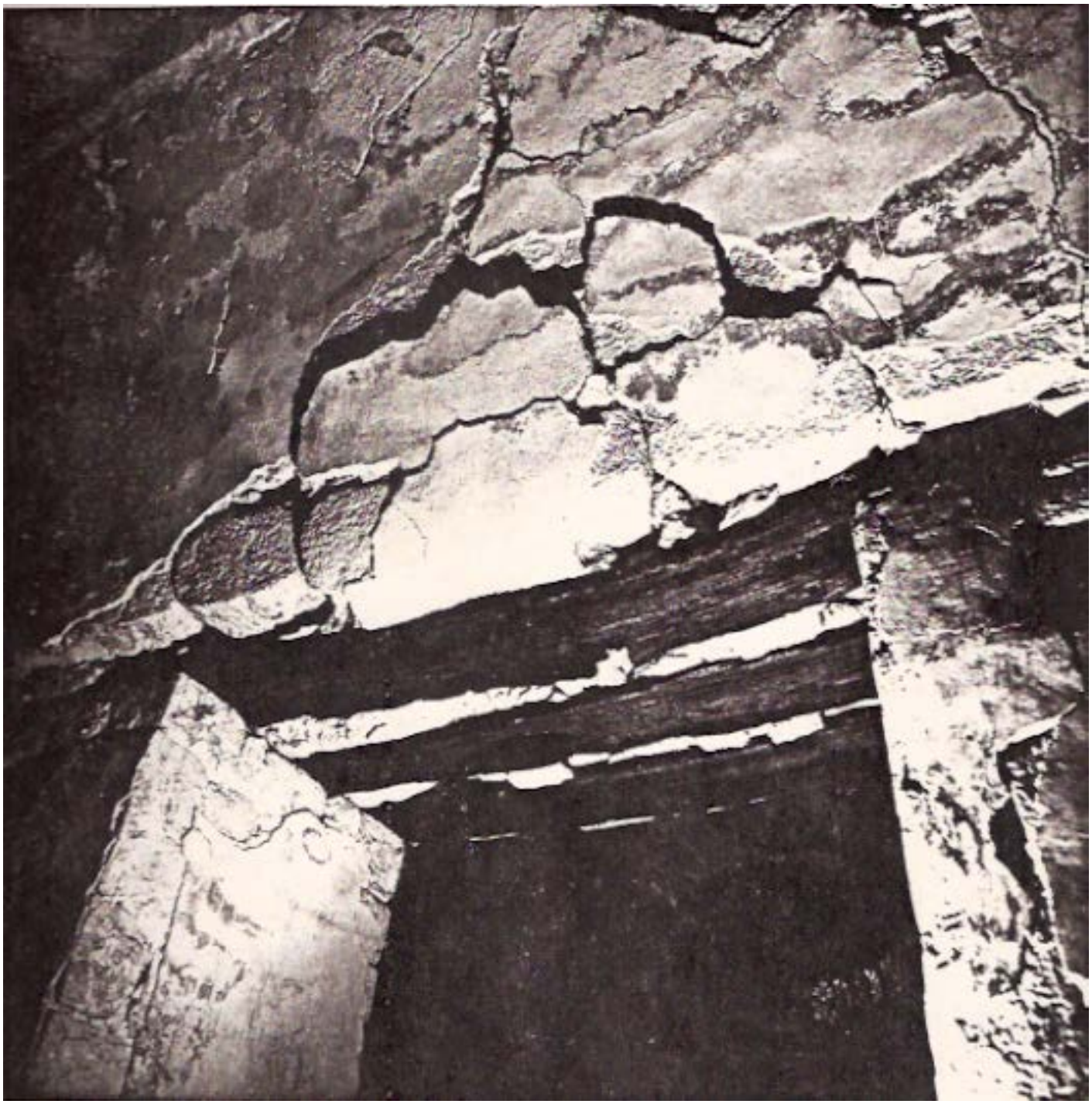
# WOOD
# THAT HAS LASTED ONE THOUSAND YEARS:



## Lintels and Vault Beams
## in Maya Temples and Palaces,
the Example of the Main Palace, Santa Rosa Xtampak, Campeche

# WOOD THAT HAS LASTED ONE THOUSAND YEARS:

Lintels and Vault Beams in Maya Temples and Palaces

June 1989

Nicholas M. Hellmuth

Curatorial Affiliate

Peabody Museum of Natural History, Yale University

This report is a limited edition of 200 copies. Of these the first 100 copies are hand numbered for benefactors whose donations have made this field research possible. The second 100 copies are for scholars, students, and libraries.

This is Number 21 out of the Limited Edition of 100 copies for benefactors.

Your donation is sincerely appreciated and is making the field work at Santa Rosa Xtampak possible.

It was not possible to have the author autograph this copy since he is several thousand miles away in Campeche.

# INTRODUCTION

This paper forms a "Volume III" of a series of four reports on mapping and photography initiated at Santa Rosa Xtampak by the Universidad Autonoma del Sudeste and the Foundation for Latin American Anthropological Research.

"Vol. I" is First Season Photography and Analysis of Standing Architecture at Santa Rosa Xtampak, about 146 pages and over 20 full page photographs.

"Vol. II" is An Introduction to Chenes, Puuc and Rio Bec Palaces: the Example of Three Palaces at Santa Rosa Xtampak, Campeche, Mexico 23 photographs and 123 pages.

"Vol. III" is the present report on wood.

"Vol. IV" is Advances in Knowledge of the Monumental Architecture of Santa Rosa Xtampak based on Photography and Mapping of June-July 1989, 40 photographs (mostly full page size and over 200 pages of informative description of Maya palace design.

A fifth report is finished but not yet typeset, by Eldon Leiter, on the number, placement, and condition of the wooden lintels of the Main Palace. Leiter is a staff member of the project and has participated in both field sessions so far, April and June-July. The other four reports are typeset, printed, and now available.

Well over one millennium ago Maya architects and engineers utilized wooden beams and lintels in their monumental architecture. Despite termites and jungle rot, original 7th-9th century Maya wood is still intact in palaces and temples throughout Mexico and Guatemala. What tree produces lumber that lasts over a thousand years, indeed a millennium plus several centuries?

Actually several trees in the forests of Campeche, Quintana Roo, and Peten produce wood which seemingly lasts forever. The wooden lintels of the great temples of Tikal, Peten, Guatemala are still in place. And one magnificent palace at the little known Campeche Maya ruins of Santa Rosa Xtampak has more than 20 planks still holding up the walls over the doorways. This palace has more 1000-year old Maya wood than any other single Maya building yet discovered.

Although wood in our North American buildings may need replacement after only a few decades and as many historical buildings throughout the United States have wood so rotted it has to be torn out and totally replaced, in fact there are scores of 8th century Maya buildings with wooden beams still intact despite monsoon rain year after year. An Early Classic palace at the remote Maya city-state of Calakmul still has wooden beams over the doorways--and this building is several centuries earlier than the other aforementioned structures which are already well over one thousand years old.

HOW MANY SPECIES OF TROPICAL WOOD HAVE THE "ETERNAL" POTENTIAL?

90% of the surviving beams at Maya ruins in Campeche (Mexico) and adjacent Peten (Guatemala) are from chico zapote, Archras zapota. The remaining 10% are palo de Campeche, tinto, Haemotoxylon campechianum. But in Yucatan and

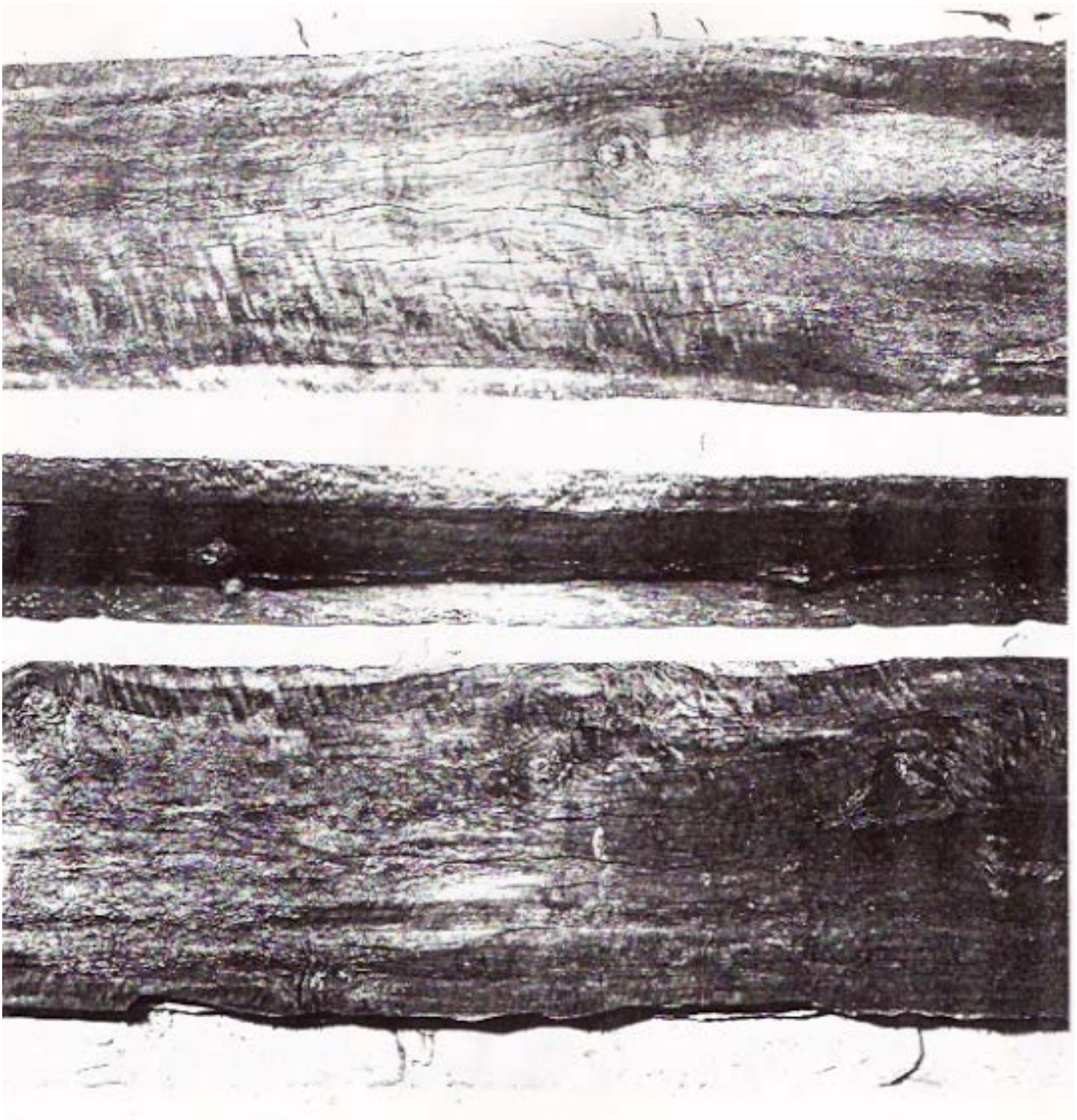


Fig. 1

Fig. 2

Quintana Roo rarer species have also been listed, such as chate Caesalpina platloba. Three beams of chate wood have also been tentatively identified for Structure 1A1 at Kabah, Yucatan (Pollock 1980: 142). Chate has also been identified for a Post Classic building on top of Structure 1 at Nohoch Mul (Thompson, Pollock, and Charlot 1932:85), an immense pyramid-temple adjacent to the Maya city of Coba, a half hour drive inland from the popular tourist destination of Tulum, the picturesque seaside Maya ruin. At Tulum itself Cirocote or madre de cacao was employed by the Maya (Lothrop 1924:27).

The ancient Maya may well have used even other hardwoods that have not survived quite this many centuries, and other woods still may be preserved but have either not been properly identified or mis-identified as chico zapote because that is what we expect. Despite the amazing durability of woods in Maya buildings not a single article has ever been written on the overall Maya utilization of lumber. Since no one has done any research on the use of wood in Maya masonry architecture there may well be references in the technical literature of at least one other species which are not known to us. Actually, I always presumed that zapote and logwood were the only woods still preserved until I began research for a German-Spanish-English lexicon of Maya architectural terms, co-authored with archaeological translator Susanna Reisinger.

One problem with the "identification" of the wood is that no botanist has been involved in most designations. Samuel Lothrop, an archaeologist who wrote the Carnegie Institution of Washington monograph on early exploration at Tulum is the person who reports the identification of the Tulum wood as Cirocote.

But cirocote, madre de cacao, or chate are all names given by local workers. Although some local workers usually know the woods better than those who have seen the trees only in a textbook unfortunately Spanish nomenclature is so informal that I have learned from experience in Latin America always to double check local workers' plant names. It is different with Mexican botanists; they know the material perfectly, but none have analyzed wood in Maya temples. The best we can do for now is to take the tree names provided by the native workers and turn to the most authoritative book on Mexican plant names Catalogo de nombres vulgares y cientificos de plantas mexicanas by eminent botanist Maximino Martinez. He gives six different species which are named in Spanish "madre cacao" or "madre de cacao." Since the only one of the six which is listed for Quintana Roo is Gliricidia sepium, that is most likely the wood used in Maya cities there--but this is not a particularly scientific way to identify thousand year old remains. The word cirocote is not even listed by Martinez nor in the Imagenes de la flora quintanarroense. Tulum is in the State of Quintana Roo.

All too often the workers are just being polite and giving any name they think of rather than to be unhelpful to the visiting gringo scientist by not providing a needed name. Karl Herbert Mayer, an Austrian Mayanist who has been on twelve research trips to Mesoamerica, agrees that information provided by local workers is always well intentioned but by no means well grounded. Too often the "native" workers grew up far away in a totally different ecological zone and thus have no idea of the names for local plants or animals.

This means that the lintels of Tulum (and presumably other East Coast style buildings) as well as that of Coba need to be analyzed by a competent botanist, or

possibly even an experienced lumberman. After all the wood no longer exhibits its flowering parts, not even its leaves. Hence identification via the normal textbook botanical analysis is simply not possible. Considering how important the lumbering industry is to Mexico, indeed to the voracious consuming nations as well, it would be a gesture of public relations to undertake a "Maya Lumber and Lintel Project."

The beam identification other than zapote which is most likely to have been studied carefully before publication is that for Dzibilchaltun's Temple of the Seven Dolls. This enigmatic temple was erected around A.D. 500 according to radiocarbon dating of the wooden lintels or about A.D. 700 according to one stylistic estimate. Excavator E. Wyllys Andrews, IV states the beams are of the subinche tree (Platymiscium yucatanum) (Andrews and Andrews 1980:97, Fig. 100). His photographs, published in the Middle American Research Institute monograph on Dzibilchaltun, are the best views yet available of any Maya lintels, though he had the same lighting problem as I with the darkness of the wood against the whiteness of the plaster. That was compounded by an off-white paper in the book that robbed the photo of what detail in the shadow that was left.

But the north doorway lintels were fully exposed during excavation in order to reinforce the doorway area with cleverly concealed reinforced concrete. The clearing beforehand allowed the lintels to be photographed from above; that meant the beams were illuminated with sunlight and the view was from on top, with no white plaster in the way.

Although labeled as "beams" the Dzibilchaltun wood might equally accurately be considered as poles. Each beam appears to be practically the entire diameter of

the subinche tree. Yet Andrews' field notes state that the lintels were hewn from the heartwood. Whatever the relationship between the beam shape and that of the original subinche tree, the beams are narrow, decidedly pole shaped and thus totally different than those of zapote in Chenes area ruins which are more plank-like or Peten style buildings where the wood is square or rectangular, typical beam shape.

LOGWOOD

Of all the wood identification, the one which is the most certain is that for tinto. For logwood even a tourist can learn to recognize how to identify the characteristic grooved, irregularly fluted outline of a logwood tree--you can see millions of such trees today. Immense stands are along the trail to El Mirador, in the area between Lake Yaxha and Lake Sacnab, indeed in any of the bajos (seasonal swamps) of Peten, Campeche, or Quintana Roo. A good place to photograph logwood in a typical watery environment is along the Arroyo Petex Batun en route to the sites of Aguateca, or indeed en route to Dos Pilas.

Logwood was the main 17th-19th century source for red dye before modern chemical dyes replaced it. Millions of tons of logwood was shipped from Belize to England during the Industrial Revolution when cotton mills spun out miles and miles of colored cloth to trade throughout the British Empire. From this use comes the native Spanish word tinto, red (as in vino tinto, red wine), dark red, dyed. The synonym, palo de Campeche, documents the commonness of this tree in Campeche's seasonal swamps in the southern part of the state.

CHICO ZAPOTE

Zapote (or sapote) is the Americanization of the local Spanish name, “small zapote” to distinguish this tree from the “zapote mamey” or forty-four other trees named zapote in Mexico. And that does not count the thirty-two trees named “little zapote” (zapotillo). The chico zapote is best known as the source for chicle, the sap from which chewing gum used to be made. Nowadays, as with everything else, modern chewing gum is mostly artificial. The chicle sap is collected by locals known as “chicleros,” who in the 1920’s-1950’s were widely considered a totally lawless group given to drunken revelry when returning to collect their paycheck. Chicleros were blamed for years as being the looters of Maya sites, though in many cases it may have been workers of archaeological projects who had learned where the burials were--and learned how much archaeologists valued tomb goodies. Today tourists can see the sleepy remains of formerly prosperous chicle towns at Uaxactun, Sayaxche, and Carmelita. The chicleros camps are further into the jungle, reachable only by trails.

Since chicle is bled during the rainy season I have never had the opportunity to see a chicle camp in full operation but it must be a vision of hell, a rather super saturated hell, since it is the height of the rainy season when they work. Their abandoned chicle camps can be seen by any tour group who make the educational forest trek to Nakum or to El Mirador. The workers spend all day climbing trees in order to hack with their machetes a channel for the sap to run. The sap is collected in buckets at the base, much like maple sap. The sap is boiled, formed into blocks, and hauled out by mules.

MAHOGANY

Once or twice while photographing inside temples or palaces I have overheard tour leaders enthrall their groups with descriptions of the mahogany that was supposedly employed in lintels. Since mahogany is the best known wood from the tropics the tourists listen attentively. Unfortunately, like so many other tales pumped into the seemingly perpetually uncritical tour groups, they have been bamboozled again. No mahogany is to be seen in any ancient Maya lintel anywhere in Mesoamerica. And the Maya had hardly any furniture, so we have to paint our view of the wonders of Maya civilization with a guarded minimum of mahogany color. Certainly they would have utilized this beautiful tropical wood--but not for lintels or vault beams.

## MORE WOOD THAN JUST AS LINTELS

Although lintels are the wood that most tourists notice, in fact there is another wood unit that is also present in virtually all Maya palaces, namely the vault beams. Each Maya temple and palace had up to dozens of beams spanning the corbel vault. Sometimes these were every meter or so, often in several rows, one row at the level where the vault “springs” from the wall, then one or two additional rows further up across the vault.

There is an unsettled academic discussion between the majority of archaeologists who estimate such beams were useful during the construction process or helped stabilize the vaults thereafter, as opposed to architect Hasso Hohmann who vehemently disbelieves such contentions--with considerable (and convincing) counter arguments. Hohmann feels certain that the vault beams were solely to hang things, such as the Maya version of hammocks, or food, since rats could not

Fig. 3

reach food if it was hung in baskets from the vault beams. There is a further item which documents Hohmann's suggestion, which I found in the musty government archives which preserve eyewitness Spanish observations on what the furnishings were in typical native Maya huts--before Spanish influence changed everything.

The Spanish observed that the Cholti-Lacandon Maya slept in plank beds, actually hanging platforms of planks. From the Archivo General de Indias, Sevilla, indexed under Guatemala 152, No.3, folio 305 verso is the following:

> ... tiene este pueblo ciento y tres casas las ciento de vivienda y las tres de comunidad .... En las otras dos casas que ambas miran a dicho adoratorio había muchos tablones colgados en los cuales parece que dormian o descansaban los que quardaban el tal adoratorio.
>
> ...this village has one hundred and three houses, one hundred as residences and three communal buildings .... In the other two (of the three communal buildings) which book look out towards the adoratory building, are many suspended planks; it seems that those who guard that adoratory sleep or rest on these.

Another report of the same 1695-96 time period, for the same village of 103 buildings, is as follows:

> En las otras dos casas (of the three-building ceremonial center of the Lacandon town) se hallaron muchas tablas colgadas de las vigas en las cuales dormian los que guardaban aquel adoratorio. Y este genero de tablas colgadas, habia tambien en todas las casas.
>
> In the other two houses (of the three-building ceremonial center of the Lacandon town) there were found many boards suspended from the beams; in these sleep those who guard that adoratory. And this same type of suspended boards, they have also in all the homes.

A different report, probably of Nicolas de Valenzuela, ca. 1696, folio 197v, gives a description of the inside of the basic Maya home:

> Y en cada aposento esta un tapesco asegurados sobre maderos

> fuertes estacados en el suelo, capas por 10 menos para cuatro personas.
>
> And in each hut is a platform secured by means of strong stakes stuck into the ground; these were capable of holding at least four persons.

Thus Valenzuela reports that the domestic beds were supported from robust stakes in the ground (since Maya houses have dirt floors). This contradicts the observation on the cult buildings where it is specifically stated that the planks there were suspended from the ceiling. But the domestic home beds were large enough for four persons, typical in pre-industrial non-Catholic societies. Perhaps the plank beds in the religious buildings did not need to be staked into the ground because the men in the cult houses did not sleep in family units. Thus the cult house bed had to support only a single individual. And, if the cult buildings had other than a dirt floor It would not have been so easy to pound stakes into the ground. Also, staked beds cannot be moved out of the way. Suspended planks can be moved at any time.

The Cholti Lacandon are a Chol-speaking group who are the most probably candidates for being the actual genetic and cultural descendants of the Maya builders of Palenque, Yaxchilan, and Bonampak. Detailed records maintained by the Spanish which I have found during research in the archives of Guatemala City and of Sevilla Spain document clearly that the present day Lacandon, who speak Yucatec Maya, are actually a wholly different group of Maya who moved into this area in the 17th century.

The ultimate proof of which group of Lacandon (Cholti speakers of 1695 or Yucatec speakers of 1800 to the present) are the actual descendants of the builders

of Palenque, Yaxchilan, and Bonampak comes from modern linguistic analysis of on-going decipherment of the 8th century hieroglyphic inscriptions of these sites. The general consensus is that a language of the Chol family was widespread in the ancient Classic Maya heartland. Michael Coe pointed out during a 1989 trip into this region with the author that if epigraphers can document the hieroglyphic texts of Palenque, Yaxchilan, and Bonampak as being predominantly Choloid, than that rules out any possibility--whatsoever--that the ancestors of the present day (Yucatec speaking) Lacandon had anything to do with these sites in Classic Maya times.

The current Lacandon are nonetheless still Maya and still "descendants of the ancient Maya,"--descendants though of Yucatec Maya, not of the Chiapas Maya. Thus advances in epigraphy disprove reams of gaper of romanticized propaganda. Nationalistic and touristic archaeology generally tend to be romanticized towards selling some party line. Nonetheless, the original, actual Lacandon ancestors slept on wooden planks~~suspended from roof beams of their ceremonial buildings, arranged from stakes in their own houses. This is an eyewitness Spanish observation--yet no mention of this has ever been made in a single archaeological reconstruction of the residential potential of Maya buildings. We expect the ancient Maya to have some form of bed, or at least hammocks. An entirely indigenous possibility has been ignored in the ethnocentric projection which typifies popular concepts about the ancient Maya.

On the subject of hammocks I would agree entirely with Hohmann who has reminded Mayanists that a hammock-like item was indeed known by the Maya and is pictured on the Pellicer Vase in the Tabasco State Museum, CICOM,

Villahermosa. Morley's The Ancient Maya maintains (including through recent editions) that the hammock was not known until introduced from the West Indies or somewhere. Hohmann also includes the hammock-like conveyances on the Chama processional vase as well as some Jaina figurine groups as further evidence not to discount the possibility that the Maya could have slept quite com fort ably in "palaces," suspended from posts or beams.

I would add a few points to this dilemma of whether ancient Maya vault beams were used to suspend things or were needed to hold up the vaults. First, there has been no in depth engineering analysis of the varying forms of Classic Maya vaults. In fact the few comments on Maya engineering have been offhand comments or well intended personal beliefs based, though, on observation not practical experience. Thus no engineer or architect has ever attempted to study the process of construction of a Maya vault. That is, no actual test has been made. In this day of computer analysis, wind tunnel studies, it would seem possible to introduce the question to a computer--but this idea has not previously been proposed either. And, the best test would be to build an actual vault, one of each type (of mortar or of actual corbels) and of varying shapes with experiments of different stone sizes. The Maya of over 1000 ancient settlements built such an amazing variety of vaults over 1000 years of building activity that it is rather misleading to make conclusions from anyone vault time. What started out as functional necessity when vaults were not yet fully developed could have been continued as a traditional decoration later. And, it is well known that many aspects of Maya stone buildings are patterned after wooden models (especially Puuc, Chenes, and Rio Bec temples and palaces). The vault beams could have

served as further reminders that these were wooden houses petrified in stone. Since no Maya stone could have spanned the vault distance they had to employ wood was used.

For me to add my two cents worth to the discussion would be to add precisely what is not called for--namely another personal opinion to a matter that should be analyzed from a technical study of facts, just the facts. One such fact is that in the daring attempt at Dzibilchaltun to erect a vault that continued around all four 90 degree corners the ancient Maya engineers there added scores of extra vault beams. Unless this were a meat locker for hanging meat or a hammock display mart there is no likely way that all these beams were necessary to hang anything. If every beam in this Temple of the Seven Dolls hung a hammock there would not be place for people to get into the hammocks. The point is that here, in a situation of structural delicacy, the Maya engineer in fact added extra beams. He did not need to hang extra hammocks on these corners.

The excavator of the Temple of the Seven Dolls, E. Wyllys Andrews, IV, commented on the special efforts the Maya engineers went to in supporting this delicate 90 degree vault turn. The Maya placed “thick beams one above the other across the corners” precisely because they recognized the potential collapse situation. These corner beams demonstrate that at least some vault beams served a structural purpose for the Maya. Any statement that intends to be all-encompassing is not an anthropological likelihood. Each Maya architect was an individual, each division of the “multi-ethnic overall Maya area had different traditions (witness the impact of first Teotihuacan and then Toltec architectural features). In a room with a dozen beams some could indeed have been for

engineering reasons while others were quite well for hanging things.

But this is ultimately a cultural question--not 100% an engineering question. Just as an archaeologist ought really to have an architect present during excavation of a complex Maya building--so also an architect would do well to consult with an anthropologist before dictating a rule based on what the architect perceives as either common sense or structural reality. What is structural necessity or nonsense to a modern architect may not have considered important by the ancient Maya at all. Whether a modern engineer would need such beams in a comparable building is not the question. The Maya did not have seminars in stress; they did not have our perspective of statics. In their own culture they felt they needed extra beams at the cornet, and so they built them. It may be the most common trap of academia today, ethnocentrism, to submit Maya building practices to what we consider "scientific" analysis. The Maya architects had other (cultural) problems to deal with. Thus an anthropological viewpoint may help as much as a cold scientific analysis.

Hohmann's point is well taken, though, in that the Maya would have needed to hang most of their "furniture" since we know from 16th century Spanish observations of Maya villages that the natives had practically no furniture other than stools or plank beds. Traditional archaeologists have been so set against considering Maya palaces as potential residences that this form of suspended platforms has not previously been considered. Arguments up to now have always revolved around whether the Classic Maya had the hammock or not. What has been known since Miguel Covarrubias's publication of the "Pellicer Vase" is that the Maya did indeed have hammock-like constructions. Hohmann is one of the first to

create a restoration view of the missing portions of this beautiful vase to bring home reality. In the case of the Pellicer Vase, though, the hammock is strung from vertical poles not horizontal beams, since the building pictured did not have a corbel vault.

To conclude, vault beams were multi-purpose. Many vault beams were to hang things from. Simultaneously, the beams could have evoked the image of the home, of wood. Native wooden huts served as the model for many aspects of stone buildings. Other vault beams (or indeed the same as used for hanging) may have assisted as scaffolding during construction; they may have been conceived by the Maya as helpful to hold up the vaults thereafter (whether or not a modern engineer would agree does not change the mind of an ancient Maya who never studied western engineering). The same beams could indeed have served as hangers--though thin poles would have been just as useful.

Why have none of the proponents of the non-structural role of vault beams never questioned why the Maya went to the effort to raise up such extremely heavy beams. If all that was to be supported were rat-proof food baskets, a slender pole would have been plenty. But if a plank bed--plus a well fed Maya ruler (and perhaps a few nubile maidens. a:; well)--had to be suspended than the vault beams would indeed need to be strong. Judging from pictures of the average Maya lord they were amply fed. These same lords favored ladies of ample dimensions. We have no idea whether the Maya procreated in their beds (since they could have engaged in such appetite fulfillment equally well on the masonry thrones or wide benches that are also in most Maya buildings) but most humans probably do engage in some intimacy prior to seeking deep sleep, and the bed is

certainly a basic locus Of sexual activity the world over. Engineering analysis of the palaces must take into account the realities of non-western, pre-industrial human occupation of such buildings.

## BANDED VAULT BEAMS

In at least two buildings at Tikal and on rare occasions at other sites the upper row of vault beams are decorated with beveled bands in the middle. This is the same motif as seen on stone colonnettes which decorate Puuc palace facades at Sayil, Labna, Uxmal, and elsewhere in Yucatan. The best place to see the banded beams in Tikal is in the Five Storied Palace, Structure 50-52. Behind it in the corner of a neighboring courtyard is the second building at Tikal with such banded carving.

## WOODEN BEAMS INSTEAD OF CAPSTONES

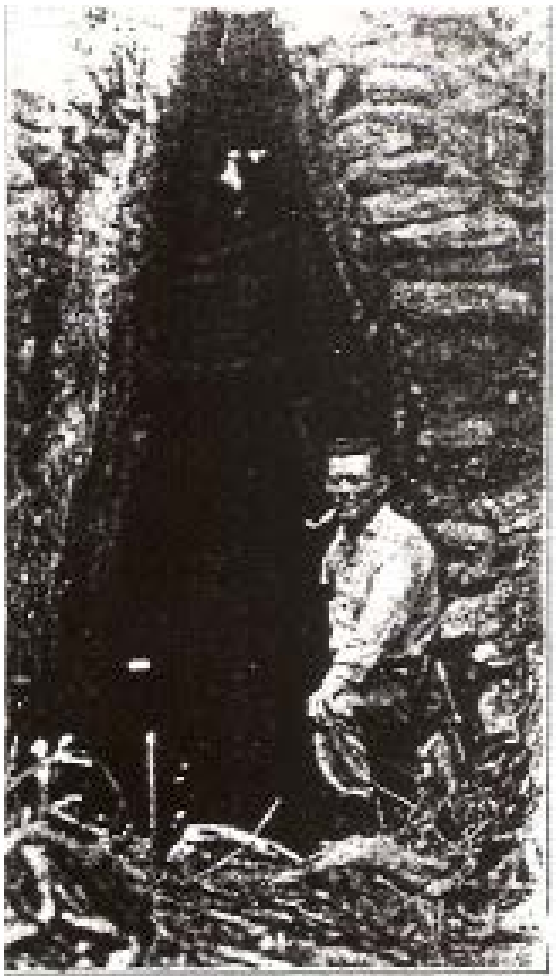
In Maya architecture builders occasionally utilized wooden beams instead of capstones on top of the corbel vaults. One instance is in the roofcomb chambers of Tikal's Temple V. The towering Tikal roofcombs are actually hollow inside, consisting of a series of low stories one on top of another as though it were a small multi-story building. Since the rooms so formed are hollow, that lightens the weight of the overall roof comb, as well as saves having to hoist so many tons of stone so high up.

A second place of such a wooden "ceiling" is in the Tomb of the Jade Jaguar which I excavated at Tikal in 1965. This royal tomb chamber had been constructed in great haste, probably because the body was decomposing in the tropical heat.

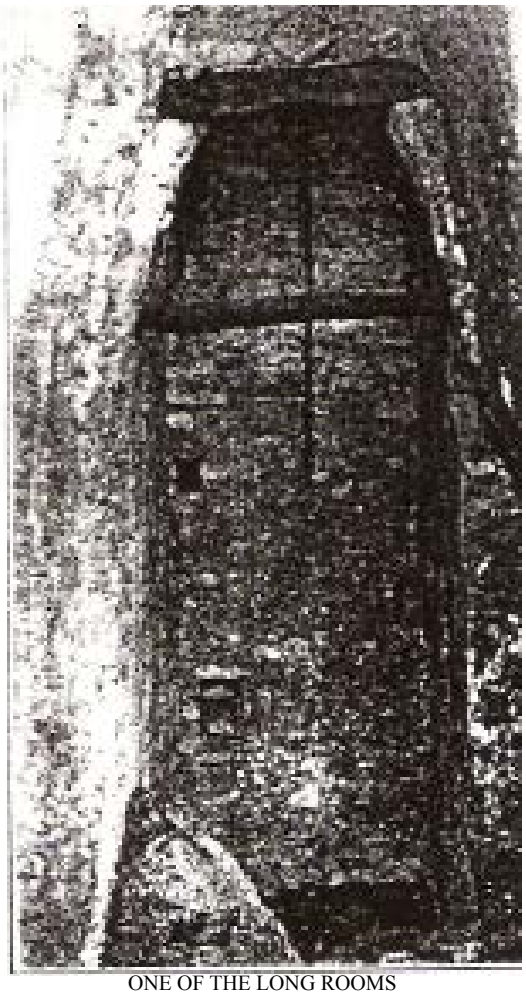
Once the body was inside the crypt's walls, the workers evidently sought to get the vault sealed as quickly as possible. They raised the vault's three courses so hastily that their hand prints can still be seen where they slapped on plaster-like mortar rather than bothering to smooth down an even layer over the entire surface. Then, instead of raising the vault another two or three courses so it could be closed with a narrow capstone about one foot wide, they cheated and laid beams about six feet across over the lower and therefore wider space. They sealed the tomb forever with mud mortar sanctified with offerings of flint and obsidian chips.

Both these instances of wooden pole ceilings were most likely of logwood, though it is now 25 years later and I do not have my memory precisely clear on whether the beam impressions were evenly round (zapote) or more likely for such a situation irregular (definitely logwood). In any case both the roofcomb and the royal burial situation are not typical of temple or palace rooms--but then again no room roofed in such a manner would still be expected to be standing today.

Virtually every "rule" which one presents for Maya architecture is broken by an innovative engineer somewhere. At the little known Classic period Maya site of Tzibanche, Quintana Roo, a room has an intervening wooden ceiling--solid wooden beams next to one another--two meters under the level of the capstone. In effect this portion of the room has two "ceilings" the wooden one, then the normal capstones far above. Considering that the room was twenty feet high overall it is perhaps no wonder that an innovative means was attempted to hold the building together. It worked, as the structure is still standing one thousand years later. In this temple the ceiling is of zapote, not logwood. Thomas Gann provides good photographs but no architectural drawings of the site have ever appeared despite



MUDDY AT ENTRANCE OF NARROW ROOM.



ONE OF THE LONG ROOMS
ONLY 3 FEET WIDE

[*p. 78*

Fig. 4

the later project of Peter Harrison which relocated the ruins from Gann's published comments. These beams were clearly structural, as they formed a complete ceiling, with no widely spaced beams for hanging anything. A vault of normal height would not have needed a solid row of beams, hence the widely spaced ones.

## BEAM AND MORTAR ROOFS

Indeed normal rooms were often built with beam roofs, the typical native Mesoamerican "beam and mortar roof." Such a flat roof was created just as its name suggests, a layer of closely spaced beams topped by native lime mortar. Although our view of Maya architecture is of monumental stone with their hallmark corbel vaults, in fact over 60% of the buildings at a Maya site would have had either beam-and-mortar ceilings or thatched roofs. Corbel vaults were only for the elite, and certainly just for those who could afford the luxury. Corbel vaults must have been prestigious to be the preferred ceiling type, since one had to sacrifice spaciousness.

The advantage of such a roof was that it could span distances considerably more than that of a stone vault. Examples of such stone roofs from the Classic Period (AD. 650-900) would be the largest sweat bath at Piedras Negras. Here the engineers raised each vault soffit (the inclined plane of the Maya vault) 1.3 m high at which ,Point the stone vault stopped. The excavator found evidence of gravel and cement remains of what had to have been a beam-and-mortar roof which covered the remaining 2.35 meter span between the maximum height of both sides of this particular' vault. This Piedras Negras wooden roof was on top of a partial-vault. Normally such a flat roof would be on top of a straight horizontal

wall. An example for the subsequent Post Classic Period (between 1000 and the Spanish conquest) would be Structure 21 at Tulum. All Maya cities of whatever period would have had such flat wooden roofs. Indeed a flat roof is pictured in the Early Classic (ca. AD. 500-600) murals of Uaxactun Structure B-XIII.

## FAILING LINTEL AT NAKUM

The damage caused to the national patrimony of Maya countries such as Mexico and Guatemala from lintels that collapse may be seen in the main pyramid of Nakum. Nakum is a monumental Late Classic (AD. 600-900) Maya site which truly warrants the old fashioned designation of "Ceremonial Center" even when today we realize that there was at least some residential population within the downtown area. Indeed potentially residential structures in the heart of Nakum were erected in excessive size and adjacent to other features which were clearly part of the ceremonial display of the ruling family. Nakum is massive in all respects; every building is of impressive proportions, and its main structure, Temple A is typical of the site.

Temple A is one side of a Solstice-Equinox Observatory Group. Such groups are related to that of Uaxactun Group E where the sun is aligned on a specific stela on calendrically important days of the year. The same type of specialized astronomical-astrological plaza arrangement is found at nearby Yaxha, at Calakmul to the north, and even at far away Santa Rosa Xtampak, the first Chenes site where this Peten type building complex has been noticed. William Folan recognized
the South Plaza of Xtampak as such a complex.

Nakum Temple A is the best preserved building at the entire site. Indeed

Nakum has more still-standing architecture of any Maya city in all Guatemala outside of Tikal. But the fact the building is still standing is entirely luck. The building might best be described as tottering, rather than standing. The entire front facade has already collapsed totally--what the visitor actually sees is the inside room, somewhat like the case of the Temples of the Cross and of the Foliated Cross at Palenque. But the Nakum structure is in Peten style and quite distinctive. Its massive roof comb is divided into three sections, one of the only such roof combs known in all Guatemala. If the zapote lintel were to finally break, the entire vault mass above would come down instantly, followed by the failure of the entire roof above which in turn would bring down the whole roof comb. Temple A is a pack of cards over 50 feet high.

And the lintel is already cracked and sagging. Indeed it is an absolute miracle that the building lasted long enough for IDAEH, finally, after constant petitions from concerned archaeologists, to at last shore up the building, which was done under the direction of architect Oscar Quintana. This long overdue awareness of the urgency of salvage repair is something new for Guatemala where for the previous decades Tikal received 99% of all archaeological and nationalistic attention. Tikal was “Mr Maya” for all Guatemala. Tikal got a paved highway whereas Nakum’s trail was initially chopped, by hand, paid for by private donations from the Foundation for Latin American Anthropological Research. Only in the last year or so has a lumber company put in a jeep trail the last few kilometers to Nakum--but this requires 4-wheel drive even in the dry season. In a country where tourist dollars could pave every road in the land it is absurd not to facilitate access to immense ancient cities such as Nakum. No government agency has

effectively created access to the very Maya cities which have the potential to revitalize Central American's tourist potential. Between Yaxha with its beautiful lakeside setting just 19 km from Nakum and Nakum itself with its lovely jungle situation Guatemala has a remarkable potential--which is going to waste because the highway is not paved towards Yaxha and the turnoff from the main road is totally abandoned and tears the bottom out of any tourist vehicle that attempts to reach the site.

Mexico has learned how much employment and income tourism can provide and has paved highways to virtually all its important ruins. Hundreds of all weather gravel highways reach to other ruins. Calakmul is one of the last great Maya capitals which is impossible to reach without a high axle 4-wheel drive vehicle, and the trail there is so bad I would not even consider taking my own 4-wheel drive truck (since tree branches would scrape off the paint and rocks sticking up in the trail would shear off even a high axle). The way we get our tour groups into Calakmul is in a specially outfitted 4-wheel drive bus raised off the jungle floor on a high axle on truck-sized tires. Dr William Folan could get his workers in to dig at Calakmul one month only with the help of two Mercedes Benz "Unimogs," the highest axle production 4-wheel drive vehicle in the world. Fortunately Santa Rosa Xtampak is easier to reach, is a mere two hours from Uxmal, and can be reached by a normal car or even a tour bus during most of the year except the height of the rainy season. The great treasures of Maya civilization such as Yaxha, Nakum, require an expedition to reach. El Mirador seems to be maintained in deliberate abandonment and dedicated inaccessibility.

Only when the "Maya Route," a proposal of National Geographic Society editor

William Garrett is put into reality will it be possible for people to see and appreciate Maya wood in person. There do exist roads southward from the Escarcega-Chetumal highway--one from Xpuhil through El Placeres, another through Buenfil (en route to Calakmul) that already reach Peten in order to poach Guatemalan mahogany for the Mexican sawmill at Zoh Laguna. And there are already lumber and oil exploration jeep trails from Carmelita most of the way to El Mirador. But people claim that roads will facilitate grave robbing--but to the contrary. Looters evidently do quite well at El Mirador with no roads whatsoever. It is the guards that need the roads--and looters never work at sites that are besieged by tourists. The Ruta Maya road network already exists--it must be cleared of fallen trees, graveled, and open the way for both students, scholars, and aficionados to learn about Maya engineering, the lintels and vault beams. This wood was a vital part of tens of thousands of Maya rooms, so on statistical grounds alone would seem to warrant our attention.

With enough lobbying a road will eventually be graveled into Nakum, and Temple A will eventually work its way into the textbooks of Maya architecture--and it was a zapote wood lintel that kept the building preserved over one thousand years until modern politicians finally recognized the value of such a monumental edifice.

## WHY DO SOME BEAMS ROT AND OTHERS LAST CENTURIES LONGER?

Not only ought scientists to know once and for all how many different species of wood have such remarkably long lasting properties, but also why do some individual beams survive and others rot?

I have always been fascinated by my workers on archaeology projects wanting to cut palm thatch when the moon is in a certain phase. Being a "modern person" I automatically disbelieve what I presume are superstitions. Yet throughout Mesoamerica today the native woodsmen know from experience that palm fronds (generally of the guano palm (Sabal species) last considerably longer when cut during a full moon. Do they also prefer to cut beams during the full moon? Does the sap really rise during this phase of the moon, and is it the extra sap that preserves the fronds? How much difference would it make in a zapote beam as to whether the sap had "risen" or not? And if the moon makes the sap rise to the fronds, what happens to the trunk, since the lintels will come from the lower tree, not the leaves or branches? Perhaps we should consider native "superstitions" as folk wisdom and heed some of this knowledge accordingly.

## LACK OF PREVIOUS ANALYSIS

It is not uncommon to find a detailed Maya archaeological monograph that describes every sherd, every centimeter of the floor stratigraphy, gives excruciating detail of how many millimeters long was each fragment of stone tool--yet not a single measurement of the wooden beams in the same building. Wood, preserved over one thousand years, does not seem to be among the academic favorites. Thus, whereas Dzibilchaltun's Temple of the Dolls had the best preserved original lintels of any Maya building of comparable age in the entire state of Yucatan, not a single measurement of the beams was published in the site monograph. We only know there were six or seven beams to create each doorway lintel, and the door itself was 2.35 meters wide. How deep the lintel butts went past the door jamb is not mentioned; the width and height of the beams is nowhere listed. Fortunately

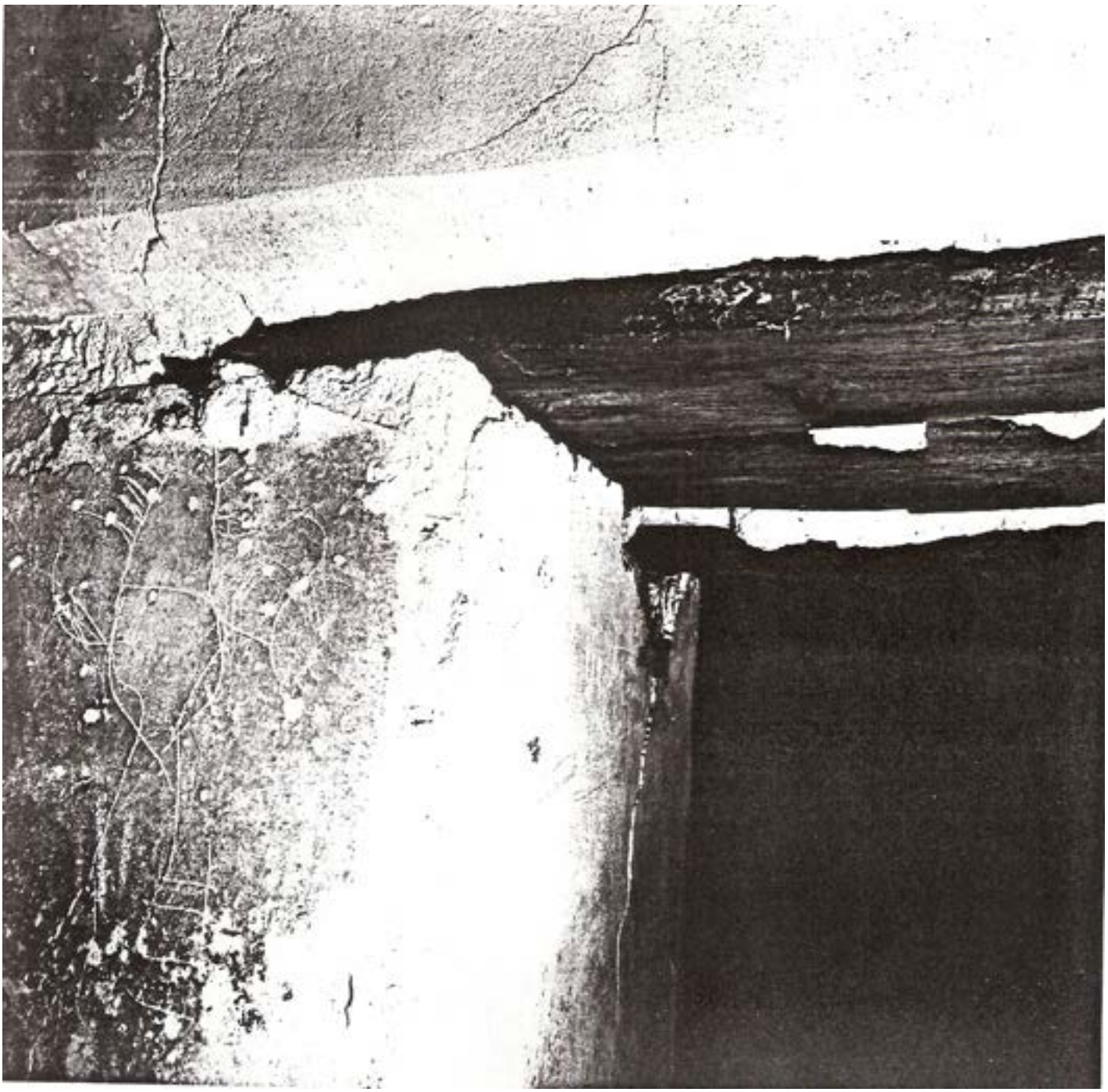


Fig. 5

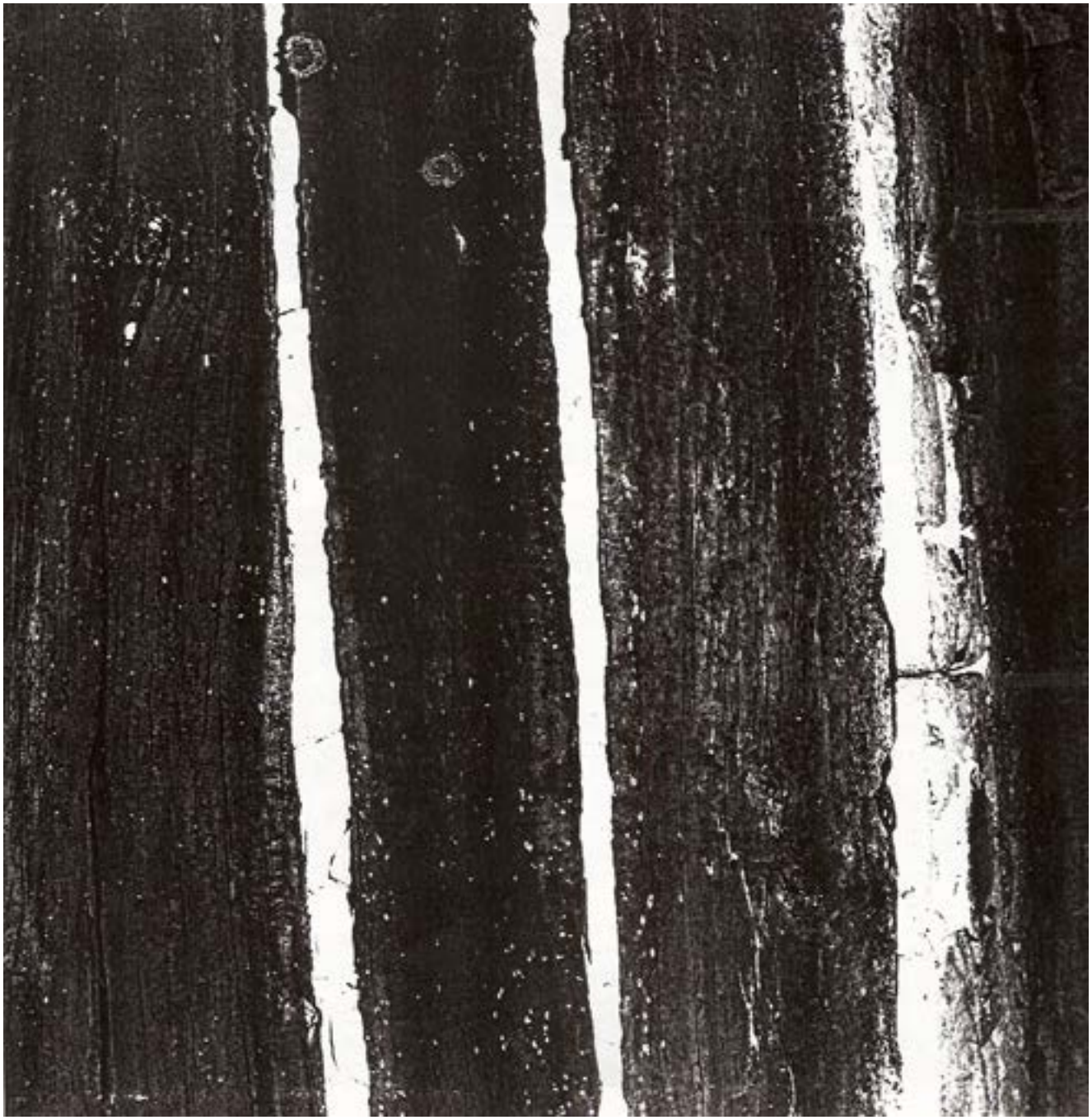


Fig. 6

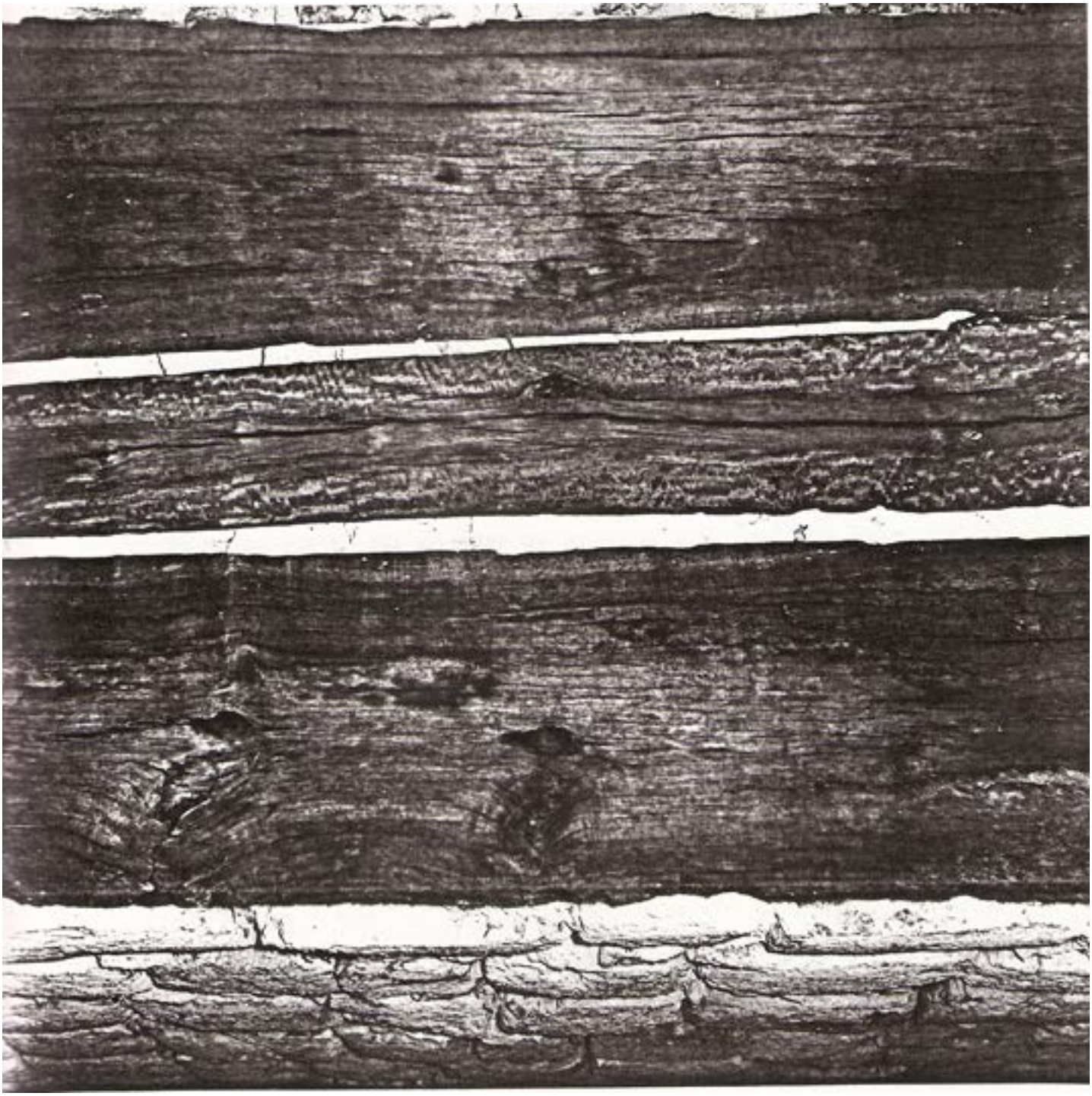


Fig. 7

two better-than-average photographs of the lintels convey the general situation and overall the Middle American Research Institute (M.AR.I.) field reports have at least gotten the basic facts in print, something which is totally lacking for most other excavations in Yucatan, Campeche (outside of the well reported M.AR.I. Becan excavations), or Quintana Roo in the last two decades.

This lack of adequate information from field archaeologists results in part from the academic drive to gather data that is usable to create models of process, of relationships among cultures, or diffusion of one rim sherd type with another a hundred miles away. The main branch of archaeology has settled into a search for artifacts in the field or the arm chair development of hypothetical structural development of ancient societies. That goes hand in hand with a scramble for grants and tenure. All too often the scientific goals have been either too nitpicking, or gone overboard in the opposite direction--increasingly for sheer publicity as an expression of ego or desire for anticipated endowment. If the lintel wood had been a bowl, a tool, a weapon it would be weighed to the gram, measured to the millimeter, drawn in considerable detail, published adequately, and stored in a laboratory. Outside of William Coe's program for Tikal in the 1960's, architecture has never been treated as an artifact. It is seldom that architecture can even be properly handled by a project, due to lack of an architect or art historian. I have seen projects where building remains were simply removed in order to get at sherds. Locally buildings are considered impressive stage sets for sound-and-light shows for tour groups--and cemented accordingly, indeed original lintels are replaced with concrete and rusting reinforcing rods.

The wooden beams of most Maya buildings are ignored when they are still in

place and abandoned in the corner when they are found already fallen on to the floor. At Tikal tourists can still see piles of actual authentic Maya lintels rotting on the floors of the buildings. These beams are absolutely irreplaceable remains of monumental architectural achievements of one of the more impressive builders of the ancient world. The beams need to be stored--and labeled as to their precise original provenance, and made available to scholarship. Hopefully the Xtampak Project can establish international standards in the scientific treatment of lintels in the manner their rarity and importance deserve. Already Eldon Leiter has measured every extant lintel in the palace, more measurements of more lintels than in any other Maya building outside the five great temples of Tikal.

Another aspect of what is much needed in Maya field work is that achieved by Paul Gendrop and his team of at-that-time students in architecture (now professors) Alejandro Villalobos, Juan Antonio Siller, and Victor Rivera. It is a shame that archaeologists do not call upon architects more often; indeed it should be considered an international requirement before savaging monumental Maya architecture that a competent photographer and a competent architect prepare a thorough record. Unfortunately archaeologists react very possessively about "their" sites and defend them like mother animals defending their young. But sites do not belong to archaeologists, they belong to the entire nation of Mexico or Guatemala, and through the national anthropology institutes to science as a whole. Architects have just as much technical training to handle ancient ruins as "archaeologists," and have an advantage in being less involved in "political archaeology," the curse of the Latin American situation. The observations of the UNAM (Mexico) group about special lintel reinforcements is presented later in the following section on Xtampak.

It is nice for once that it was scholars resident in Mexico that made the discovery--and published their findings immediately and in a satisfactorily illustrated manner.

## SUPRA-LINTEL REINFORCEMENTS

Originally noted for the Rio Bec area ruins of Payan and subsequently also at the Chenes-Puuc site of Dzibiltun (Structure 1) and Santa Rosa Xtampak, Gendrop and his colleagues found special wooden reinforcements less than a foot above the lintels. These reinforcement poles extended at least 50 cm beyond the length of the lintels. The purpose of these reinforcements was to bear some of the weight of the wall and vault mass above and to distribute this weight further out past the jambs.

When I was in charge of the excavation of tunnels inside Tikal's Structure 50-73 we found numerous places deep within the fill where wooden poles had once been in place--and here buried inside solid fill it is unlikely that they were for hanging hammocks or rat-proof food baskets. I do not remember ever reading anywhere else about such beam remains inside solid fill, but we have already learned that architectural features tend to be overlooked during excavation.

The supra-lintel reinforcement poles at Xtampak had rotted long ago but the Mexican architects were nonetheless able to document their presence through the molds which the surrounding mortar had made.

## VAUL T BEAMS AT SANTA ROSA XTAMPAK

Architectural historian George Andrews has visited Xtampak several times and

with his wife Geraldine has recorded all the lintels and vault beam holes in those rooms of the palace which are still standing (well over half of the 44 room edifice). William Folan initiated a project at Xtampak in March 1989. He is an archaeologist who has been resident in Mexico the last two decades and is currently director of the Mexican Calakmul Project, recently supported by two grants from the National Geographic Society. Now that the Calakmul Project is nearing the end of its over seven years, the work crews are being transferred to Xtampak. On Folan's reconnaissance study of Xtampak he recognized the danger that the entire palace was in the process of imminent collapse as the lintels were finally giving way. German archaeologist Hanns Prem and Austrian Mayanist Karl Herbert Mayer recorded the cracked and failing wooden lintels and sent out an international appeal a year ago. The Foundation for Latin American Anthropological Research (FLAAR) was the first response to the urgency of the situation. Three considerate individuals donated a total of $12,500 to initiate a feasibility study of how best to conserve the building. Eldon Leiter, who has been studying Maya ruins through his viewfinder for over 15 years, joined the Xtampak, project as photographer and was assigned to measure all the lintels so that new beams could be cut. This involved studying and photographing each doorway. The results of this study are being prepared as a supplement to the "First Annual Report."

Room 23 (based on the Andrews numeration, which he revised from that of Stamps) is one of the few in the entire ancient city which still has two complete cross beams remaining inside the room. These are just at vault spring level, in the end of the room. The other rooms tend just to have lintels remaining. It is as

though the vault beams were of a softer wood. Why would the lintels, which are closer to outside, to rain, and under 1000 years of stress under tons of weight last longer than a beam which only has to hold up its own weight.

## TERMITES AND ZAPOTE

Termites are the main cause of wood loss in Maya buildings. The millions of termite tunnels weaken the lintels to the point where they crack from the enormous weight resting on them over the door. Yet why do termites only nibble lightly on zapote instead of chewing away the entire beam? You can see termite holes in virtually all the lintels, so it is not as though termites do not attack zapote.

When I was younger, still a graduate student, and in charge of the archaeology project at the remote Peten Maya site of Yaxha, I noticed that after the first year that my camp collapsed because of termites. In fact by the third year" there were only stubs and powder left--the hungry insects literally ate the entire building. After six years it was hardly possible even to see where the camp had once been. Yet the pole huts built by the workers were perfectly intact. They were put up at the same time as my camp, designed in the same native fashion--yet the termites gobbled up my houses and did not destroy the worker's camp 100 yards away. So I asked the men why their camp was still standing while mine was reduced to humus. They answered, "quite simple, we built our camp of termite proof wood." More amused than irritated at such a daring (and truthful) answer I asked why they did not build my camp also of the same wood. Answer, "you did not tell us to build the camp of termite proof wood. You just said build so-many buildings, of

such-and-such dimensions. If you had specified termite proof wood we would have used such."

Yes, I did learn from that mistake, though my accountant never fully accepted how I could possibly depreciate a building in one year. He said that was not allowed. I said, just visit Yaxha, the termites took only one year to eat everything, so consider it a new biodegradable building material with a life expectancy of 12 months. The new camp, though, you can depreciate over a normal 10 year period (the accountant at least presumed that jungle rot would get it by then even if termites did not).

If it can be documented that the Xtampak vault beams are also zapote, then what factors are the cause of the vault beams disappearing? How many were still in place when early explorers visited the site? How many were used as convenient firewood by visiting chicleros in early years of this century (there are graffiti signatures on the. walls from the 1920's through 1940's). Local visitors seem to delight in whittling at ancient wood to test how strong it is, as well as to show off their machismo by means of wielding their machetes. Xtampak did not receive government guards until less than 7 years ago, and even now visitors roam unwatched through the buildings. Visitors should at least be asked to check their machetes before entering the site area.

SHRINKING

Somehow in the 12 months that I undertook archaeological field work at Tikal never noticed any extraordinary shrinkage of the lintels of Tikal, nor in any of the more than two hundred visits since then lecturing for tour groups or taking

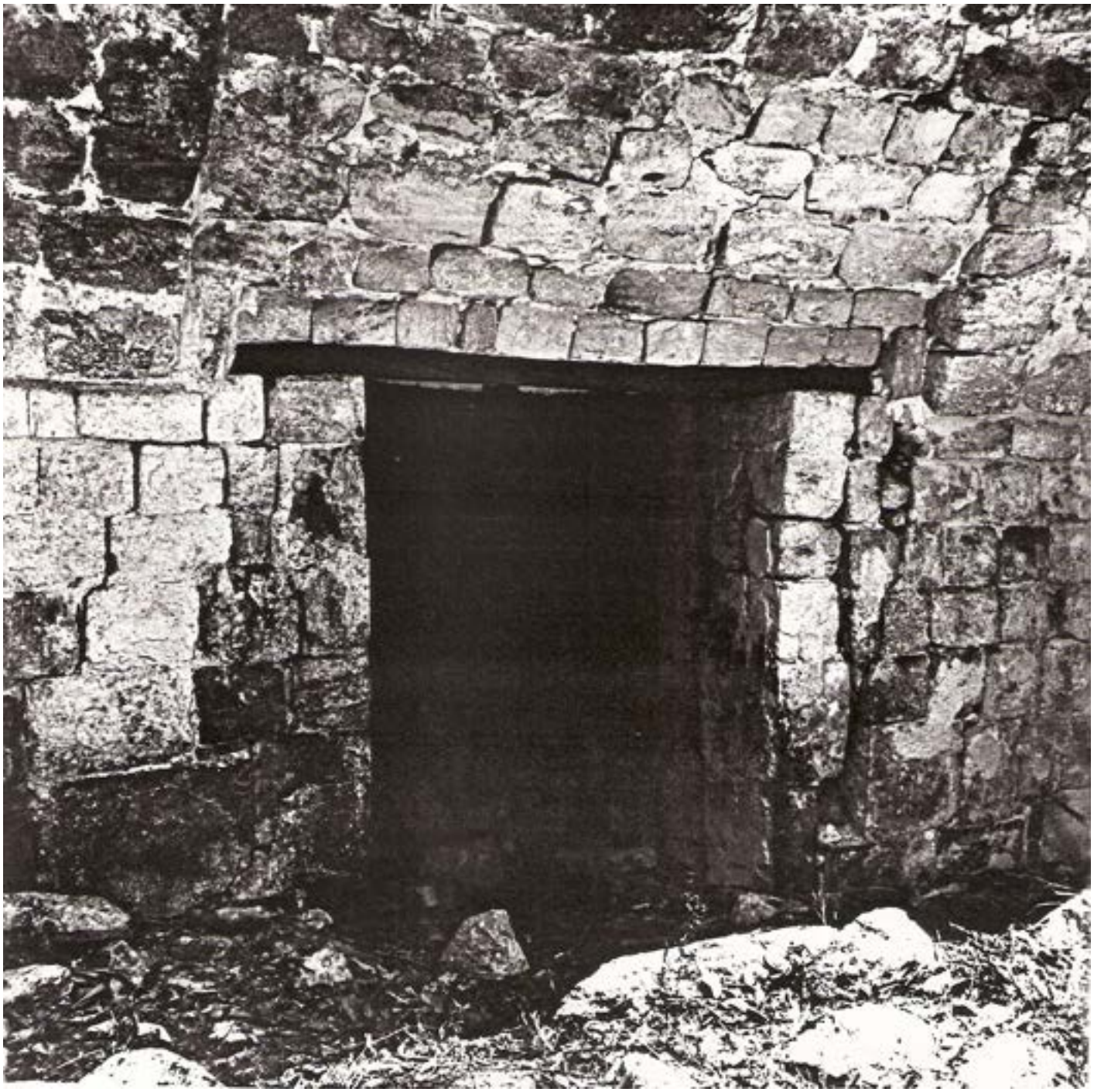


Fig. 8

photographs for lectures or books. Yet the minute I looked at the lintels of Xtampak I was struck by the degree to which the lintels had shrunk, indeed shriveled. The butts have withdrawn several centimeters--you can still see this where a mold has been created by the mortar around where the fresh beam once extended. And looking at the beams from below you can see how the beam has retracted, leaving wide white space in between the beams.

How closely the beams were originally inserted can be ascertained from the marks in the plaster or mortar. Immediately after the beams were freshly inserted mortar and stone was laid on top. The beam on the outer edge was partially covered with a thick coat of wall plaster. The mortar and plaster have long ago hardened around the shape and size of the fresh lintel beam. As the beam shrunk, the plaster retained the original form as a mold. In one case, though, on the first floor, back corner, the Maya did not in fact set solid beam edges directly against one another, instead they filled in the two inches of intervening space with a round pole, not a squared stick. The adjacent beams are perfectly preserved; the pole long ago rotted but left its complete imprint beautifully preserved in the mortar.

## WAS BARK STILL ON THE WOOD?

Leaving bark on a house pole is like leaving chocolate for a chocoholic. Termites will attack bark because it is. tender and also the bark provides darkness underneath so they can nibble contentedly on the main pole. This is something else I learned--that even “termite proof” poles can become infested if their bark is left on. Whether this rule applies to zapote I do not know, but the question is worth asking since many of the lintel beams used at Xtampak appear to be the

edges of the trunk, even retaining the rounded shape of the original tree. The question is whether the bark was still present when the lumber was set in place. But a larger question is why was the outer edge of the tree used instead of squared beams. Should this imply a lumber shortage in a period when suspected overpopulation would have decimated the forests, especially to provide agricultural land for the teaming peasant masses? Whether there was in fact a wood shortage we will never know, though the lesson of the cedars of Lebanon should be a good message. Some archaeologists suspect that the area surrounding Teotihuacan was denuded of wood in order to fuel the thousands of lime ovens which were in demand to create stucco and plaster for thousands of square feet of wall area for murals.

The first step will be to analyze each lintel to ascertain whether it is in. fact from the edge of the tree. Then do a comparative analysis to see if this is a Chenes-wide trait or restricted to Xtampak. I certainly do not remember the Tikal or other Peten lintels as being cut from the edge.

## THINNESS OF THE XTAMPAK LINTELS

Although it might be considered that the Tikal lintels were thicker because doorways were wider in fact even normal width Tikal doorways also have rectangular beams. In comparison the Xtampak lintels are barely thick enough to be called planks--they are just thick boards.

Yet in the same Chenes area, at the ruins of Tabasqueno, the lintel appears to be twice as thick as those of Xtampak. The same is true at the Rio Bec area sites of Chicanna, Becan, and Hormiguero, where several of the monster facades still

retained their original lintels up to their recent restoration.

REPLACING THE LINTELS

At Palenque concrete lintels replaced the original wood during the restoration project. That may have been a safety factor since the door spans are twice the width there, and the restorers may have worried about wooden replacements. At Mitla steel--now rusting--bolsters replaced lintels, though there usually supports for original stone. Both concrete, and especially steel, are about the ugliest and most inappropriate materials which could possibly be selected. With todays technology in dyeing it is certainly possible at least to create a concrete replacement where visitors do not have to be reminded with rusting steel reinforcement rods. I am not sure that a simulated wood lintel would be acceptable--but it can hardly be any uglier than raw concrete. At Dzibilchaltun restorers directed by M.AR.I. placed a concealed concrete beam on top and then returned the original wooden beams to their place. The concrete beam actually takes the load, but the visitor sees only the natural wood.

But the doorways at Xtampak are narrow enough so that fresh zapote wood can be reinserted. After all, the original zapote lasted over 1000 years so the replacements should last that long too. Thus it is the intention of Folan to replace the sagging lintels with fresh zapote. I have suggested cutting them from tree fall, from trees blown over in wind storms, so that no live trees have to be sacrificed.

But the main danger to the overall palace is not just from fracturing lintels. When the lintel finally falls that brings down “only” a semi-circle of stone above.

What causes entire rooms and whole facades to crumble is the physical disintegration of the jambs. An entire wall can collapse even when the lintel is in perfect condition. This results from the sheer factor along the edge of the doorway from the accumulated weight forcing down on the ends of the lintels. This enormous weight over the centuries is actually crushing the jamb portion of the wall. You can see the expanding cracks alongside more than half the doors of the palace. This manner of major structural failure has not previously been considered, since it was commonly thought that it was lintel failure alone which brought down the vaults above. That also is certainly also a factor, when in fact a lintel rots before the adjacent wall is crushed. Ironically it is the strong lintels that seemingly transfer sheer to the adjacent jamb area. It will be necessary either to inject an impressively strong binding mortar into the cracked jambs, or disassemble them completely, clean the joints, then restore them.

It is essential to have competent engineers and architectural specialists analyze the situation as traditional native mescla may not be strong enough to do a proper job. The normal mortar which is used is selected for its low cost, not necessarily for its high binding capability. Entire pyramid facades have collapsed within two years after being “restored.” This happened more than twice at Tikal, once on the Twin Pyramid Complex and most recently on the Lost World Pyramid, where the damage was costly in monetary terms as well as damage to the pyramid itself. Why has not anyone considered that perhaps the mortar constituents are not necessarily the best for the ancient buildings? It may be that entire Maya cities are being “conserved” with the wrong mortar, selected solely because it is “traditional, “--and cheap.

The other practice I wish to introduce is a manner of injecting mortar under pressure deep into the walls. This will require a special pump, motor, and hose which we hope a tuckpointing equipment manufacturer will donate (along with a cement mixer with its own motor) so we can donate this to Mexico. Such a system could consolidate Maya temples and palaces thereby saving countless architectural treasures from total collapse.

## WOOD AS ARTIFACTS

From time to time "ancient" Maya artifacts in wood are offered for sale. Since such preservation is so rare these artifacts fetch high prices. They are usually offered together with testimonies from "scientists" or scientific "laboratories" proclaiming that the art object is x-thousand years old. But the "scientist" or "lab" is o ten a silent partner of the deal, or at least simply paid off for the creation of the letter. The wood itself is in fact sometimes old ... but the carving is modern. Besides, even if the artifact were original, it is today considered unethical to buy and sell it, especially since it was most likely stolen from a Maya ruin; But, the chances are 1000 to 1 that you can buy it legally--since it was probably created in the Ticul fake factory outside Merida, where 28 craftsmen are busy at work creating "reproductions." Their work decorates major museums in the USA, Canada, Germany, and Australia. Indeed the Albuquerque "Maya Treasures of an Ancient Civilization" of Maya art was actually a traveling show of some of both the best fakes and worst neo-Maya art ever fabricated in the fake factories of Mexico.

Francis Robicsek, M.D. was one of the first to notice the crass fakes, as well

as Barbara and Justin Kerr. Michael Coe, Yale University, published a list in the West Berlin scholarly Mesoamerican journal mexicon of all the definite fakes in the Albuquerque show--even giving the names of some of the "artists" involved. One of the featured pieces of the exhibit was a fake wooden lintel ....

This crude forgery (No. 74) received an entire page, and faced another fake on the opposing page (No. 72) and had a fake so crude on the following page that it is best described as "airport art" (No. 77). Airport art is that cheap mass reproduced product sold at airports in tourist lands which tourists buy to get rid of the foreign money that would otherwise be worthless once they get on the airplane.

The scene on this wooden lintel is a parody of Maya art by a modern artist who did not fully understand actual Maya iconography. The Jaguar God of the Underworld cruller is wrong; the Manikin Scepter the lord holds is ridiculous. The headdress is all wrong c:nd the feathers are a joke. The moral of the story is best left unsaid so as not to offend the several archaeologists, art historians, and organizer of this public spectacle. One moral is clear--an increasingly percentage of what passes muster into otherwise respectable Mesoamerican art books are fake, and others are looted. The two Early Classic cache vessels (Nos. 48 and 49) in the same catalog were looted almost certainly from Guatemala--yet were "repatriated" through an auction sale to a private collection in Mexico. Other items in the same catalog were grossly repainted--Guatemalan government archaeological "restorers" are rendering the same modern repainting that have flawed and ruined so many thousands of Maya vases in museums and private collections. The Albuquerque show is a painful reminder of the destruction of authentic art through repainting,

the destruction of Rio Azul through illicit tunnelling, and the double trouble of wooden artifacts. If real they have been stolen; if not real they are fakes. The moral to be learned is simple, do not buy wooden artifacts.

The fake wooden lintel of the Albuquerque show returns us to Maya reality. Most lintels were plain. The carved wooden lintels found by Stephens and Catherwood at Kabah burned up when their New York exhibit went up in smoke. Outside of Tikal, Tzibanche (the same site with the curious wooden ceiling), and EI Zotz decorated wooden lintels are unknown. It is their plainness that has perhaps saved them. Today these “plain” lintels at Santa Rosa Xtampak tell a story of engineering and design that takes us back to the 7th-8th century when the Main Palace of Xtampak was under construction.

Aided entirely by private donations and gifts of products by corporations, the Xtampak rescue project is laboring in Mexico to salvage both scientific information as well as the physical palace itself. Since so~e of the lintels will need to be temporarily moved in order to repair the stones above and below them, that is the perfect time to combine archaeology, architecture, and conservation. This article may be the first ever on hardwoods in Maya stone construction but it should not be the last from the Xtampak Project.

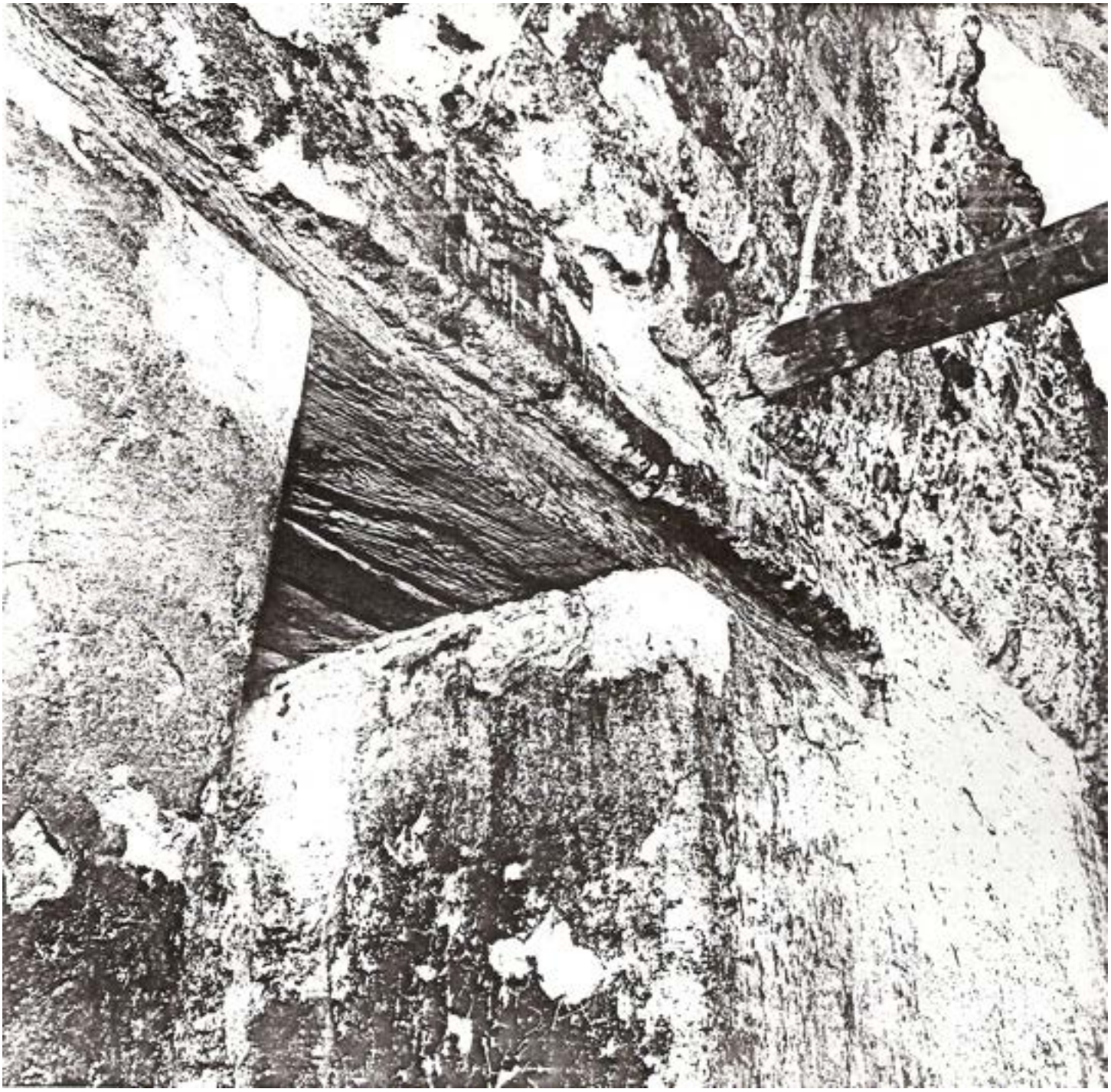


Fig. 9

Fig. 10

Fig. 11

WORKS CITED (to be completed ... )

**ANDREWS, E. Wyllys,** and **E. Wyllys ANDREWS, V**
1980 Excavations at Dzibilchaltun, Yucatan, Mexico. Publication 48, Middle American Research Institute, Tulane University, New Orleans.

**CIANCY, Flora et al.**
1985 Maya: Treasures of an Ancient Civilization. Harry N. Abrams, New York, and the Albuquerque Museum, Albuquerque.

**GANN, Thomas**
1928 Maya Cities. Charles Scribner's Sons, New York.

**HELLMUTH, Nicholas**
1978 Tikal, Copan. Foundation for Latin American Anthropological Research, Guatemala City.

**LOTHROP, S. K.**
1924 Tulum: Archaeological Study of the East Coast of Yucatan. Carnegie Institution of Washington, Pub. 335, Washington, D.C.

**MARTINEZ, Maximo**
1979 Catálogo de nombres vulgares y scientificos de plantas mexicanas. Fondo de Cultura Econmica, Mexico City.

**MORLEY, Sylvanus J.**
1946 The Ancient. Maya. Stanford University Press, Stanford.

**SOUSA, SANCHEZ, Mario** and **TELEZ VALDES, Oswaldo**
1982 Imagenes de la flora quintanarroense. Centro de Investigaciones de Quintana Roo. Quintana Roo.

**THOMPSON, J. Eric S., POLLOCK, Harry E. D.** and **Jean CHARLOT**
1932 A Preliminary Study of the Ruins of Coba, Quintana Roo, Mexico. Carnegie Institution of Washington, Washington, D.C.

Illustration captions

Front cover: Santa Rosa Xtampak, Main Palace, first story, west side of palace, inner room. None of the doors of the outer facade still have their wooden lintels, suggesting that rainfall (causing rot) may have been a factor in their loss. The planks have shrunk, thus leaving extra white space between them.

Fig. 1. Santa Rosa Xtampak, Main Palace, east side, inner room. Three beams which have shrunk, leaving extra white space between them. On at least two doorways, though, the wide space between planks was original and was spanned by a thin, round pole. In this particular photograph you can see the heartwood of the center plank. On the wider planks you can also see the outside of the tree. Forestry experts and botanists should be able to contribute considerable information on the lumbering habits of the Maya from analysis of these Xtampak planks.

Fig. 2. Santa Rosa Xtampak, Main Palace, east side, inner room 8, view from inside looking out (looking northeast). The wall beams are actually three in number, one near the door lintel butt, two almost next to each other against the north end wall.

Fig. 3. Detail of the three wall beams in Room 8, looking west. The plaster is as remarkably preserved as are the three round beams. Since the wood is still flush to the pole this means these have not shrunk at all, quite a difference from the door lintels. Is that because a plank exposes more surface or because the poles have all the core intact and less surface area? Santa Rosa Xtampak, Main Palace, first floor, east side.

Fig. 4. Tzibanche, Quintana Roo, reproduced from Gann (1928). This unusually high room 'has the most unusual use of Maya wood yet reported for pre-Columbian architecture. The same site also has doorway lintels with hieroglyphic texts which have been reported upon by Thomas Gann as well as by Peter Harrison.

Fig. 5. Santa Rosa Xtampak, Main Palace, west side, inner room (24 or 26, Andrews' 1988 numeration). The wall plaster is still in amazing original condition. The degree of shrinkage can be measured as the distance the wood has retreated from the plaster; the plaster forms a mold of the wood at its original 7th-9th century size.

Fig. 6. Santa Rosa Xtampak, Main Palace, east side. Three rooms on the east side, 6 and 8 on the first floor and 32 on the second floor, have the best preserved and most photogenic beams in the whole edifice. The rest of the fully preserved lintels are on the first floor, west side, especially rooms 24 and 26. Overall about 31 beams are still present (Leiter 1989, personal communication). Elsewhere at the site only a single beam is preserved, and that fallen, in the back side of the South Range, Northeast Quadrangle.

Fig. 7. Santa Rosa Xtampak, Main Palace, east side. The outer edge of the tree is visible as a lighter wood. It appears that the termites have chewed tunnels mainly in this area.

Fig. 8. Santa Rosa Xtampak, Main Palace, east side, probably Room' 6. These

planks are so well preserved that the stress has transferred to the jambs, causing them to sheer away from the wall. In this instance the jambs will buckle out before the lintels rot or break causing far more destruction than if the lintels alone broke.

Fig. 9. Tikal Central Acropolis, Structure 50-54, looking west at doorway lintel. In the center is a vault beam, here spindle shaped, the same as the better known ones of Structure 50-52. The Tikal lintel beam is neatly recessed, a typical placement in most Classic period Maya buildings. This Tikal beam is more than 50% thicker than those of Santa Rosa Xtampak.

Fig. 10. Although Tikal has more preserved 1000-year-old wooden lintels and vault beams than any Maya site in fact you can find original wood in most of the major Maya ruins, such as Calakmul and here at Uxmal. Long Northern Building, in front of the side of the Nunnery Quadrangle. 451608-7-Neg.1.

Fig. 11. Tzikin Tzakan, Peten (near Belize border), an unusually wide and deep doorway, seemingly five beams. Science's opportunity to study these beams was lost forever because the entire palace was crushed by the weight of rain water seeping into the vault mass. Palace after palace are being lost throughout Guatemala and Mexico; crumbling before anyone bothers to record them. These FLAAR photographs may be the only record of this entire structure before it collapsed. For this reason we are photographing at Santa Rosa before the Tzikin Tzakan fate befalls Xtam

Additional copies of this report, as well as three volumes of field reports on field work completed so far at Santa Rosa Xtampak may be obtained from F.L.A.A.R. Write for price.

Nicholas M. Hellmuth,

Art Department

Rollins College Campus Box 2675

Winter Park, FL 32789

or

Schützenhofgasse 36

A-8010 Graz

These were the addresses of Dr. Hellmuth several decades ago. Rather obviously he is no longer at either of these addresses today in 2015.

Contact for F.L.A.A.R. today (2015) is frontdesk@FLAAR.org We do our best to reply to correspondence, but since Dr. Hellmuth lectures in Dubai, Johannesburg, and is consultant on wide-format digital imaging and printing also in Dubai, Guangzhou, Shanghai, and Singapore, he is often not at his desk.

To see our current research, enjoy looking at www.maya-ethnobotany.org and www.maya-ethnozoology.org.