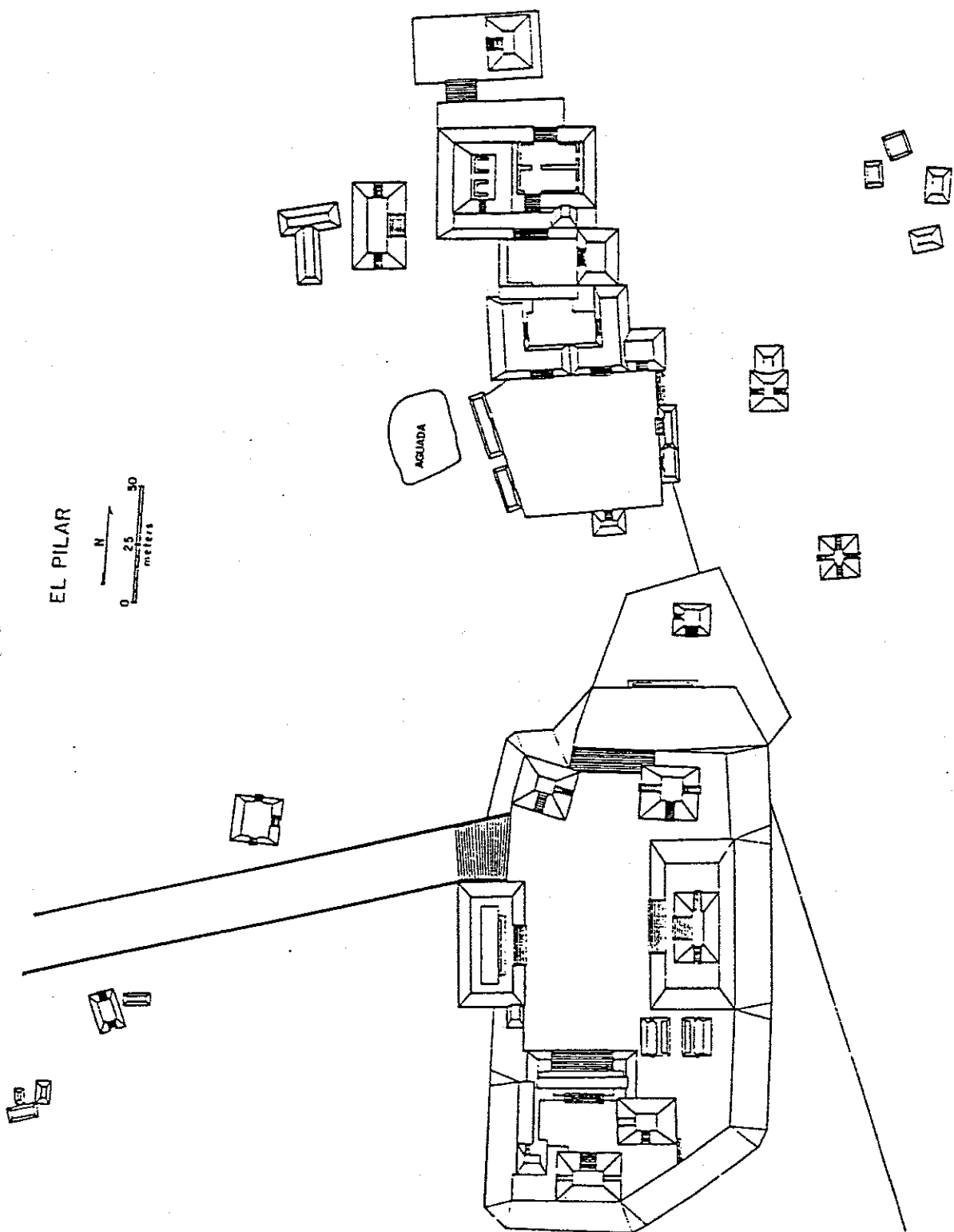


Figure 13: The Mountain Center of El Pilar

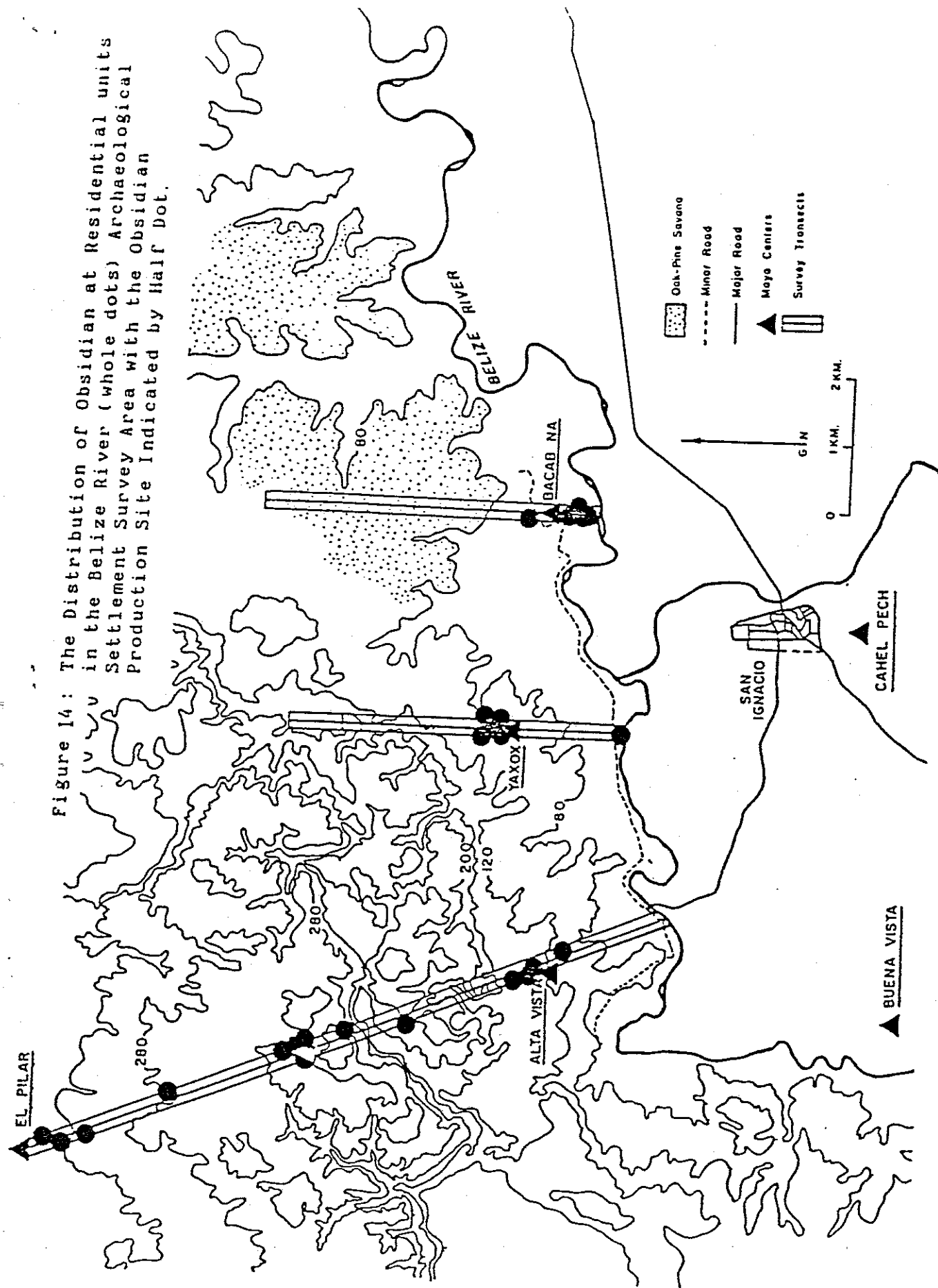
Valley centers do not appear to have the same relationship to the surrounding settlement as does the center of El Pilar (Table 6). The average settlement density in the overall Yaxox, Bacab Na, and Barton Ramie areas corresponds to the density within 1 km of the center. Lack of settlement aggregation around these valley centers suggests a brief period of center building and maintenance. This is corroborated by excavations at valley centers where the bulk of structural fill is Late Classic in date (e.g., Bullard and Bullard 1965; Thompson 1940) and supported, to a degree, from the BRASS tests at valley centers where early building was identified only at Yaxox.

The center of Alta Vista differs from other valley centers. Settlement density around this center is over two times as great as the overall valley settlement density (see Table 6). Its location, although within the valley, is within the limestone foothills, which are distinct from the valley floor. This environmental setting may account for the difference in settlement.

While the centers of the valley and mountain zones may have emerged under different conditions, they all must have served in some administrative capacities for the immediate areas. Distribution of the long-distance trade item, obsidian, provides an illustration of possible distribution functions.

Distribution of obsidian within the entire Belize River area seems restricted, as not all have access to this exotic material. Obsidian was found at 56% of the tested residential units (Appendix II), each with substantial Late Classic components (Figure 14). Residential units with obsidian appear to concentrate around distribution nodes both in the valley and mountain zones. Distribution beyond the immediate centers of control is rare. All valley residential units in the eastern Bacab Na Transect near the center of Bacab Na, and the middle Yaxox Transect in the vicinity of the center of Yaxox, contained obsidian, whereas the inland residential units away from the center had none. Residential units with obsidian present along the western El Pilar Transect were located 1) in the foothills

Figure 14: The Distribution of Obsidian at Residential units in the Belize River in the Belize River (whole dots) Archaeological Settlement Survey Area with the Obsidian Production Site Indicated by Half Dot.



adjacent to the center of Alta Vista, 2) within a densely settled zone called El Laton with the obsidian production site, and 3) around the center of El Pilar.

The obsidian distribution at residential units in the Belize River area contrasts with residential units of the core area between Tikal and Yaxha as well as the Yaxha-Sacnab lakes area where the majority of the households had access to some obsidian. While not all residential units exhibit access to obsidian, overall obsidian density is relatively high in the BRASS area. Compare the obsidian densities (OD), as calculated by Sidrys (1976:453, also Sidrys 1977), for specific sites:

| | |
|------------------------|-----------------------|
| Core Area Tikal: | OD = 15.3 |
| Core Area Tikal-Yaxha: | OD = 2.7 ³ |
| Lacustrine Yaxha: | OD = 12.8 |
| Riverine Barton Ramie: | OD = 0.3 |
| Riverine Melhado: | OD = 0.2 |

Applying the same formula, the obsidian density in the Upper Belize Valley area is 25.5! However, this includes the obsidian production site, where the OD = 75.5. Removing the production site from the sample, the density is 1.7, still over five times as great as at the nearby sites of Barton Ramie and Melhado, but two thirds the density of the rural core area as exemplified by the Tikal-Yaxha area.

Recorded production sites are rare in the Central Maya lowlands (Puleston 1973:104; Neivens and Libbey 1976; Woerner 1980; Clark 1984 personal communication). Further, no work has been done on the relationship of obsidian blade production and consumption. The production debitage at the El Laton site in the mountain zone of the El Pilar transect should be analyzed and the relationship between this production site and the general obsidian distribution in the Belize River area requires investigation.

³ The data for the Tikal-Yaxha OD are derived from Ford (1981).

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Attachments:

Profiles of Looter's Trenches

the Four Major Centers within the

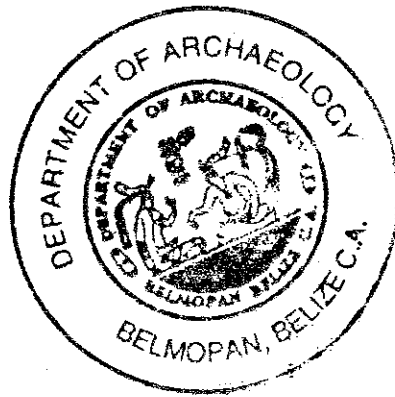
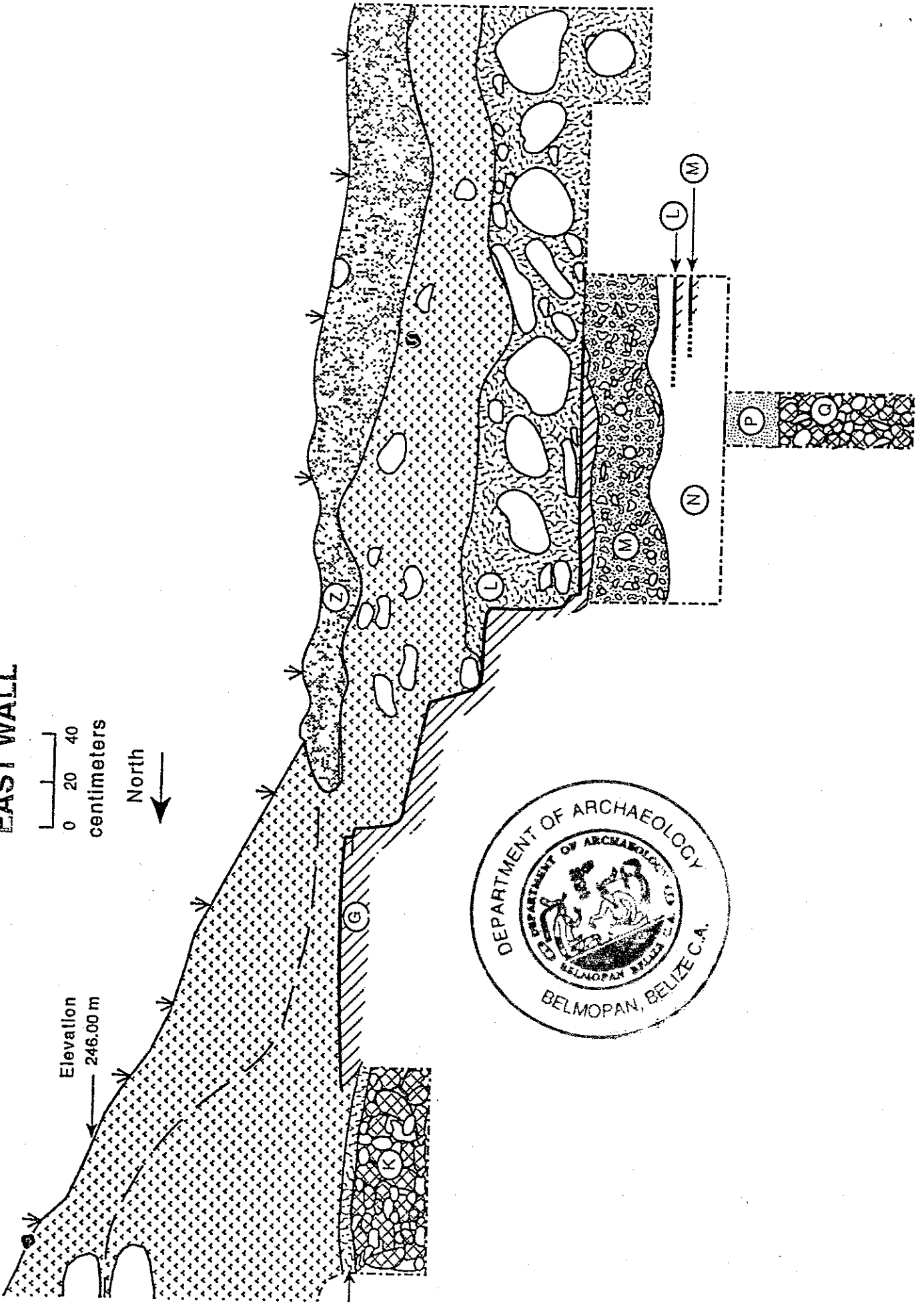
BRASS Research Area

EL PILAR
EP2 LT10
EAST WALL

0 20 40
centimeters

North
↓

Elevation
246.00 m

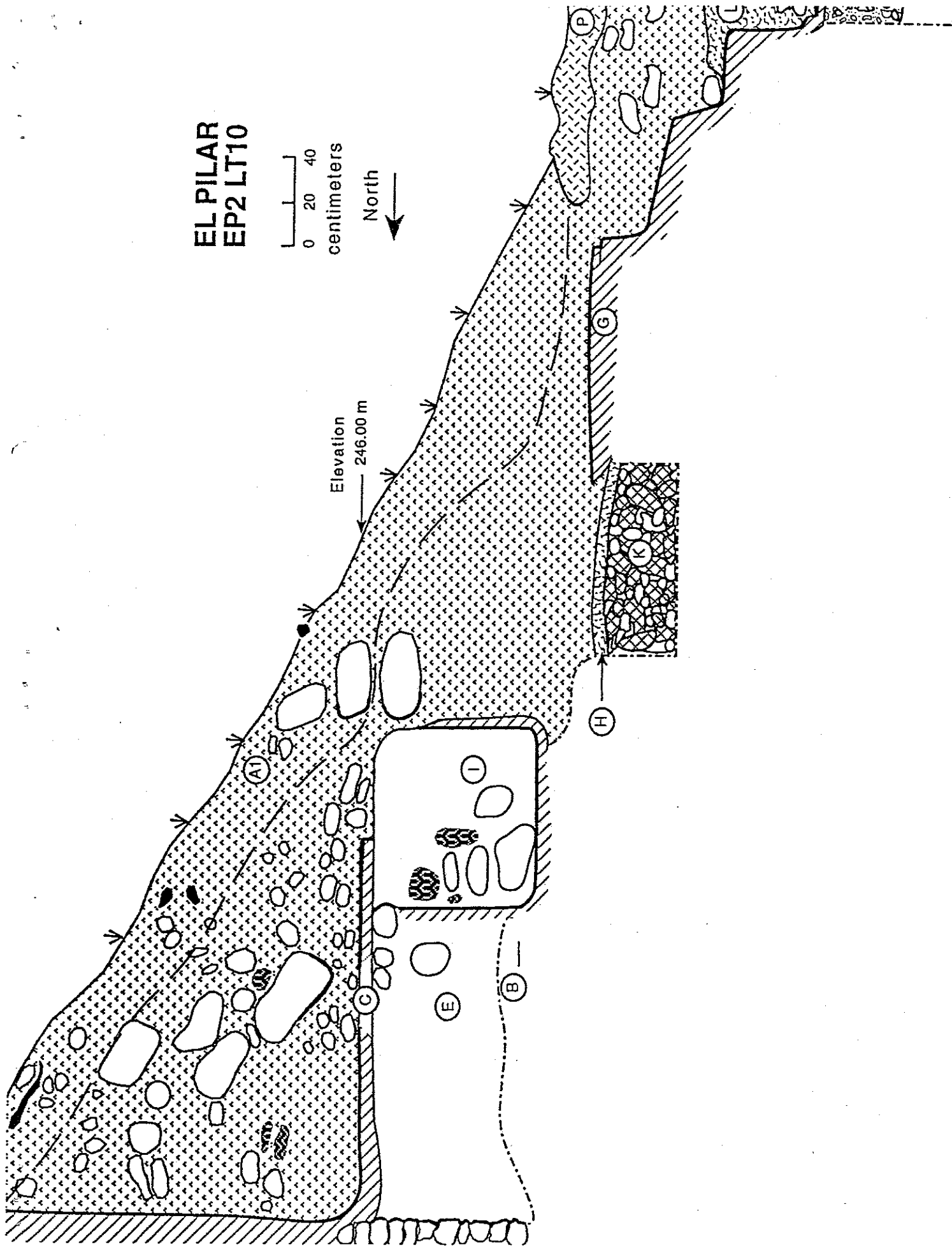


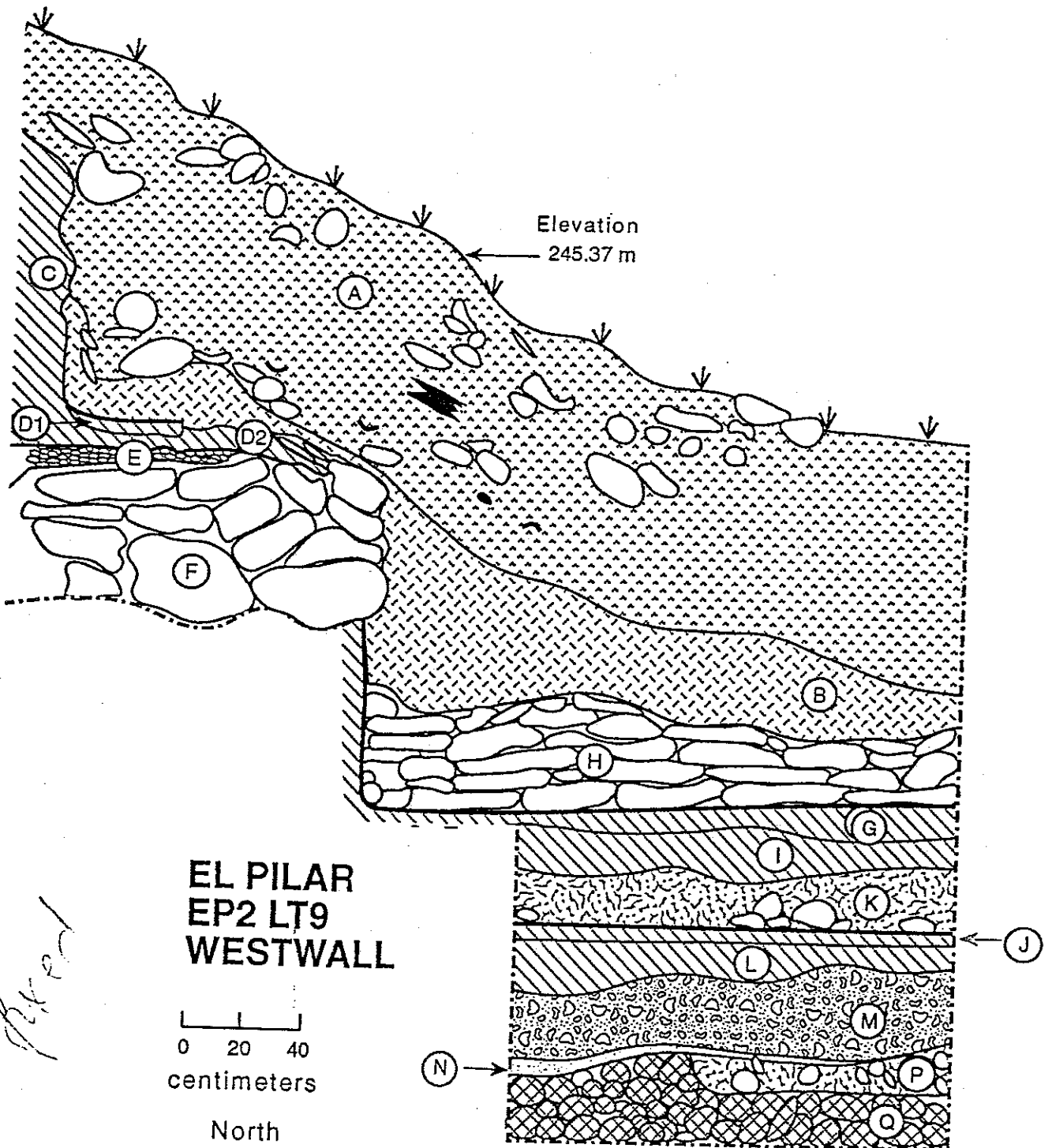
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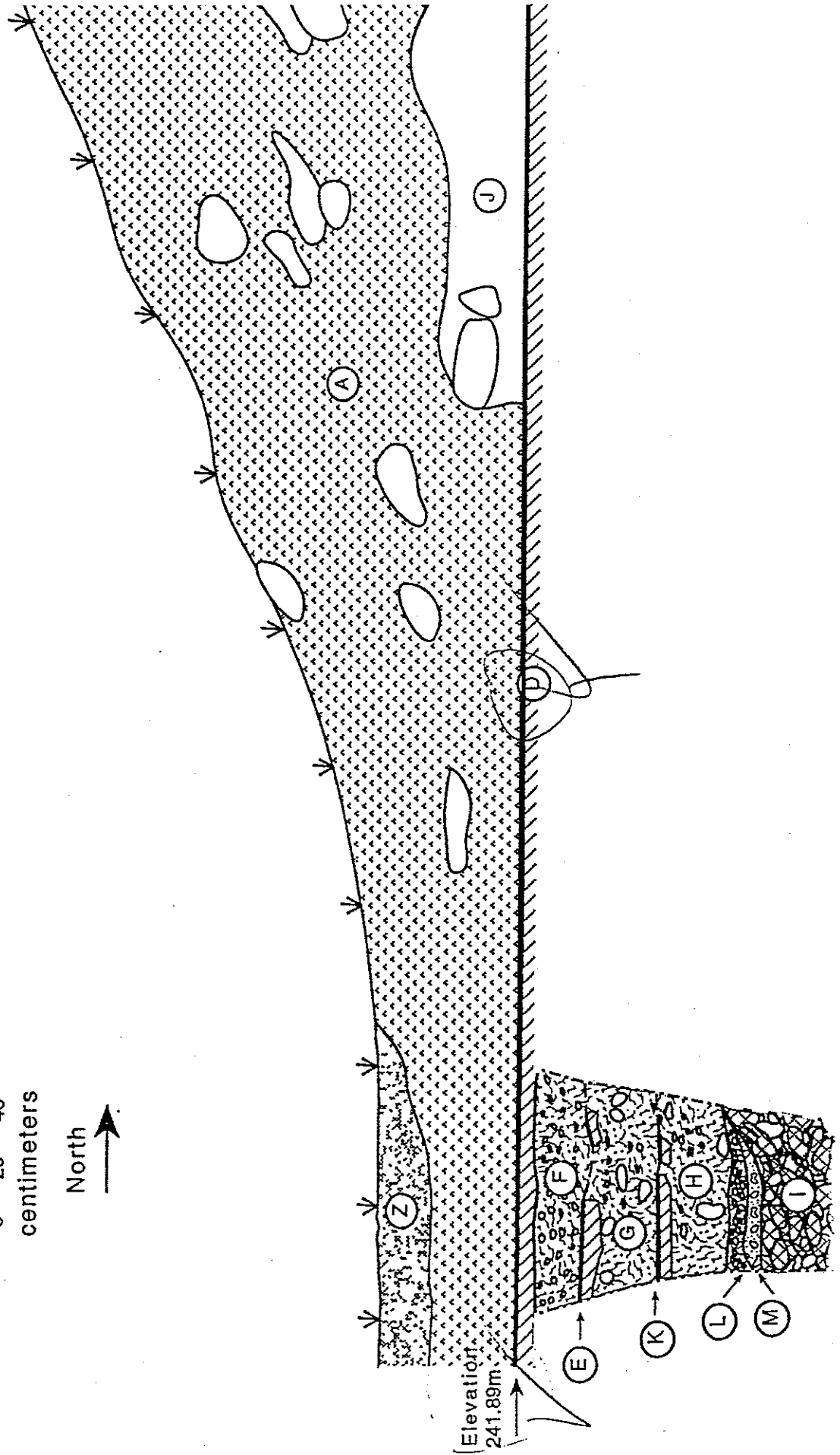




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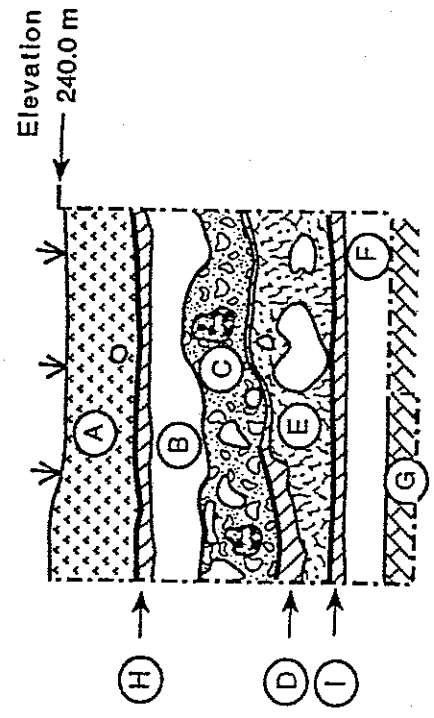
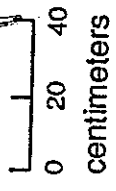
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SP 33



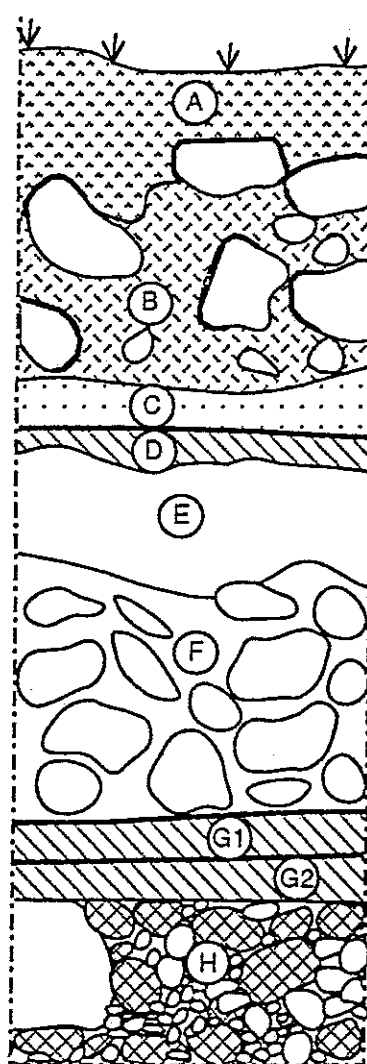
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PLAZA C TP1
WESTWALL



EL PILAR
PLAZA G TP7
NORTH WALL

0 20 40
centimeters

East
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Elevation

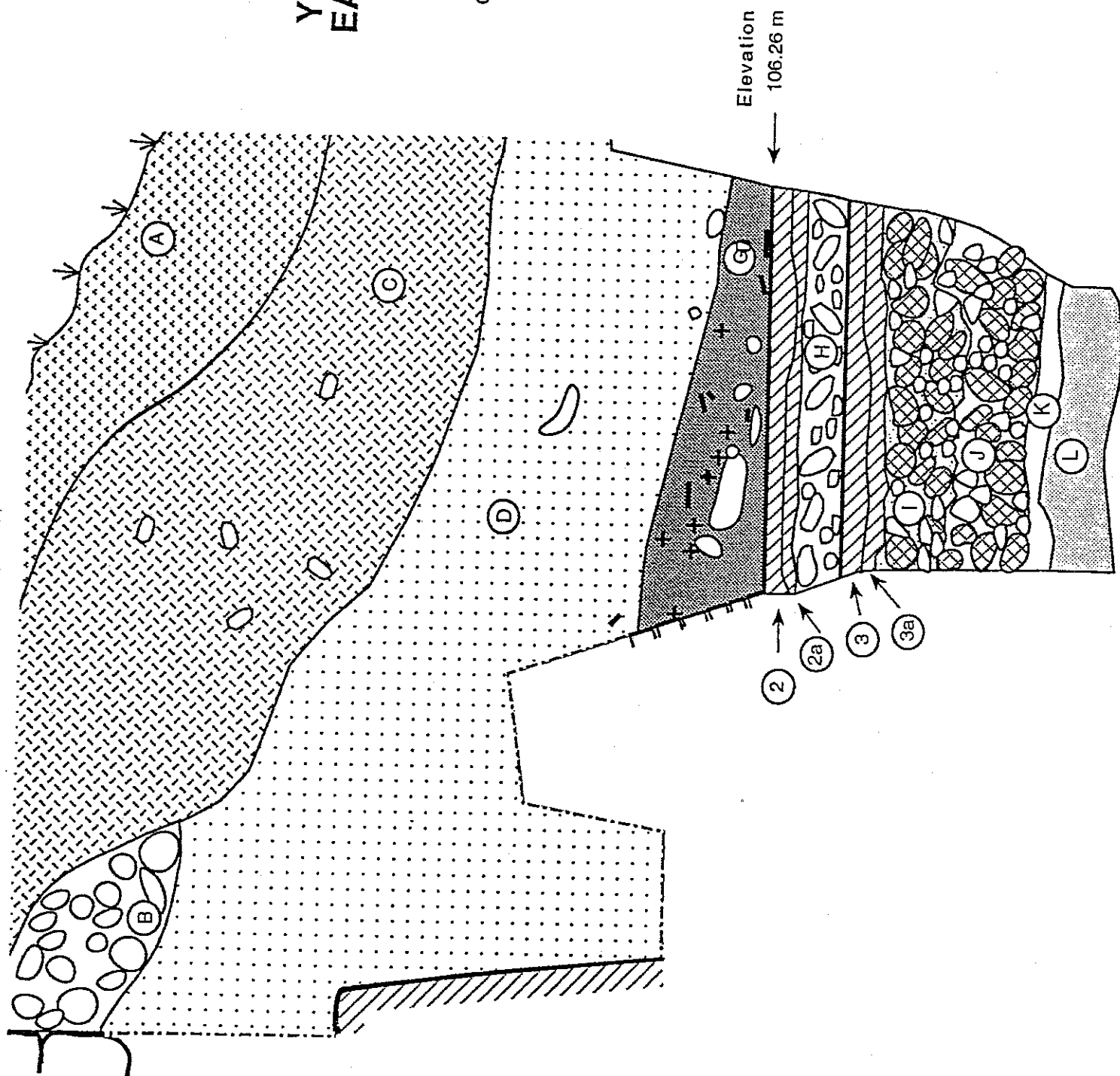
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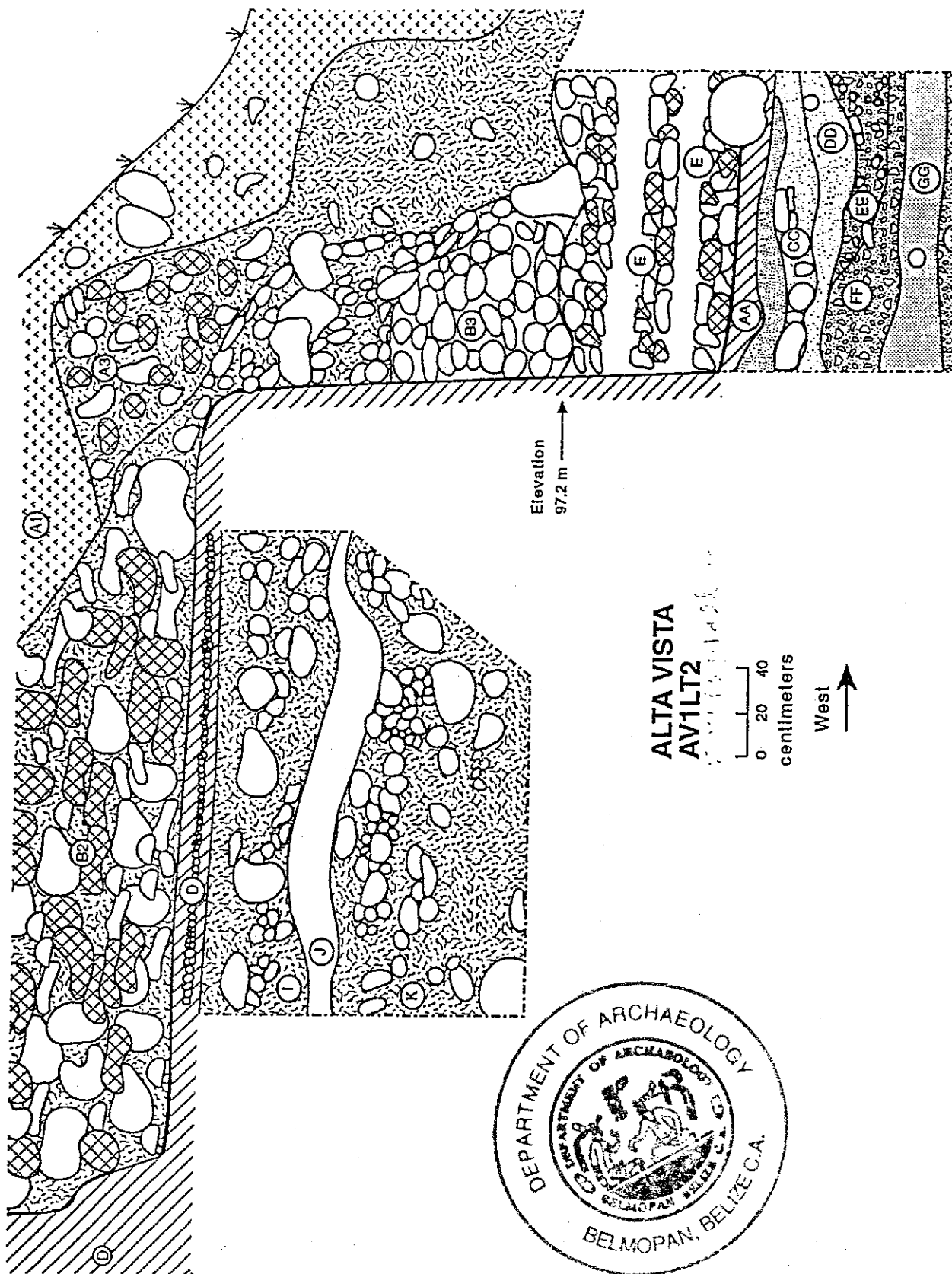
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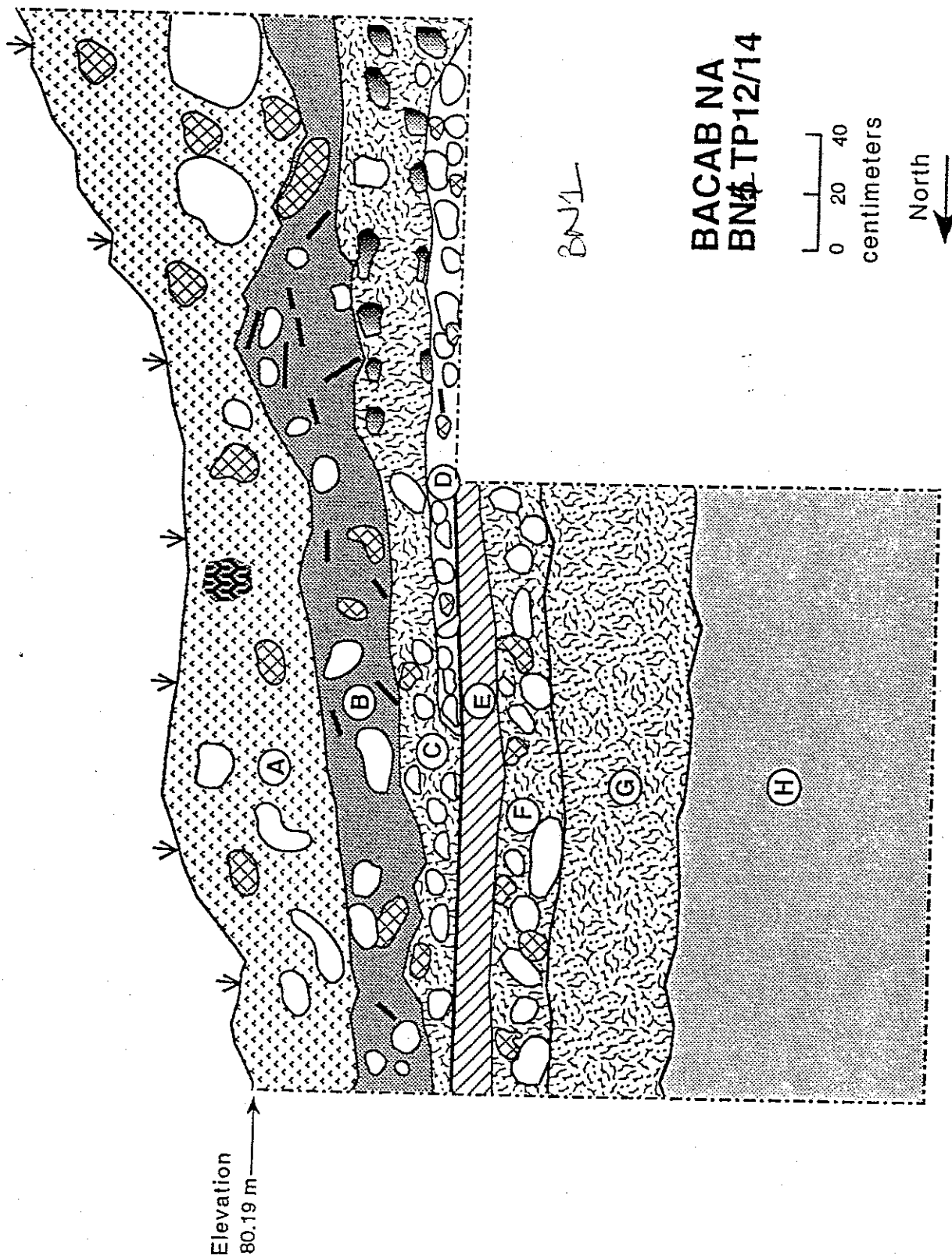
YAXOX
YX1 LT1
EAST WALL

0 20 40
centimeters

North
↓







BACAB NA
BN1 TP12/14