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Longer Live the King: The Questionable Demise of K'inich K'an Joy Chitam of Palenque

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Tonina's Monument 122 (Figure 1) is certainly one of the most famous of all Maya figural sculptures. Peter Mathews was the first to see that the bound yet richly dressed captive is named by the three glyphs on his leg as the Palenque king K'inich K'an Joy Chitam (see Becquelin and Baudez 1982:846). The accompanying caption features a "star" verb for war, and naturally suggests that the Palenque ruler was captured by Tonina on 9.13.19.13.3 13 Ak'b'al 16 Yax, the widely accepted placement for the Calendar Round recorded on the panel (Mathews 2001). From this it has often been assumed that K'inich K'an Joy Chitam was sacrificed soon thereafter (Schele and Freidel 1990:424), and the lack of a death record for him in Palenque's texts seemed to agree with this long-held interpretation.

Figure 1. Tonina, Monument 122, depicting the Palenque lord K'an Joy Chitam as a bound prisoner. Drawing by Ian Graham, Corpus of Maya Hieroglyphic Inscriptions Program.

In this note I would like to raise questions about such widely accepted interpretations of the history of Palenque and Tonina. I do not cast doubt on the general significance of Monument 122 as a historical record of K'inich K'an Joy Chitam's subjugation by Tonina, but I do suggest that the king may have continued to live and rule for nearly a decade beyond his supposed demise. Schele (1992) in fact first raised the possibility that K'inich K'an Joy Chitam (whom she called "Kan-Hok-Xul") lived well beyond his capture, but the scenario I posit differs from hers in one key detail: whereas Schele saw indirect clues suggesting that the royal captive was held hostage at Tonina for an extended period until his death, I believe he continued to reign at Palenque as an active and very "present" ruler.

K'inich K'an Joy Chitam is named in three inscriptions in connection with dates that fall after his supposed capture. One case on Palenque's Palace Tablet (Figure 2) has been known for years, and it has presented a vexing problem for the conventional interpretation of events. This final passage of the lengthy text records the dedication of the north gallery of the Palace (House

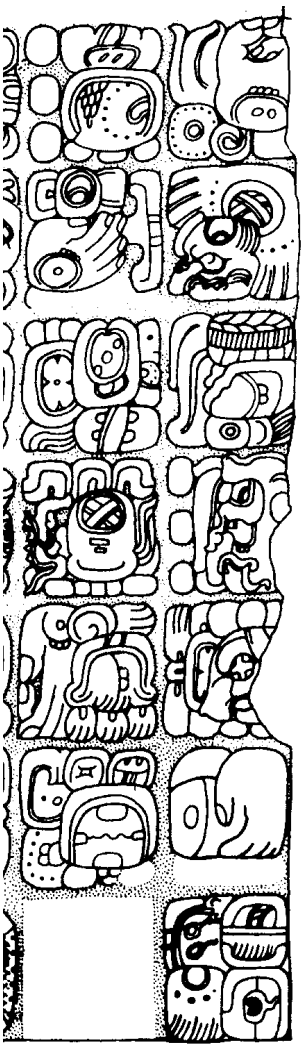

Figure 2. The final dedicatory passage of the Palace Tablet from Palenque. Drawing by Linda Schele.

A-D), where the tablet was found in 1949. The associated dedication date is 9.14.8.14.15 9 Men 3 Yax. According to this final passage, a man bearing the title *Ux Yop Hu'n*, "Three Leaves Headband" (this title appears with personal names in other Maya inscriptions) owned the building. After the still-untranslated expression **ye-te-je** we find the name glyph for K'inich K'an Joy Chitam, "the Holy Lord of Palenque." There the main inscription ends, without any other indication of another royal figure at the house dedication. I have long taken this as good evidence that the king is present and an active participant in the dedication of House A-D, but the dedication date comes approximately nine years after the war recorded on Tonina's Monument 122. It is probably also significant that one of the fallen piers of the gallery once bore a standing portrait of K'inich K'an Joy Chitam, further associating him with the building (see Robertson 1985:Fig. 252). This presumably dates roughly to the time of the gallery's dedication, if not somewhat later.

A second and previously unknown record of the Palenque ruler appears on Stela 8 from Piedras Negras (Figure 3). There we find his name – eroded but I think just recognizable – in association with an event on 9.14.2.11.9 6 Muluk 7 Mol, nearly four years after his presumed capture date. Unfortunately the verb and other associated glyphs in this passage are eroded, but it is perhaps significant that the previous passage on Stela 8 seems to record an event also involving another foreign ruler, namely a ruler from Santa Elena, a politically important center on the lower Río San Pedro. This Piedras Negras citation is significant, for it may suggest that K'inich K'an Joy Chitam was politically independent to some degree, and had direct relations with distant kingdoms only a few years after the Tonina defeat.

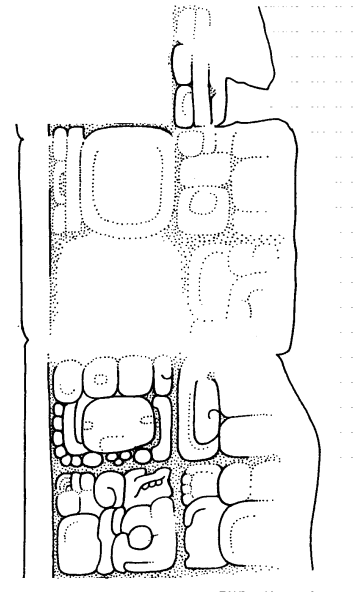

Figure 3. Passage from the right side of Piedras Negras, Stela 8, possibly citing K'inich K'an Joy Chitam. Drawing by David Stuart, Corpus of Maya Hieroglyphic Inscriptions.

A third text, again from Palenque, offers more suggestive evidence of K'inich K'an Joy Chitam's extended life. The so-called K'an Tok Panel from Group XVI is one of the very latest texts thus far discovered at Palenque (Figure 4), and presents a remarkable history of nobles who occupied a junior office within Palenque's court over the course of several centuries (Bernal Romero 2002). Palenque rulers oversaw the accession rites of these high-ranking figures throughout the Classic period, and the names of several familiar kings appear as the "overseers" of the subordinate inaugurations. Among the name of Late Classic rulers we find the "3-Axe-Earth" glyph that can only refer to K'inich K'an Joy Chitam, whose complete name on the panel is now missing. He is said here to have overseen the installation of one Janahb' Ajaw, likewise a grandson of K'inich Janahb' Pakal, as a junior official, yet the date given for this event is in all likelihood 9.14.7.0.15 6 Men 13 K'ank'in, according to my own reconstruction. Once more this falls a

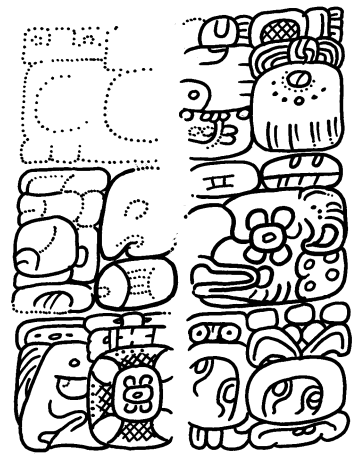

Figure 4. Passage from the K'an Tok panel from Palenque. Inking by David Stuart, after preliminary drawing by Linda Schele and Peter Mathews.

number of years after the war event recorded at Tonina, and strongly points to the king being alive and in power at the time.

These later dates, if I understand them correctly, present an unusual conundrum for Maya historiographers. Monument 122 at Tonina is an unequivocal depiction and record of the Palenque king as a bound prisoner, yet the texts we have surveyed offer, I think, a compelling case that K'inich K'an Joy Chitam did not die at that time. How do we reconcile such seemingly contradictory evidence? One might call into question the Long Count placement of the CR on Monument 122, 13 Ak'b'al 16 Yax, but there seems little room to maneuver around the widely accepted date of 9.13.19.13.3 offered by Mathews. Unless there is an error of some sort in the sculpted date, this is the only acceptable placement in the reign of K'inich K'an Joy Chitam.

The resolution to the problem comes, I believe, from the history of the Río Pasion region, and specifically the belligerent relations that seem to have existed between Seibal and the Petexbatun sites of Dos Pilas and Aguateca. Epigraphers have long known of the "star war" waged against Seibal by Ruler 3 of Dos Pilas on 9.15.4.6.5 9 Chikchan 18 Muwan. This resulted in the capture and subsequent display of the Seibal ruler Yich'aak B'alam six days later, at which time he is portrayed as a bound and altogether defeated figure on two Petexbatun monuments (Figure 5). However, it is clear that Yich'aak B'alam did not die at the time of Seibal's military defeat. Later records at Seibal make it clear that that he was alive as late as 9.15.15.0.0, at which time he witnessed a period-ending ritual involving Ruler 4 of Dos Pilas (Figure 6). Yich'ak B'alam had in fact outlived his captor, and he was actively ruling Seibal for several years, though probably still under the political control of Dos Pilas. The portraits of the bound ruler at Dos Pilas and Aguateca are images of a living *ajaw* who would retain some degree of local power *at* Seibal for many years to come.

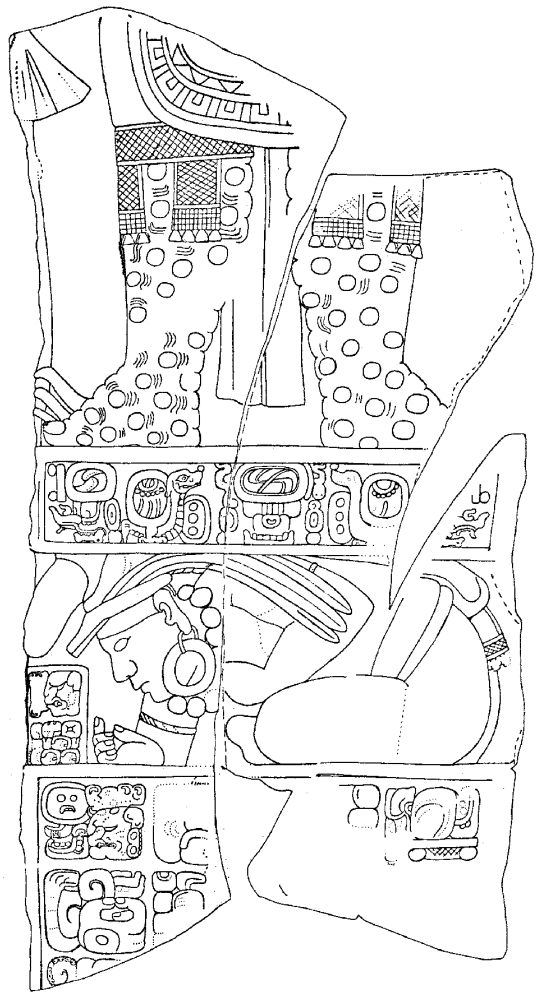

Figure 5. The Seibal ruler Yich'aak B'alam, shown on lower fragments of Dos Pilas, Stela 2. Preliminary drawing by Peter Mathews.

I suggest a similar scenario can account for the evidence surrounding K'inich K'an Joy Chitam of Palenque. The "star war" with Tonina was real enough, but the dynastic consequences of Palenque's military defeat seem to have long been misinterpreted. The Palenque king was apparently not sacrificed, but was kept on the Palenque throne, perhaps even for several years under the watchful eye of Tonina's ruler.

It is possible that after a time K'inich K'an Joy Chitam had regained enough political autonomy to oversee dedication rites and the installation of junior officials within the Palenque sphere. We still lack a firm date for his true death, but I suspect it came soon after the dedication of the Palace's north gallery, perhaps during the year or so leading up to the inauguration of his successor, K'inich Ahkal Mo' Nahb', on 9.14.10.4.2.

Understandably we often characterize Maya warfare in dire and fatalistic terms, so that a nobleman's "capture" as recorded in history quickly becomes, in our own analysis, a "capture and sacrifice." Yet it is important to keep in mind that the consequences of Maya warfare are never clearly spelled out in the inscriptions. Perhaps one's "capture" should be taken at face value when further elaboration is missing. Abducted nobles surely met violent and perhaps even prolonged deaths, but high kings, once captured, might have been more highly valuable alive as political hostages or vassals. The "quick death" view for the treatment of captured kings – and there are not many cases to compare in Maya history – has perhaps

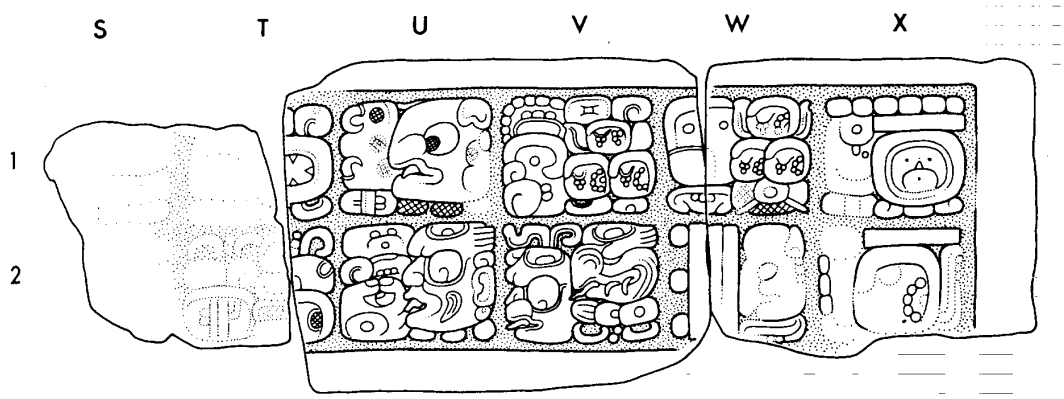

Figure 6. Seibal, Hieroglyphic Panel. Drawing by Ian Graham, Corpus of Maya Hieroglyphic Inscriptions.

been heavily influenced by the history surrounding the defeat and beheading of Copan's Ruler 13 by Quirigua. At Quirigua we do have clear records of the Copan ruler's sacrifice, but it is a unique case, significantly different from other Maya records of conquest. We find no "capture" glyphs or "star" events associated with that episode, suggesting that the circumstances of the Quirigua-Copan war were not representative of the other conflicts in the central lowlands and the Usumacinta region. Maya rulers and their kingdoms fought under very different circumstances, and we should reasonably assume that some losers, like K'inich K'an Joy Chitam, lived longer than others. It remains to be seen how independent these defeated lords were once they returned to their own communities, but clearly the evidence as it now stands should have important implications for interpreting the overall nature and political context of Maya warfare.

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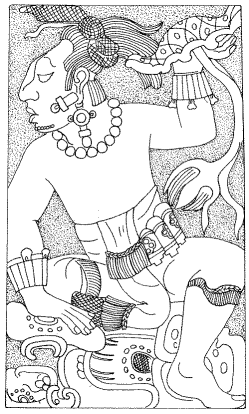

The Environment of Pakal's Tomb

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Summary
For two extended periods during 2000 and 2001 the relative humidity and temperature were measured within Pakal's Tomb at the base of the Temple of the Inscriptions in Palenque, Chiapas, Mexico. The temperature averaged 26°C. The relative humidity, often saturated, was observed in the 90-100% range; which is our best estimate despite sensor difficulty. During visits the walls were visibly wet, but months passed without documenting changes by a visit.

It was suggested that an expanded measurement program be undertaken using dual instrumentation. One sensor would be within the tomb, and it would be complemented by a measurement site located outside, at the top of the pyramid.

Introduction
Palenque is a major Maya archaeological site located in the foothills of the Chiapian Mountains of southern Mexico. One of the most dramatic buildings within the extensive site is the Temple of the Inscriptions, a pyramid near the present-day entrance to this national park. Deep within the structure is a room, discovered in 1952, built around a large sarcophagus which holds the remains of the eleventh Palenque ruler Pakal (who reigned from 29 July 615 until his death on 31 Aug 683 AD). The coffin and walls are covered with sculpture and paintings. (The tomb room has been reconstructed within the Archaeological Museum in Mexico City[1].)

Access to the tomb is no longer allowed. The stairway leading from the top of the building is steep and dangerous. The tomb room is subject to further deterioration and damage as visitors, some bent on vandalism, have not been escorted. Even the presence of people and illumination may add to the problem.

The Instituto National de Archaeologia e Historia (INAH), administrators of the Palenque site, in an effort to document the air environment, authorized the gathering of temperature and relative humidity within the tomb room. Observations were begun in February, 2000, and extended through May, 2001.

Procedure
A Langan Hygrothermograph, Model T16, was made available for the measurements[2]. This data-acquisition device will save measurements over long periods of time for subsequent retrieval. The plan was to download the data each six months or so. In practice the data were read twice: in July 2000 and in June 2001. Since the sampling interval was set to be each twenty minutes, and the data capacity was 15,360 measurements, 213 days could be saved before data were lost. As a result, a few months were lost in the middle of the investigation.

The temperature sensor is one manufactured by National Semiconductor Corporation (Santa Clara, CA)[3]. It is extremely rugged and the resultant observations are valid to approximately 0.5°C (<1°F). It is a small integrated circuit placed just next to the humidity sensor. The probe was placed inside the iron gate protecting the tomb; it was draped over the stairs leading down to the sarcophagus, exposed to the open air but not in contact with the stone.

The humidity sensor is one manufactured by Hygrometrix, Inc. (Alpine, CA); it is their Xeritron Model[4]. This is a very unusual sensor designed to be able to observe humidity over its entire 0 to 100% range. It is unique in that the portion of the sensor that is modified by changes in humidity is the dried seed stem of a geranium plant. This is affixed to an electronic strain gauge. In high humidity the crystalline cellulose is more limp; when dry it is brittle. The Xeritron has been tested extensively and has been used in critical environments for thirty years[5].

In Pakal's Tomb the high humidity environment was as difficult as one can find to measure. The exposure to near and full water saturation put the sensor to a test.

Placing sensors (shown in outline).

Normally such an environment would damage a humidity sensor beyond use, but we were able to gather data for most of the recorded period. Preferably we should have tried to make calibrations during retrievals; but this was not practical. We did so prior to the project and after the instrumentation returned; hence the data changed. As a result it was necessary to make a best judgement as to the actual calibration of the humidity sensor during its time within the tomb.

Fortunately data were gathered before and after the sensor was used. Fortunately there were variations recorded during the entombment. Extensive review of humidity data over years and in many environments has enabled an educated guess at the calibration; it provides an estimate of the water content of the air. The caveat remains, however, that the accuracy of the results are subject to change based upon possible future measurements.

What changed the calibration of humidity? The basic transducer, the geranium fibers, became wet for long periods. There was no resultant strain; humidity was 100% and the associated electronic part used to observe the strain was subject to measuring the mass of the water only. What is important about this sensor is that it can recover; once the liquid water evaporates it will again measure gaseous water (humidity). In the tomb it never got even moderately dry, so the sensitivity of the measurement device changed as some of the fibers loosened. The result, variations in humidity were still observed, but their scale was something different than before, when first installed.

The practicalities of measuring in a distant locale, and in a restricted area, limited attention that might have resolved this problem (by more frequent calibration). A laptop computer, a familiar technician, the cost and access all had to converge to do better. We were fortunate to get the information we have.

Results

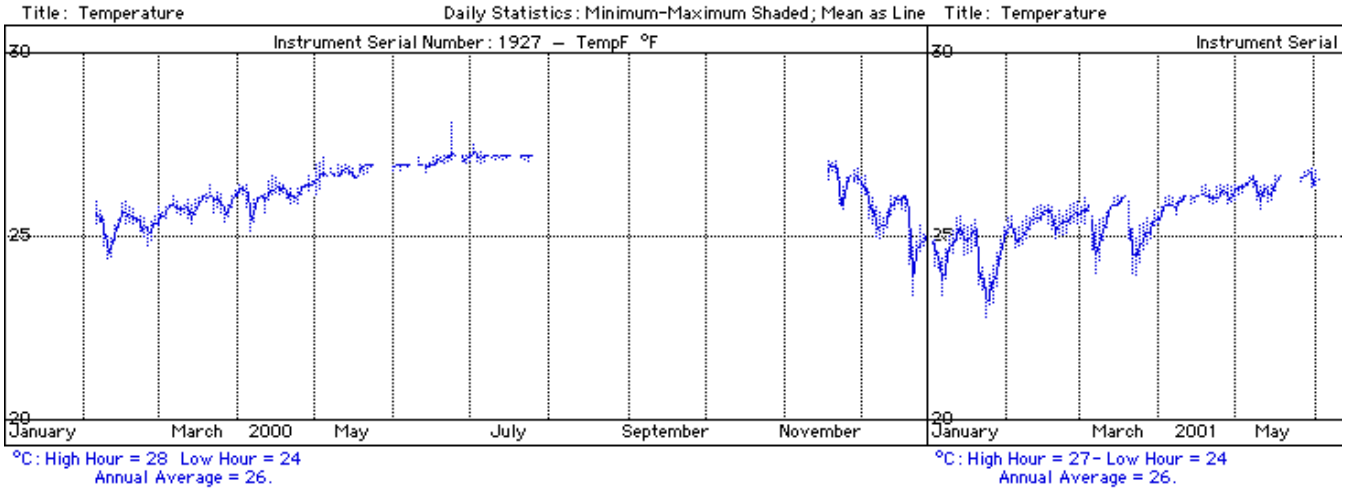
From February 4 through July 25, 2000, 12,380 readings were made for both temperature and humidity. The averages of 26.4°C (79.5°F) and 93%RH give a simplistic overview of the results; the time series (Figure 1) shows some periods of constant dampness and others of still-high but lesser humid conditions.

From November 15, 2000, through May 30, 2001, 14,130 readings were made for temperature; the humidity sensor ceased operation, by moving out of range, in March, after about 9,500 stored samples. The averages of 25.6°C (78.0°F) and 94%RH again provide a simple overview. Figure 1 combines both contiguous measurement cycles.

Moist stalactites show humidity in Pakal's Tomb.

Normally in a stable open air mass, as the temperature increases the air expands and the water molecules have more room. The humidity goes down. A typical diurnal cycle has cool damp nights and hot dry days; humidity levels vary inversely with temperature. We see something different in Figure 1, an overview of all the gathered data. It is obvious that, as the temperature drops (even slightly) so does the humidity. This is counter to what we would expect. What is happening? It would appear that, as in your refrigerator, the cooler temperature is causing condensation on the walls of the tomb. The condensation is reducing the amount of water vapor in the air more rapidly than the cooling air is allowing an increase in humidity (the inverse expectation.) Thus, in this 'sealed' environment, the net effect is for the humidity to move together

Temperature in Pakal's Tomb



Relative Humidity in Pakal's Tomb

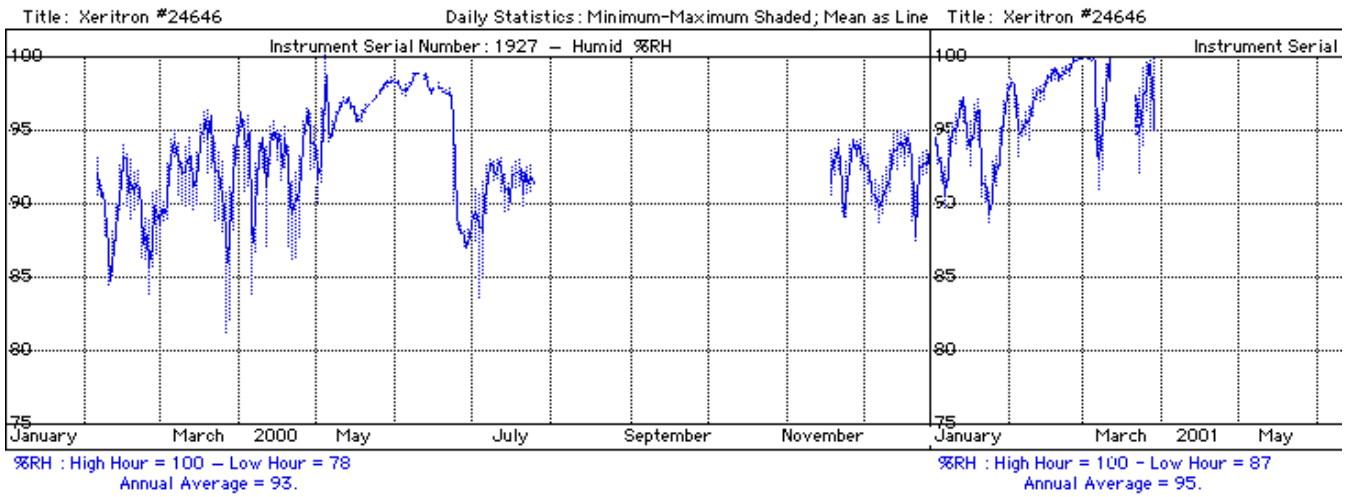


Figure 1. Tomb environment.

with the temperature. Even a small change in temperature creates a significant reduction in humid air. Albeit the environment remains classed as highly humid.

Now the tomb is not truly sealed, but there is very little air flow. The closest opening to the outside is a small window up a long flight of stairs[6]. It is effectively a closed space. What this suggests is that there may be a method to reduce the condensation damaging the walls of the tomb: run truly cold water through pipes and draw the condensed water away. A possibility fraught with practical limitations similar to those who recommend an air-flow exchange.

Figure 1 also shows the seasonal temperature trend of temperature; it is difficult to see a corollary humidity trend. Data for the traditional rainy season, in the Fall, were missed. The temperature in May, for both years is very similar: 26.5°C (80°F). More precisely the average in 2000 was 26.8°C (80.2°F); in 2001, 26.5°C (79.7°F). It is the nature of measurements that one needs more to resolve trends, and certainly more long-term data gathering would help define the environment within the tomb.

The offset in humidity that occurred in April 2000, cannot be explained by viewing the data alone. Some condition changed rather suddenly. Here is a case (see Figure 2) where the temperature rose quickly by two degrees (F), in a span of 20 minutes. The effect was to reduce the humidity by 7%. Just as would be expected, inverse correlation. One might conjecture that several people visited; the change occurred at 17:00 hours on June 23. What

is surprising is that the changed air conditions remained for many days.

It is not possible to make but the most broad inferences for the missed data from August into November. The temperature could have risen but slightly because this is typically the rainy time of the year. Because of these rains, the humidity probably remained in the 90% range.

The average means given above are graphically enhanced with histograms showing the accumulated data from both measurement cycles, Figure 3a and Figure 3b. These plotted frequency distributions show the range of temperature and relative humidity to which the tomb was exposed over each several-month period.

The effect of all of this humidity is shown directly in the degredation of the figures on the wall of the Pakal Tomb.

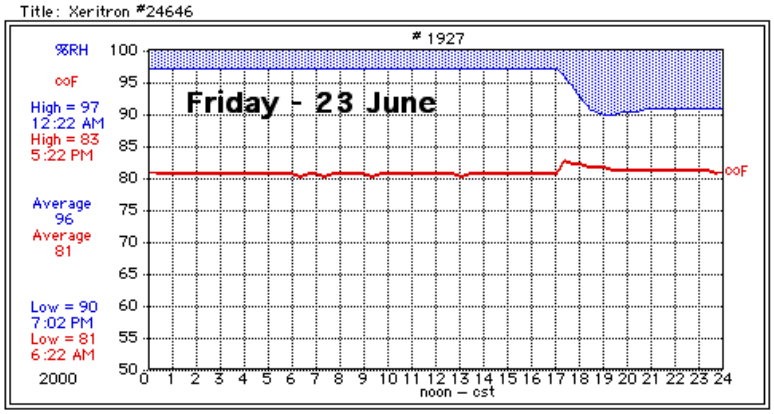


Figure 2. Impact of change. Temperature impact on humidity in Pakal's Tomb.

These two pictures compare the state of Stucco Figure 8 (Figure 6) in 1976 and in January 2001, a short twenty-five-year span for art that had withstood twelve-hundred years. The photographs speak for themselves, despite the limitation in the lesser-quality of the recent image because of low light levels.

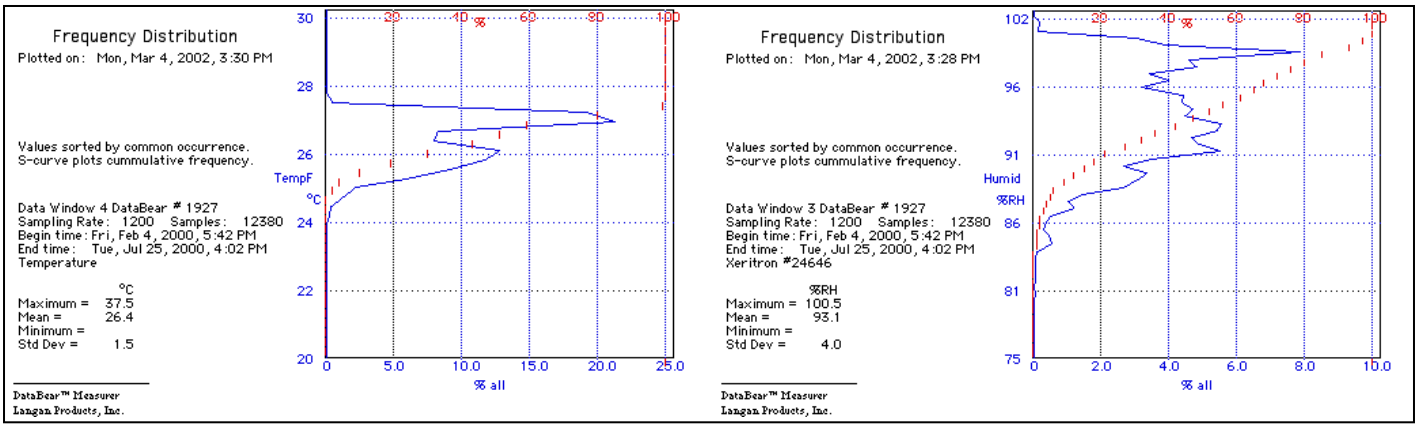


Figure 3a. Tomb exposure (2000). Exposure of Pakal's Tomb to temperature and relative humidity in 2000.

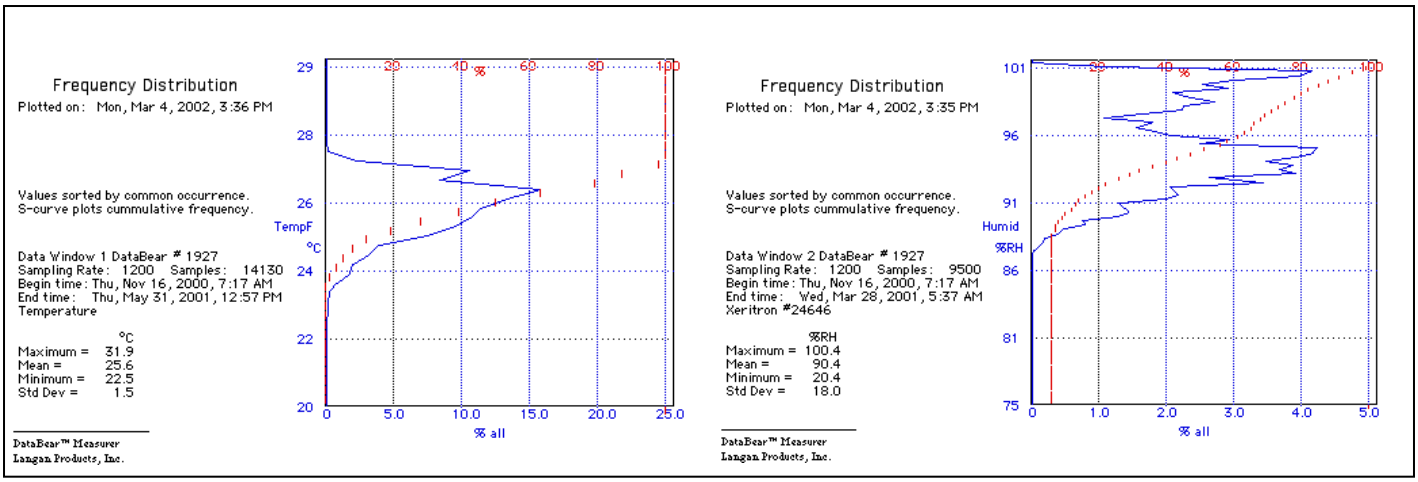


Figure 3b. Tomb exposure (2001). Exposure of Pakal's Tomb to temperature and relative humidity in 2001.

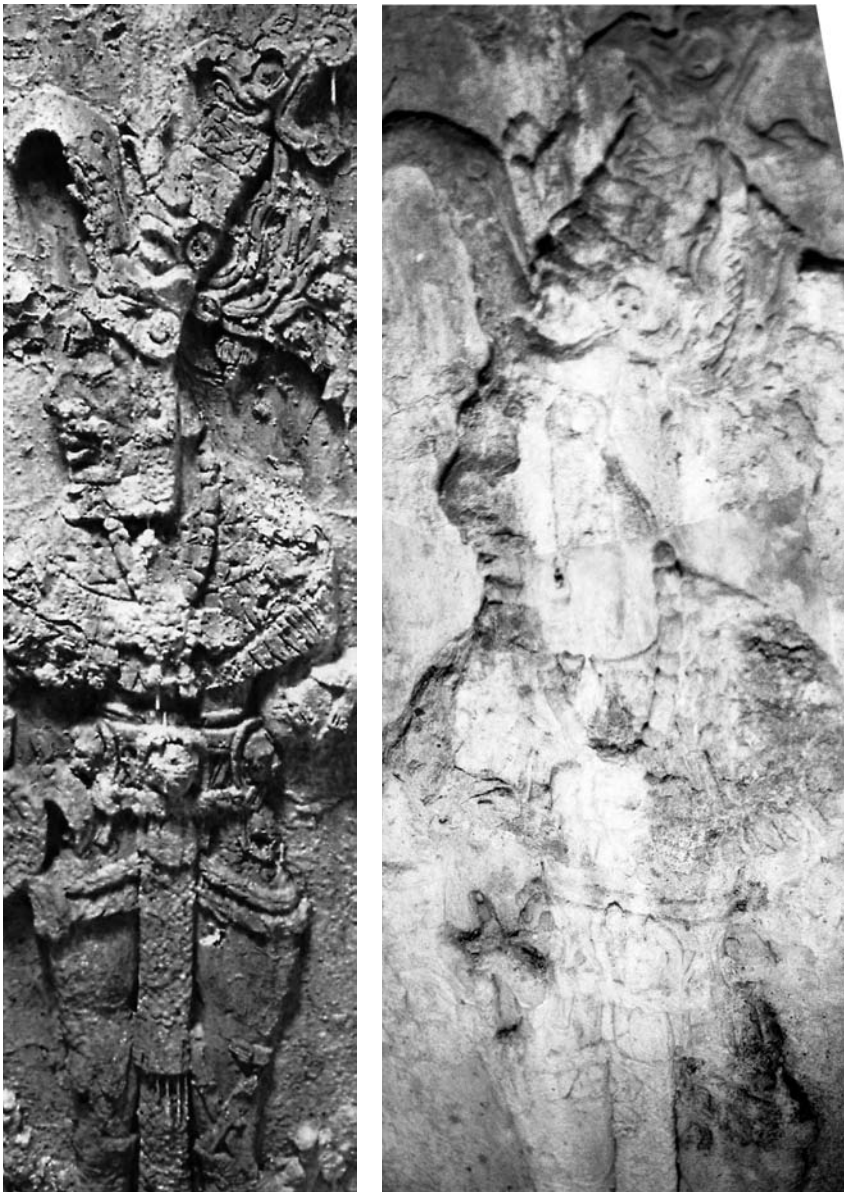


Figure 6. **Destruction of wall figures.** Stucco Figure 8 (southeast corner): left from 1976 (after Robertson 1983:Fig. 318); right from January 2001.

Conclusion

It is highly desirable to maintain archaeological finds in conditions that are far more favorable than those measured in this study. Ideally a conservationist would strive for a temperature environment between 20-23°C (68-75°F) with a relative humidity between 40 and 60%. The more stable the better for long term survival. Palenque is in the tropics, so it is warm. The temperature is stable. But the natural humidity is destructively high.

The high moisture probably exists because of water leaking through the rock boundaries of the pyramid. It is not easy to stop. The only way to reduce the humidity would be to remove it mechanically, an expensive prospect.

These are, perhaps, the first long-term environmental data gathered in Mayan archaeology. In any event, they do provide modest insight into the stability that exists within a pyramid. A continued program would allow more certainty in the absolute nature of the humidity conditions. The benefit would be to assess what might be done to protect the buried treasure that is Pakal's Tomb.

Acknowledgments

The cooperation and permission provided by the INAH staff and site archaeologists is greatly appreciated. Director Juan Antonio Ferrar (INAH, Palenque Archaeological Zone, Chiapas), Arnoldo Gonzales (Site Archaeologist), and Alfonso Morales (Project Director for the Proyecto Grupo de las Cruces), contributed directly with their support. Merle Greene Robertson encouraged these measurements and provided support and computers from the PARI facilities in Palenque.

Endnotes

1. Aguilar, Manuel (2001): The Skeleton That Eats Maize. *The PARI Journal* 2(3):16-17.

2. Model T16 Hygrothermograph contains long-life battery support and a rugged Xeritron Humidity Sensor and temperature sensor with data acquisition; all but the sensors are sealed from the moist environment. Langan Products, Inc., San Francisco, CA, USA.

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6. Robertson, Merle Greene (1983): *The Sculpture of Palenque, Volume 1, The Temple of the Inscriptions*. Princeton University Press, Princeton, NJ, ISBN 0-691-

Urbanism at Palenque

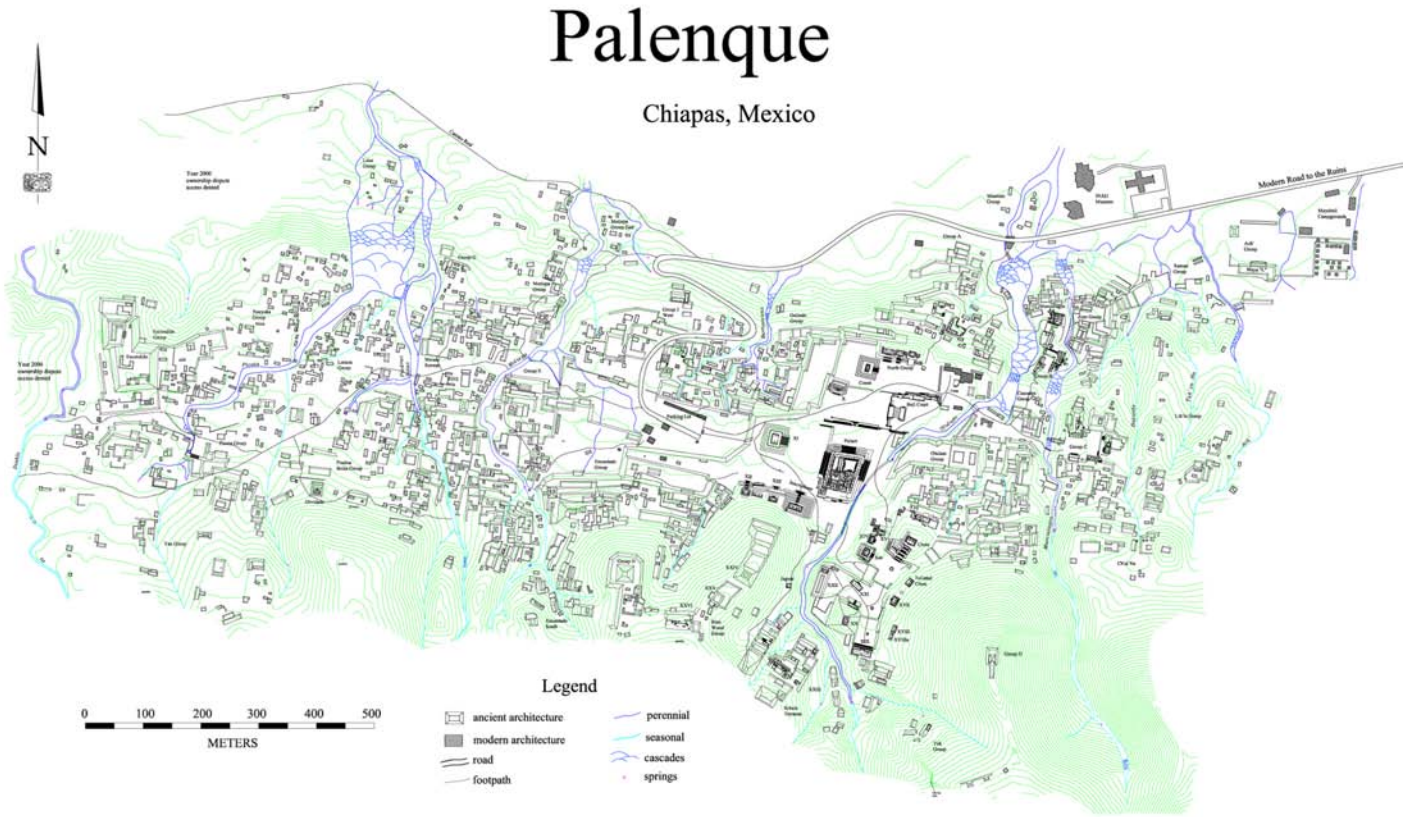
EDWIN L. BARNHART

A Paper Presented at the Society for American Archaeology 67th Annual Meeting
Denver, Colorado March 20-24, 2002

Introduction

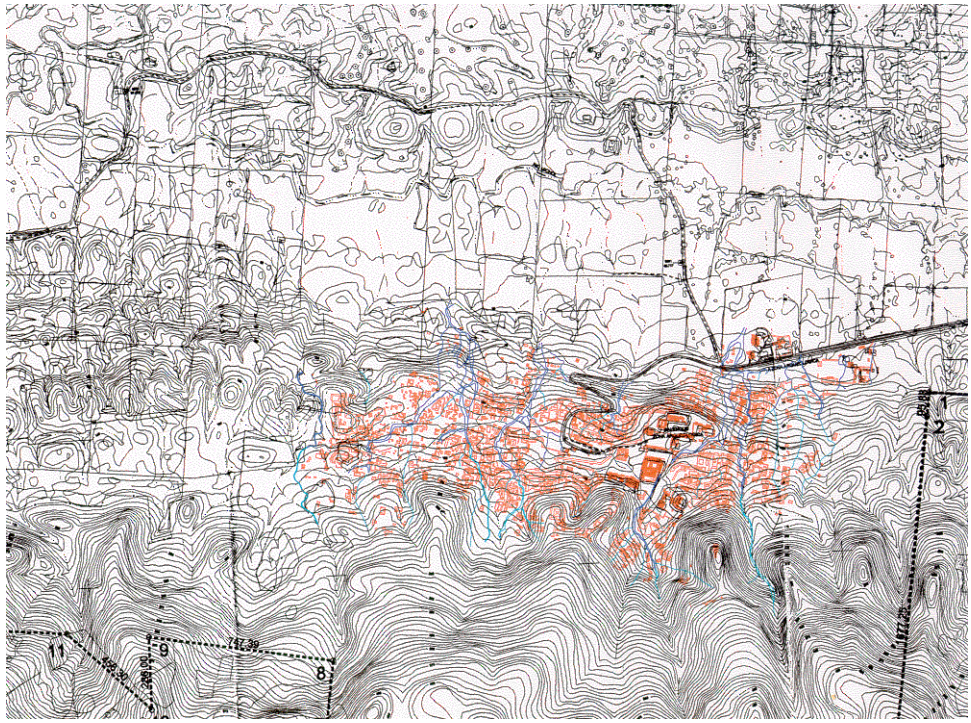
Urbanism in Mesoamerica is a much-debated topic. In their 1989 paper "The Mesoamerican Urban Tradition", Sanders and Webster drew distinctions between Maya and Central Mexican cities, identifying the former as "regal-ritual" cities and the later as "administrative" cities (classification system after Fox 1977). In a rebuttal paper, Chase, Chase and Haviland (1990) argued that Sanders and Webster had underestimated the urban qualities of Classic Maya cities. Just last month David Webster sent me a new paper that continues the debate. In this paper, Sanders and Webster take their distinctions a step further, ultimately suggesting that the central Mexican cities are so far advanced beyond their Maya counterparts that they "should probably never have applied the word city even in a qualified sense" to the centers of the ancient Maya (Webster and Sanders 2001). On the one hand, I concede their point. The central Mexican cities were much more urbanized than those built by the Maya. On the other hand, I take exception to their assertion that the centers of Classic Maya civilization should not be called cities. Just because they did not reach the same degree of urbanization as Central Mexico is not grounds for removing them from the category of city. Urbanism, by definition, is the way of life within a city. Based on the core qualities commonly cited as indicative of urbanism, the recently completed Palenque Mapping Project map provides new information supporting Palenque's identity as a city.

This paper will discuss Palenque's urban qualities, not in comparison to Mesoamerica as a whole but rather specifically within the context of Classic Maya culture. Some of the more common characteristics used to define urbanism



Map 1. The Palenque Mapping Project map (Edwin Barnhart 2001).
A high resolution version of this map suitable for printing is available at www.mesoweb.com/palenque/resources/maps/print.html.

will be reviewed for their presence or absence at Palenque. That data in turn will be compared to what we know of other Classic Maya cities.



Map 2. Area topography overlaid by the PMP map.

Settlement Density

The Palenque Mapping Project (PMP) recorded 1481 structures and 16 linear kilometers of terracing in a 2.2 sq. km area (Map 1 total map). The area covered by the map should be considered Palenque's "core" settlement, not the core and periphery combined for the site's total settlement area. Even more so than Tikal's core bounded by *bajos* and earthworks (Haviland 1970) or Copan's alluvial valley floor (Willey, Leventhal and Fash 1978), Palenque's plateau location provides a clear boundary for its core area. However, unlike Tikal and Copan, Palenque's immediate periphery has an extremely low settlement density, almost negligible compared to the city's core.

The surrounding mountainsides were apparently too steep for building and the plains to the north were seasonally inundated (Map 2). Palenque is isolated by geographic circumscription. There is simply a lack of habitable land around Palenque's center. Blom and La Farge (1926-27) estimated Palenque's settlement to extend 16 square kilometers around its center. While it is true that ruined structures are found that far outside the center, they are so infrequent that it would be misleading to call them peripheral settlement. My research indicates that Palenque is at most 3 sq km of core surrounded by small pockets of peripheral settlement.

Site	Core Area (km^2)	Structures / km^2
Copan	0.6	1449
Palenque	2.2	673
Dzibilchaltun	19.0	442
Caracol	2.2	300
Siebal	1.6	275
Tikal	9.0	235
Becan	3.0	222
Sayil	2.4	220
Quirigua	3.0	128
Belize Valley	5.0	118
Uaxactun	2.0	112
Nohmul	4.0	58

(Adapted from Sharer 1994 and Rice and Culbert 1990).

Table 1. Core area urban settlement densities at selected Classic Maya sites.

All excavation evidence to date suggests that Palenque, similar to many Classic sites, reached its population peak in the Late Classic. For the purposes of this discussion, we will assume that the majority of the city's structures were occupied during that time period. Table 1 compares an estimated Palenque Late Classic settlement density peak to data reported from contemporary cities. The results indicate Palenque was second only to Copan in the degree to which its community was nucleated.

Population Size

Table 2 shows Palenque's population density is high, but its lack of peripheral settlement makes its overall population size small compared to contemporary Classic Period cities. Current evidence of core settlement at Palenque supports no more than 6220 people at its peak population. Though continued survey of the city's scant periphery will doubtless increase that number, it will never rise to the

levels known to have lived within sites like Tikal, Caracol and Copan.

Site	Core Area (km^2)	Peak Population	Population/km^2
Copan	0.6	5797 – 9464	9662 – 15,773
Sayil	3.4	8148 – 9900	2396 – 2912
Palenque	2.2	4147 – 6220	1885 – 2827
Komchen	2.0	2500 – 3000	1250 – 1500
Siebal	1.6	1644	1028
Santa Rita	5.0	4958 – 8722	992 – 1744
Tikal	9.0	8300	922
Tayasal	8.0	6861–10,400	858 – 1300
Caracol	2.2	1200 – 1600	545 – 727

(Adapted from Sharer 1994 and Rice and Culbert 1990).

Table 2. Comparison of population estimates in the Maya region

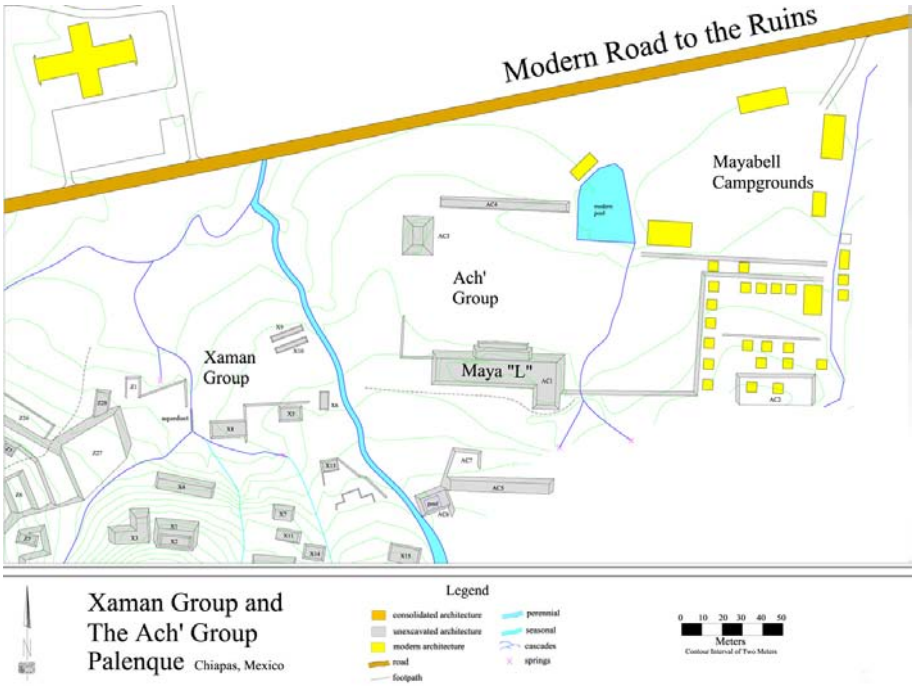
Social Diversity

Social diversity is a key component of the urban setting but can be difficult to detect in an abandoned and ruined city. Archaeologists typically look for differences in housing types and burial goods and evidence of occupational specialization through presence of craft workshops. In Palenque, the great variation in building sizes and patio arrangements is evidence in support of social diversity. Palenque's many burials excavated by Blom in the 1920's showed great diversity in accompanying goods (Blom and La Farge 1926-27). As for craft workshops, however, only two possible areas have been thus far discovered; an incensario workshop area found by Rands (1974) in the 1970's approximately one kilometer east of the Palace and a possible masonry workshop found in Group H during the 1998 season of the PMP. Though this is indeed little evidence of craft production, bear in mind that the absence of craft workshops in Maya sites is common. At Tikal only two ceramic workshops (Chase, Chase and Haviland 1990) have been found. At Sayil, only one ceramic workshop was found (Symth and Dore 1994). The new paper by Webster and Sanders (2001) cites Copan specifically as an example of a site that has been intensively surveyed and yet produced very little workshop evidence.

Roads

Not a single road or causeway was found during the course of the PMP survey. The two bridges crossing the Otulum and the Murcielagos seem likely to have been linked by a causeway but that area is now covered by a prepared tourist trail.

Two potential roads have been located outside of Palenque's core. The first, identified but not investigated (Liendo 1999), runs roughly east-west along a series of low hills in the plains below the city. The second is located roughly three kilometers east of the city. Unlike the long straight roads and causeways of Yucatan and the Peten, these roads, if they are indeed roads, curve frequently and cannot be easily tracked through destroyed sections. Neither of these hypothesized roads have been tested archaeologically or shown to lead into Palenque's urban core. In sum, while intra-site transportation undoubtedly occurred at Palenque, no archaeological evidence has been found attesting to it.



Map 3. The Ach' Group and connecting terracing.

Subsistence

A community with a significant portion of its population separated from farming activities needs the support of an intensive agricultural system. Rodrigo Liendo (1999) has identified

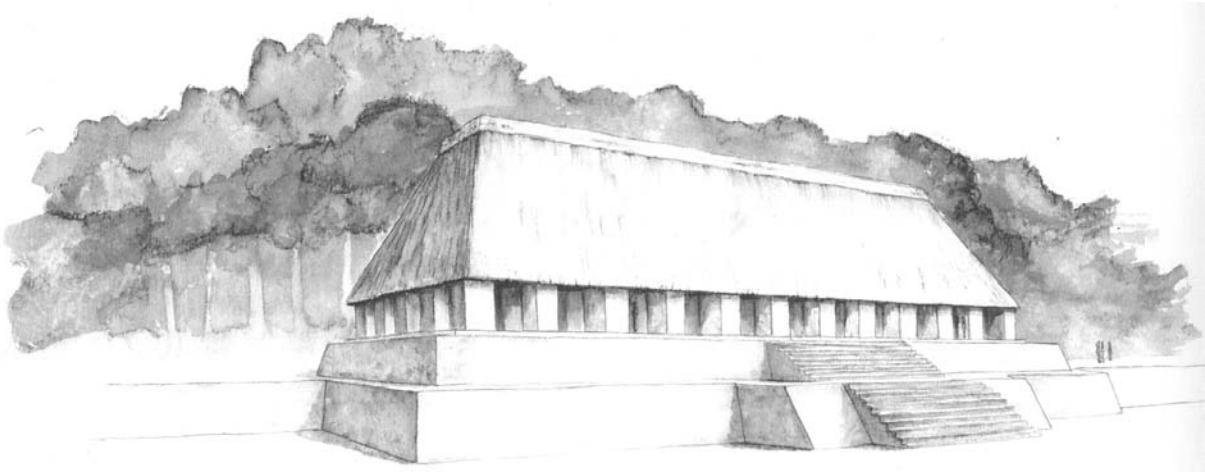
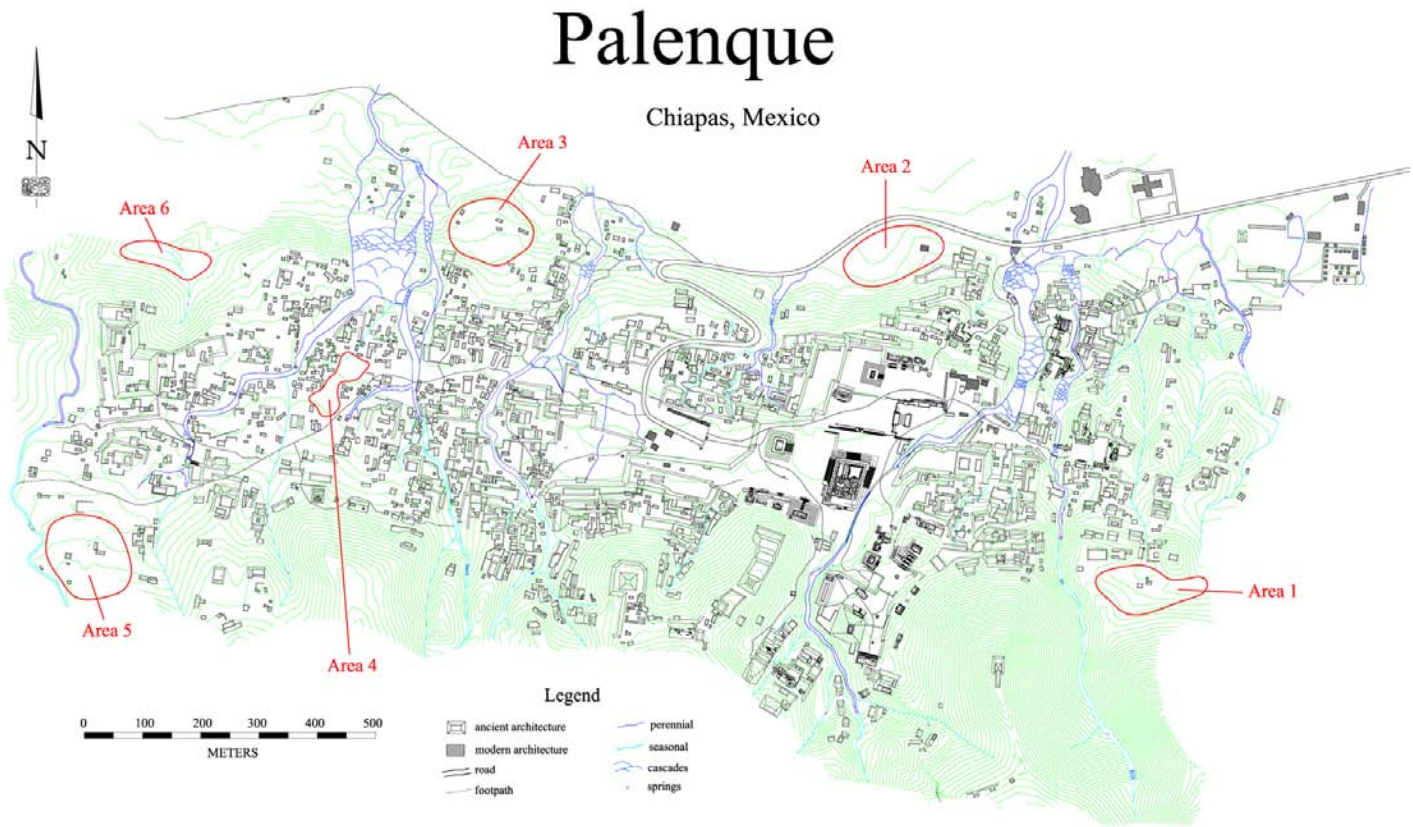


Figure 1. Reconstruction of the Maya "L" (drawn by Heather Hurst 2000).

irrigation canals and agricultural terracing in the plains directly below the city's plateau. Some of those terraces, the ones within and to the east of Mayabell Campground, were mapped during the PMP survey (Map 3). The terraces are wide, gently sloped and do not have structures built upon them. They also connect to the only off-plateau public plaza at Palenque, the Ach' Group. The Maya "L", the dominant structure of that 80x80 meter plaza, has a distinctly public architectural form.

Figure 1 is Heather Hurst's reconstruction drawing of the Maya "L". Its 30-meter wide staircase leads six meters up to a 50-meter long, L-shaped superstructure. Its front face had fourteen entry points into the structure. Fifty



Map 4. Potential tree grove locations.

column stubs are still visible on the superstructure surface. Its direct association with agricultural terracing and irrigation canals makes it logical to assume it too is involved in subsistence activities, perhaps as a farmers market, co-op or surplus redistribution center.

There is growing evidence of potential tree groves within Palenque's core settlement. In modern and historic times, Tabasco and Northern Chiapas have been centers for the arboriculture industry. The region is known for its cacao in particular. At Tikal, Haviland (1970) proposed that its inhabitants' diets were supplemented by breadfruit trees grown within and around patio groups, not unlike the in-fields described at Sayil (Symth and Dore 1994). It is proposed here that a similar subsistence strategy was employed at Palenque. The Map 4 demonstrates six areas suspiciously free of ancient structures.

These same areas have sporadic tree groves within their boundaries. This is mentioned not to suggest that the same groves have been there since antiquity but rather to note that the area can support groves.

Palenque's ancient name was *Lakam Ha'*, translating "Big Water". The glyph translated as *Lakam*, however, is actually an iconographic representation of a tree (Figure 2). Its translation is based on phonetic substitutions found at other sites. If Palenque, as hypothesized here, was using fruiting trees for subsistence and trade, then it may give rise to a rethinking of why the hieroglyph *Lakam*, meaning "big" is iconographically represented as a bent over tree.

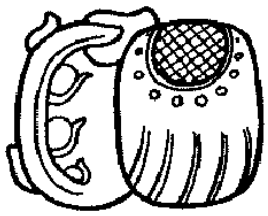


Figure 2. Palenque's toponym for its central precinct.

Wrapping around Pakal's sarcophagus are relief carvings representing a sequence of royal ancestors that had come before him (Figure 3). Each ancestor is depicted emerging from a fruiting tree, trees with leaves very much like the *Lakam* of Palenque's toponym. As noted by Merle Greene Robertson (1983) and McAnany (1995), each tree has a different kind of fruit. In McAnany's interpretation the trees symbolize the longevity of the royal lineage. It is suggested here that the trees, while definitely symbolizing the lineage, were also emphasizing one of their most valuable resources, fruiting tree groves.

Public Works

Terracing encountered outside of Maya city centers is typically determined to be agricultural. At Palenque, terracing appears instead to have been employed to stabilize hillside residential sectors. Groups both east and west of Palenque's center contain residential terracing. Most groups contain multiple terraces running over 100 meters in length. In total, over 16 linear kilometers of terraces have now been documented at Palenque. The important point to note here is that these hundreds of terraces were neither ritual nor agricultural in function. They were put in place to allow residential settlement of Palenque's hillsides and to protect structures on the plateau from soil

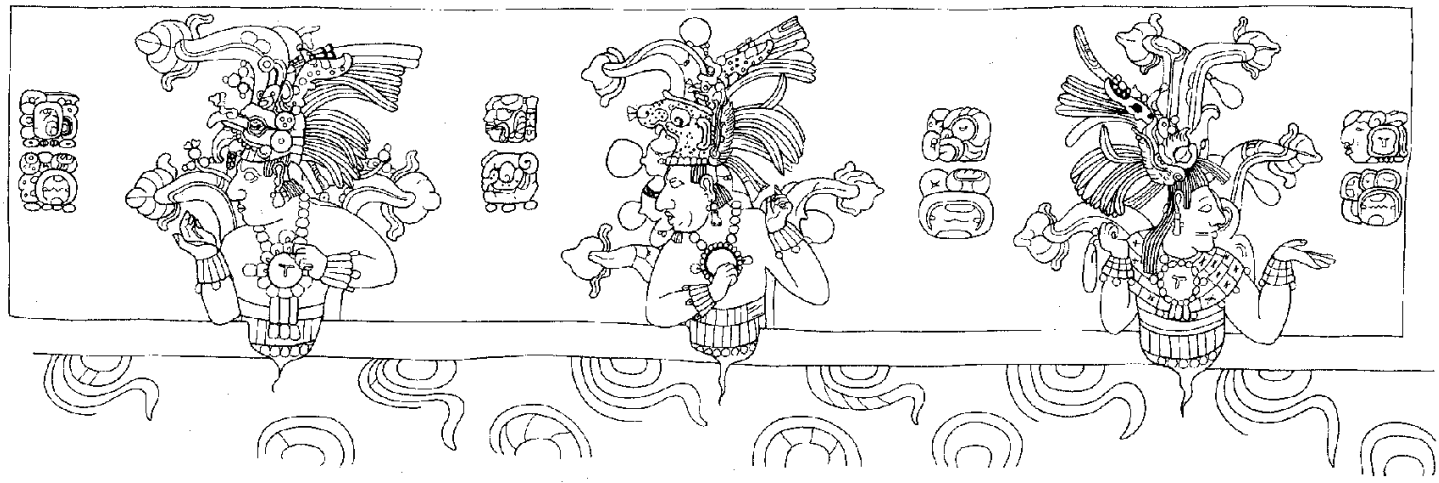
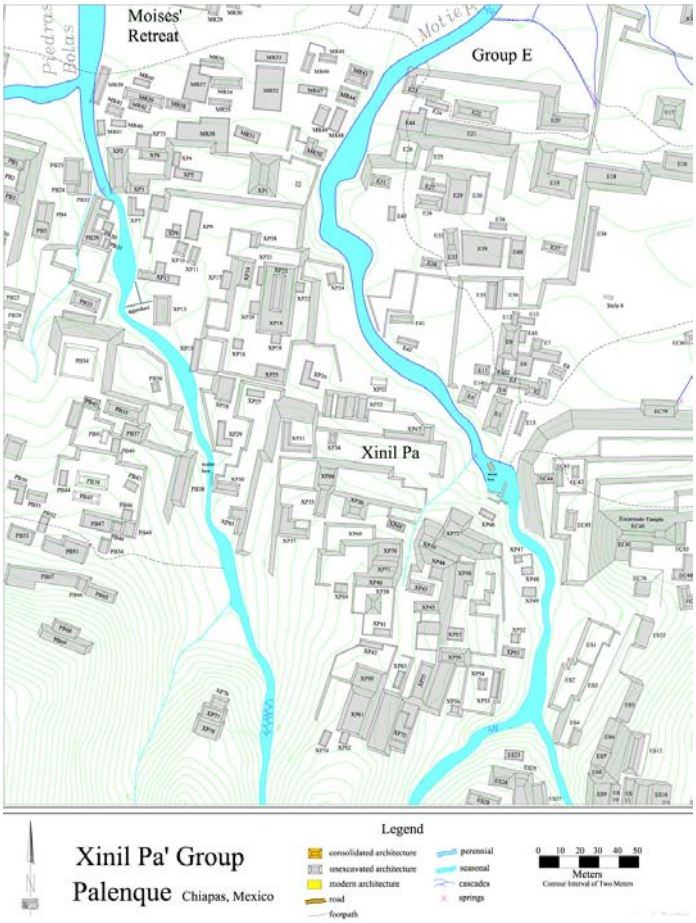


Figure 3. The west side of Pakal's sarcophagus (drawing by Merle Greene Robertson).



Map 5. Xin Pa' Group.

erosion. Major city labor and material resources were spent to increase habitable land so that a sizable, non-elite population could live close by the center.

The Xinil Pa' Group alone contains over a kilometer of interconnected terracing (Map 5). The scale of these terraces clearly required the supervision of skilled engineers and an organized labor force of a size beyond extended family numbers. The sophistication of their erosion-control building techniques is testified to by the fact that the terraces have remained in place against over a millennium of rainy seasons (Figure 4).

These terraces had to withstand the forces of intense rainy season water flow down the hillsides and direct it away from the habitation. Another aspect of Palenque I would term "public works" is the city's intensive water management system, found not only in the center but in the neighborhoods as well.

Conclusion

This paper has attempted to be objective, illuminating points for and against Palenque's identification as an urban center. In terms of settlement density, or nucleation, Palenque is second only to Copan. Current estimates of population size, however, are relatively small. The intensive agriculture systems found beneath the city support the belief that Palenque's core population was separated from farming, but evidence of social diversity within the core is still lacking. In this author's opinion, it is Palenque's "public works" that hold the city's greatest evidence of urbanism. In the many terraces and canals, we see major city resources expended not on the glorification of the royal family and not exclusively in the city's central precinct. These major constructions outside the central precinct seem to have focused on opening and securing habitable land within the city, denoting a civic-mindedness rarely evidenced among the Classic Period Maya.

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Figure 4. Year 2000 photo of an intact terrace segment in the Encantado Group.

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