

THE GENETIC MODEL REVISITED: ON THE ORIGINS  
AND DEVELOPMENT OF THE MAYA\*

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At a Wenner-Gren Symposium at Burg Wartenstein in Austria in 1962—a Symposium in which Alfonso Villa Rojas and the late Alberto Ruz were active participants—I presented a paper on “The Genetic Model and Maya Cultural Development” which was published in 1964 by the Seminario de Cultura Maya here at UNAM in a volume which I edited with Alberto Ruz entitled *Desarrollo Cultural de los Mayas*. A second edition of the volume was published in 1971.

My paper set off a controversy among Mayan ethnologists, archaeologists, and linguists that was destined to last for nearly a *katun* in the ancient Maya calendar! Now that the *katun* since 1962 is nearing completion, I thought it might be useful for me to take a new look at the application of the genetic model to the Maya case and see where we are at present.

Many of my critics have misunderstood the nature and use of the genetic model. It is *not* intended to be a statement about historical reality; *nor* is it a set of empirical generalizations about cultural phenomena through time. Rather the model is a methodological framework for comparative study; a way of looking at the data that helps us raise questions and generate hypotheses.

\* This lecture was presented at the Instituto de Investigaciones Antropológicas, Universidad Nacional Autónoma de México on February 26, 1981. I am very grateful to the Instituto for warm hospitality and stimulating discussion and would like to thank especially Alfonso Villa Rojas, Luis Vargas Guadarrama, Carlos Serrano Sánchez, and Patricia Pastor for their assistance.

In my own thinking about anthropological research, I begin with the premise that scientific knowledge about human societies requires objective and detached comparative study. Just as the astronomers compare red and blue stars to state some general propositions about the nature and evolution of star systems in our universe, or zoologists compare species of mammals to state some general principles about mammal behavior and evolution, anthropologists compare human societies to reach for general principles about the nature and development of the cultures of man.

The genetic model grows out of the method of controlled comparison (Eggan, 1954; Romney, 1957) and it contrasts in important ways from the approach of the cultural evolutionists and from the method of cross-cultural comparison. In the comparative studies made by the cultural evolutionists (of whatever theoretical persuasion) there is always an explicit or implicit theoretical bias that prematurely influences the kinds of questions to be asked and the ranges of data to be examined in answering these questions. The results are often both exciting and satisfying to students of anthropology who, like the rest of us, hope desperately for answers to the problems of the modern world. But, repeatedly, we find that longer and closer scrutiny discloses, that the answers of the cultural evolutionists are hasty, premature, and often untrue. A perfect example is the early paper of Julian Steward on "Cultural Causality and Law: A Trial Formulation of the Development of Early Civilizations" published in the *American Anthropologist* in 1949. I remember as a young professor being enormously impressed and excited by the idea that the requirements of irrigation led to the development of complex socio-political mechanisms in five widely separated parts of the world. But, alas, further hard archaeological research demonstrated beyond a shadow of a doubt that the sociopolitical mechanisms of these "hydraulic societies" *preceded* the construction of the irrigation works in most of these cases.

In the cross-cultural comparative method, as developed by George P. Murdock and his colleagues, you assume certain basic universals in human societies. Then you select a sample of 100 or 200 cultures (that are presumably *not* historically interrelated), and proceed to run correlations

between two variables in these cultures. For example, my colleague John Whiting (*Burton and Whiting, 1961*) has suggested that male initiation rites are found in societies where the father is absent (or remote from) the children and the infant sons sleep with and identify with their mothers. The purpose of the rites are "to make men" out of the sons. He looks at his sample to see if male initiation rites are correlated with absent fathers, or not. The method is interesting and rigorous in its approach. The problems always become: how do we know that the correlation represents causation? The variables are lifted out of cultural context, and do we not know from intensive studies of cultures that the context is crucial? And, if the universals are there, why do we always have a number of awkward exceptions: absent fathers, but no male initiation rites, or male initiation rites but fathers present?

In controlled comparisons, the cultures selected for study are set within a geographic and historical frame. A good example is Fred Eggan's (1950) classic study of the social organization of the Western Pueblos, all located in the Colorado Plateau country of New Mexico and Arizona, and all subjected to the same sequence of historical events: pressure from the Athabascan tribes arriving from the north, the later arrival of the Spaniards from the south, and finally the American conquest during the Mexican war.

The genetic model goes a step further and takes as a field of comparative study a group of tribes which are set off from all other groups by sharing a common physical type, possessing common systemic patterns, and speaking genetically related languages. Correspondence among these three factors indicate a common historical tradition for these tribes.

This segment of cultural history is a 'genetic unit' and it includes the ancestral group and all intermediate groups, as well as the tribes living in the present.

It is *not* assumed that all the people in the genetic unit are necessarily descended from the ancestral group in a strict biological sense, for biological mixing always occurs when two different cultural groups come into contact. All that is required is a physical type that converges rather than diverges as we go back in time (Romney, 1957).

Not only does the genetic model maintain the geographical and historical contexts, but it also provides a framework for analysis that utilizes the data of *all* the branches of anthropology —archaeology, linguistics, ethnology, and physical anthropology— as well as the data of the historians.

The Maya are an ideal case for the application of the genetic model:

1) Except for the outlying Huastec in northern Veracruz, the present Mayan cultures have a nearly contiguous distribution in Mexico, Guatemala and Belize.

2) There is no doubt according to the linguists that all of the 30 Mayan languages, now spoken by at least 3 million people, are descended from the Proto-Maya language.

3) There has been a great deal of archaeological work on the Maya; and the rate of research in ethnology, ethnohistory, and physical anthropology is increasing.

4) Careful comparative study of the contrasts in ecological settings and historical experiences can eventually account for the present variations in culture that we now see in the Maya area.

In the application of the model, it is theoretically possible to begin with any of the three factors that define the genetic unit —physical type, language, or systemic patterns. In practice, it is more economical to begin with language because we are further along in the definition of genetic units in terms of genetically related languages and, I would argue, that, so far, the comparative methods of the linguists are more refined and more rigorous than those of the archaeologists, ethnologists, or physical anthropologists.

Given this point of departure, there are eight basic steps in the analysis:

1) Plot the distribution of the related languages —this has been done with precision in the case of the Maya. The main work still to be done are studies of earlier distributions as the work of the linguists and ethnohistorians proceeds.

2) Calculate approximate time-depths and chart the various divergences of the related languages, utilizing glottochronology (see Figure 1).



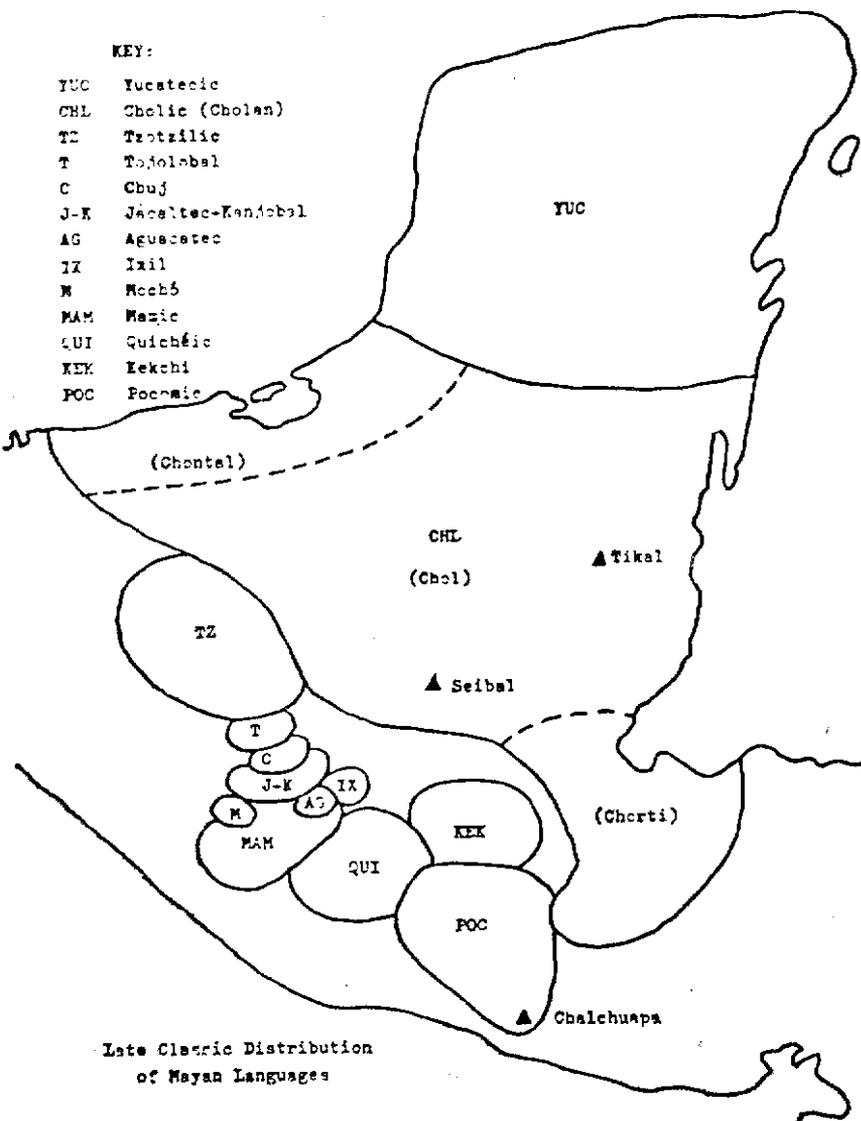
tensity of the Spanish contact since the conquest. Incidentally, the same paper shows that there is a correspondence between the important dates in central Mexican prehistory and the major nodes of divergence in the Nahua language—the Pipil separations and migrations, the spread of the Toltecs, the final destruction of the Aztec empire, etc.

3) Locating the dispersal area, and the spread of the proto-groups, utilizing comparative linguistics and migration theory. The work of the linguists in the Maya area, especially that of Terry Kaufman, Otto Schuman, Nicholas Hopkins, J. K. Josserand, and many others, has advanced markedly in the last two decades. Utilizing these data and the "least moves" model of migration theory (Diebold, 1960), it is inferred by the linguists that the proto-Mayan homeland was in a highland area, not far from the lowlands. This is so because Proto-Mayan has terms for both highland and lowland flora and fauna. In the Maya area, lowland people are ignorant of highland products, but highland peoples are aware of lowland products. Therefore, the proto-Mayan homeland was in a highland area not far from the lowlands (Kaufman, 1976; Josserand, 1975).

Looking at the distribution map for the late Classic period (Figure 2) Huastec can be rolled back from the migration to northern Veracruz, the Yucatec Maya from a lateral spread into the peninsula from the highlands, and Chorti, Chol, and Chontal put back together. The Tzeltalans are post A.D. 100 arrivals in the Chiapas Highlands. These data all indicate a point of dispersal in the Guatemalan Highlands. Kaufman (1976) suggests the Soloma area of the Cuchumatanes which is both near the lowlands and near the rivers flowing north, east, and west. He adds that in rugged highlands, river valleys facilitate population movements, and it is easier to move downstream than upstream. Josserand (1975), on the other hand, drawing on the archaeological data of Robert Sharer suggests the Chalchuapa area of El Salvador as the homeland.

I do not believe there is yet sufficient evidence to choose between these two possible homelands, and there is also the more recent data of Norman Hammond from the archaeological site of Cuello in Belize that must be taken into account. The radiocarbon dates on his early Swasey Phase

FIGURE 2 (after Josserand, 1975)



run as early as approximately 2200 B.C. with ceramics and architecture that look to be ancestral to formative Maya (Hammond, 1977; Hammond et al., 1979). If the highland origin of the Mayan radiation is correct, then the Swasey phase must represent one of the earliest Mayan movements into the lowlands following the break-up of the Proto-Maya. Hammond also reports three earlier radiocarbon dates back to 3200 B.C. on the Cuello site that may indicate prior occupation, but it is not clear yet what this occupation might represent. It is possible, of course, that both the 3200 B.C. occupation and the later 2200 B.C. Swasey Phase were aspects of an earlier Macro-Mayan out of which came both Proto-Mayan and Proto-Mixe-Zoquean peoples.

4) Reconstructing the proto-language, and as much of the proto-culture as possible, utilizing the techniques of comparative linguists. Again, this effort is proceeding apace and we already have much useful information to utilize from the proto-Maya level.

5) Using archaeological data to confirm, reject, or modify hypotheses about the dispersal area and migrations from this point as well as the reconstruction, of the proto-culture and of the variations that have occurred over time. This step requires the solution of a number of critical problems. One of the problems is the definition of a series of diagnostic Maya traits for an early horizon (on the order of 2000 B.C.). Another problem is to be able to pick up these traits in the supposed homelands in the highlands where not as much archaeological work has been done as in the Mayan lowlands which has witnessed the lion's share of the archaeological work for decades.

6) Adding physical anthropological data on skeletal materials and on living populations to check on shared and variable features in physical type within the genetic unit. With reference to the hypothesized common physical type among the Mayas, my most severe critic was the late Juan Comas (1966; 1969) who concluded that both prehistoric skeletal data and measurements on the living Maya indicated "...the non-existence of a unique somatic type, with definable characteristics representative of the Maya linguistic family". Frank Saul (1968), on the other hand later exa-

mined Comas' arguments and came to the conclusion that Comas' data were too limited to reject my hypothesis.

So, my hypothesis survived, barely, from the Comas attack! Then, more recently, Carlos Serrano Sánchez, of this Instituto, began additional work on dermatoglyphs among the Yucatec Maya, as well as among the Zoques in Chiapas. As Dr. Serrano points out, dermatoglyphs are highly relevant for cultural historical studies because they are polygenically controlled, probably, nonadaptive, and undergo no postnatal modifications, unlike, for example, head form. If I have whorls (*torbellinos*), rather than loops (*presillas*) or arches (*arcos*) on my fingers, I was born with them and will have them all my life. And whether I have whorls, loops, or arches has no apparent adaptive significance (see Figure 3 from Serrano, 1973).

FIGURE 3  
(from Serrano 1973)



In a series of recent publications (Serrano Sánchez, 1973; 1974; 1976-77; Serrano Sánchez and Aréchiga, 1978; 1979; Aréchiga, 1979) Dr. Serrano and his colleague, Julieta Aréchiga, not only present new exciting dermatoglyph data, but also re-analyze data previously collected in the Mayan highlands. Unlike the earlier findings of Newman (1960) which indicated a marked difference between the Yucatec

Maya and Guatemalan Highlands, on the one hand, and the Maya in the Chiapas Highlands, on the other, Dr. Serrano finds evidence of uniformity in dermatoglyphs among the Maya, and marked differences between the Maya and the Indians of South and Central Mexico. In Figure 3 note the three kinds of fingerprints that exist in the world's populations: the whorls, the loops, and the arches. The crucial differences in Mesoamerican Indian populations are the re-

FIGURE 4

(from Serrano 1976-77)

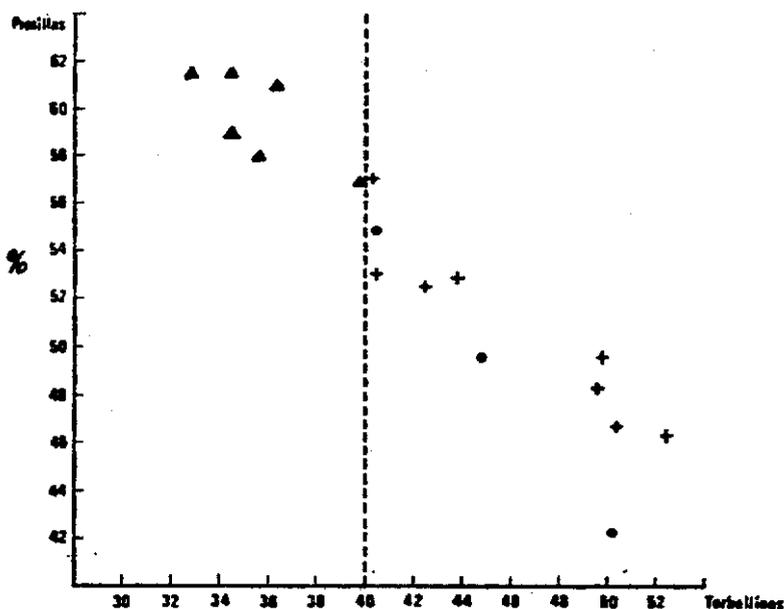


FIGURA 4 Distribución de poblaciones indígenas mesoamericanas de acuerdo a frecuencia de Presillas Torbellinos %.

- + Tzeltales-tzotziles.
- Mayas yucatecos.
- ▲ Grupos indígenas de la zona centro-sur de México.

lately different percentages of whorls and loops as displayed in Figure 4 (from Serrano, 1976-77). Note the difference between the Yucatec Maya and Chiapas Maya populations, with more than 40% having whorls, and the southern and central Mexican populations, with fewer than 40% having whorls. Similarly, in the so-called Cummins Index—a measure of pattern intensity—there is also generally a difference (see Figure 5 from Serrano, 1976-77) between the Maya and the Indians in south and central Mexico. The break here is between those populations with an index of greater or less than 13.4.

FIG. 5. (From Serrano 1976-77)

PATRONES DERMATOGLIFICOS EN GRUPOS INDIGENAS  
MESOAMERICANOS SEXO MASCULINO %

<i>Grupo</i>	<i>n</i>	<i>A</i>	<i>P</i>	<i>T</i>	<i>Índice Cummins</i>
<i>Chiapas</i>					
Tzeltal (Amatenango) <sup>1</sup>	49	1.2	46.4	52.4	15.4
Tzeltzil (Zinancan) <sup>1</sup>	24	2.2	48.2	49.6	14.7
Tzeltzil (Huixtán) <sup>1</sup>	50	2.5	49.6	48.9	14.6
Tzeltzil (Zinancan) <sup>1</sup>	90	2.8	46.8	50.4	14.8
Tzeltzil (Chamula) <sup>1</sup>	100	3.4	52.8	43.8	14.0
Tzeltal <sup>1</sup>	62	5.0	52.6	42.4	13.7
Tzeltal <sup>1</sup>	47	2.8	57.0	40.2	13.7
Tzeltzil <sup>1</sup>	230	7.2	57.0	35.8	12.9
Tzeltal-Tzeltzil (S. Cristóbal) <sup>2</sup>	90	6.4	53.6	34.9	13.5
Zoques (Copoya) <sup>3</sup>	74	6.6	53.0	40.3	13.5
<i>Yucatán</i>					
Peto <sup>4</sup>	160	4.9	54.8	40.3	13.5
Chichimilá <sup>4</sup>	62	5.6	49.7	44.7	11.9
Hacienda Acú <sup>1</sup>	25	6.4	42.4	51.2	14.5
<i>Zona Centro-Sur</i>					
Tarascos <sup>1</sup>	116	4.2	61.6	34.2	13.0
Náhuas (Cholula, Pue.) <sup>6</sup>	178	5.6	53.1	35.3	13.0
Zapotecos <sup>1</sup>	50	3.0	61.0	36.0	13.3
Zapotecos <sup>2</sup>	104	6.6	59.1	34.2	13.3
Mixtecos <sup>1</sup>	78	3.0	57.0	40.0	13.7
(Mestizo, México, D. F.) <sup>6</sup>	250	3.4	61.4	32.6	13.1
<sup>1</sup> Datos recopilados por Coope y Roberts, 1971. <sup>2</sup> Zavala y col., 1971. <sup>3</sup> Presente estudio. <sup>4</sup> Serrano, 1973. <sup>5</sup> Serrano, 1971. <sup>6</sup> Zavala y col., 1969.					

Dr. Serrano suggests that these data do indeed indicate some kind of common physical type among the Maya, a physical type that converges as one goes back in time, and that diverges in later prehistoric and contemporary populations. The divergences are what we observe in measurements made on skeletons and living bodies. The divergences are most probably due to differences in environmental adaptations and to biological inter-breeding, as for example the biological mestizoization process that Dr. Serrano has documented in Yucatan.

Dr. Serrano's Zoque data suggest that at a deeper level of time, the Zoques could have been part of a Macro-Mayan family of languages and peoples. It is of interest to note here that the Olmecs were almost certainly Mixe-Zoque speakers (Campbell and Kaufman, 1976).

These data and analyses of Dr. Serrano have encouraged me to think much more about the genetic model in the past few years, and have inspired me to attempt this lecture.

7) Utilizing ethno-historical materials to provide readings on the various branches of the genetic unit between the time of the Spanish Conquest and the modern ethnographic studies of living tribes. Here the earlier work of the ethno-historians is now being continued and deepened especially by the research of this Instituto, of the Instituto de Investigaciones Históricas and of the Centro de Estudios Mayas of UNAM.

8) Adding ethnographic data on living Maya communities to map variations in common systemic patterns that have survived from earlier time levels and to detect cultural "drifts" or trends that are still occurring in these living systems. In some parts of the Maya area, notably Highland Chiapas, parts of Yucatan, and in some zones of Highland Guatemala our data base is approaching a level of quality and quantity that make intensive comparisons possible.

The third prong of the genetic model concerns systemic patterns (Kroeber, 1948: 312-13) patterns that seem to run deep in time in the Maya genetic unit and may have evolved at the proto-time-level or shortly thereafter, and, with variations, continue to be important in Maya cultures up to the present time. I wish to finish my lecture with a new

look at the nine systemic patterns I discussed in the 1971 revised edition of *Desarrollo cultural de los mayas*.

1) The Maya *subsistence system* is based upon the cultivation of maize, supplemented importantly by beans, in a system of *swidden agriculture*. There seems no doubt from the reconstruction of Proto-Mayan that the ancestral community had domesticated maize and beans, as well as many other crops. They also had a word for *metate*, but did not have words for *comal* or *tortilla* —both seem to have been absent in southern Mesoamerica until the Classic Period. Ground corn must have been consumed in the form of *pozol* or *tamales* in earlier Mayan times.

The idea that the swidden system of agriculture was *the* basic systemic pattern for subsistence for the ancient Maya is now in need of revision. The data we now have on raised-field, or chinampa-like, intensive agriculture in parts of the lowland Maya area, especially from the Rio Pasion region of Guatemala and from Northern Belize has convinced me that this intensive system must have been important to the lowland Maya. It is interesting that the raised-field systems were not really discovered until there were aerial surveys to view the grids from the air; then ground survey teams could check them out. More recently, my colleague R.E.W. Adams has had a project involving radar planes from NASA which have mapped areas of the Peten (Adams, 1980). The main problem is to sort out grids made by limestone bedrock and vegetation from the grids that are the remains of the canal systems of ridged-fields. But it *does* appear that large areas may have had these intensive agricultural systems underpinning the impressive growth in Maya population during the Classic. On the other hand, the situation should not be exaggerated, because other archaeologists, notably Anabel Ford (1980) have recently shown that the facts on settlements pattern around the most important Mayan center —Tikal— fit better with a system of swidden agriculture than they do with some system of raised-fields. So the argument is not over. In the meantime, we can still say that swidden agriculture was prior and basic in the Maya case and that it clearly outlived the ridgedfield system of prehistoric times.

2) The basic Maya settlement pattern consists of dispersed hamlets in sustaining areas surrounding ceremonial centers. My argument is that except where there are special geographic factors—as in the towns surrounding Lake Atitlan Guatemala—or historical factors—as in archaeological sites like Mayapan which were under heavy Central Mexican influence, or in post-Conquest towns that follow Spanish models—the empirical data still seem to bear out the proposition that the Mayas are basically a hamlet dwelling people. In fact, the pattern of a patrilocally extended family living in a compound, or “patio group” (Willey and Leventhal, 1979), surrounded by a maize field seems so fundamental I would guess that even the highest ranking “ruler” of the famous sites like Palenque, Tikal, or Copan maintained a large, comfortable thatched-roof house (which wouldn’t kill him when earthquakes occurred) in a field of maize which he went out to ceremonially inspect in the same way that the kings of East African kingdoms spent a few minutes each day “herding” the royal cattle! (Vogt, 1980).

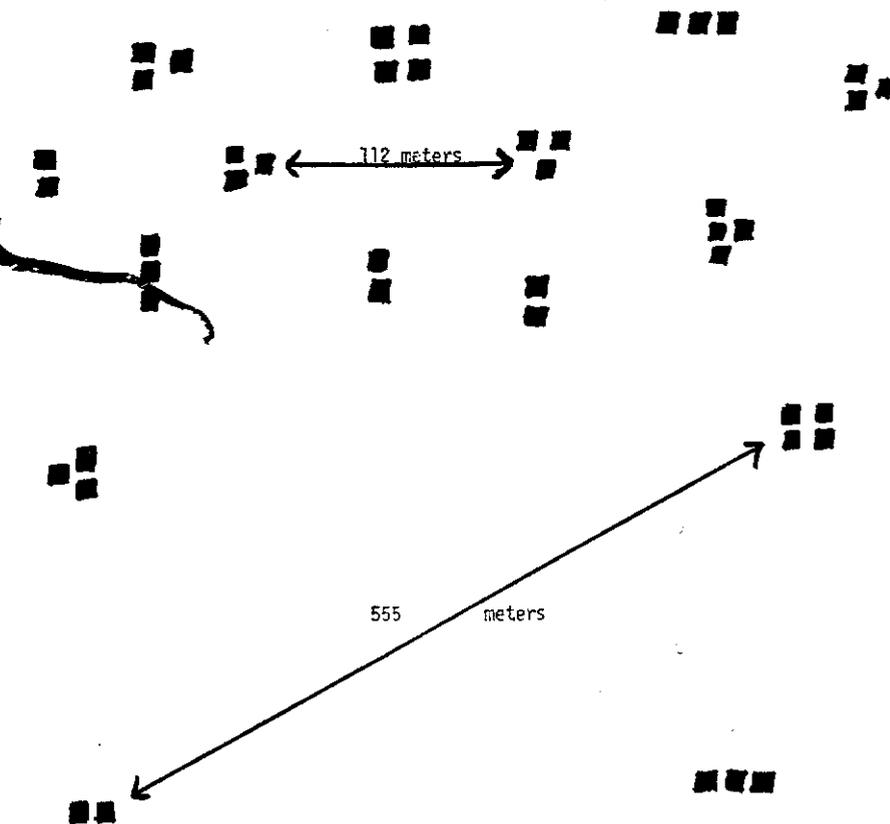
What about the “city” of Tikal? Except for the complexes of buildings like the North and Central Acropolis (and who really *knows* yet whether they were “palaces”, “administrative and judicial offices”, or “ceremonial chambers for retreats and rituals”?), I am impressed when I look at the splendid map to Tikal (Carr and Hazard, 1961) how much the pattern resembles a series of extended family patio groups living in hamlets that have been “compressed” together. In a word, the basic pattern is still there; it’s just more dense! This represents a huge difference from the compact settlement of Teotihuacan. 72,000 people in 120 square kilometers in Tikal is of a different magnitude from Teotihuacan’s 100,000 to 200,000 packed into 21 square kilometers. Teotihuacan was a city; Tikal was still a ceremonial center.

Further, I have found corroboration for my conclusion in some amazing uniformities discovered in the distances between houses in the domestic family compounds (Vogt, 1971). This discovery was first made by Dr. Linnea Wren (1970, 1974) who, using aerial photographs, measured all the distances between houses *within* these patio groups in three Zinacanteco hamlets, and found that they were

all 11 to 15 meters (with a mean of 139 meters) from each other. What varied widely—in response to local environmental conditions, especially the availability of household water in the dry season—was the distance *between* one patio group and another—the meran was only 112 meters in a compact hamlet; 550 meters in the most dispersed hamlet (Figure 6). Later Ashmead, 1971; Lesser, 1971) two of my students also measured the average dist-

FIGURE 6

## SETTLEMENT PATTERNS IN TWO HAMLETS IN ZINACANTAN (SCHEMATIC)



ances between houses *within* patio groups in the sites of Mayapan, Tikal and Altar de Sacrificios and discovered an averages distance of 10 to 14 meters with a mean of 12 meters. Again what varied was the distance *between* domestic family patio groups with Mayapan being most "compressed", Altar de Sacrificios being most "dispersed", and Tikal being in between. What all this appears to signify is that the distance between Maya houses in the immediate face-to-face daily living in an extended family tends to be a constant over time and space, including settlements in both highland and lowland ecological settings.

3) The social structure of Mayan hamlets was (and continues to be) characterized by patrilocal extended families; and by patrilineages composed of groups of extended families. This proposition has been critically reviewed by several scholars, especially by William A. Haviland who, in his latest paper on the subject, finally agrees with me with reference to the Maya Classic. He writes: "I think most people are prepared to accept the idea that the usual Classic Maya household was a patrilocal extended family" (*Haviland*, 1972: 2-3). Similarly, my colleague Gordon Willey has recently concluded that:

...patio groups may be considered as the basic "building block" of Maya settlement study... there is ethno-historic and ethnographic evidence to link the single house or minimal residential unit with the biological family and the larger patio-group unit to the extended family, all in a kin system that was essentially patrilineal and patrilocal (Willey, 1980: 14-19).

4) While the Mayan "priests" and perhaps "rulers" presided over and managed the economic, socio-political, and religious system from the ceremonial center where they had their "seats" of power, and *may* have resided at least for periods of time during the year, the hamlet-dwellers were also involved in some kinds of ceremonial duties in the center.

If the Maya have been, and continue to be, basically hamlet-dwelling around ceremonial centers, then the intriguing question arises as to how the hamlets are socially, economically, and politically related to the center. Many archaeolo-

gists have tended to approach this question with only one model in mind: the feudal model derived from our own cultural background in Europe. This model places a king in the ceremonial center, surrounds him by nobles, and pictures the hamlet-dwelling Mayas as conr-farming peasants who dutifully bring food to the center for the aristocracy to consume and do the hard labor in building pyramids.

It is now clear from the work of archaeologists and epigraphers, especially at the sites of Palenque and Tikal where dynastic sequences are recorded in the hieroglyphic records, that the prehistoric Mayan centers certainly had an aristocratic elite. But, on the basis of almost everything else we know about the Maya, the feudal model still seems naive and simplistic to me. This does not mean that I am arguing for "democracy" or "egalitarianism" among the Ancient Maya as epleague, the late Alberto Ruz (1964) incorrectly assumed. On the contrary, my research among the Zinacantecos in Chiapas demonstrates that the Mayas are essentially as rank-conscious as any people I have ever encountered. The Zinacantecos have their important, high-ranking lineages that control many hectares of land and own large houses both in the hamlets and in the ceremonial center; they also have lowranking lineages that control smaller amounts of land and own small houses. Further, Zinacanteco officials (whether religious or political) pay meticulous attention to rank-order—they sit on long benches in precise rankorder with the highest official toward the rising sun; they march in precise seating and in the order of serving food and drinks (Vogt, 1976: 34-44).

By analogy, the long benches found in the so-called "palaces" in Maya sites look like places where groups of Maya ritualists in ceremonial retreat sat in rank-order to deliberate, to pray, or to wait for bowls of turkey and venison and tortillas cooked by their wives nearby and served by members of their retinues; or like places where political officials sat in rank-order holding their staffs of office and "held court" for trouble cases of land disputes, thefts, or wife-beatings that were brought before them.

Similarly, the wonderful causeways constructed within and between Maya sites have always impressed me as being

basically pathways for ceremonial processions. For the Mayas we know today ethnographically, it is clear that the processions is one of the most basic forms of ritual. These impressions about the functions of causeways are corroborated by the recent analysis of J. W. Ball who concludes that causeways are basically for ceremonies, and that daily, secular travel occurred along shaded paths on softer ground through the selva.

So the basic question is *not* whether the Maya, ancient and modern, have their elites—they clearly did, and do. Rather, the problem concerns whether there was some system of rotation (of residence and religious duty) between the dispersed hamlets and the center. I suspect there was and that these relationships were infinitely complex and involved a variety of economic, religious, and political movements of people and goods. Perhaps the most interesting new archaeological data on this problem are the findings of Willey and others (Willey, Leventhal and Fash, 1978) at Copan and of Haviland (1981) at Tikal that there *were* elegant residences out from the ceremonial centers—just as I have suggested.

5) One of the fundamental deity concepts is that of ancestral gods of the various social units in Maya society. My hypothesis about this systemic pattern is that each significant level in a Maya social system—extended family in a patio group, a patrilineage, a patriclan, etc—all have deified ancestral beings that are given offerings at some kind of ceremonial focus whether this focus be a small household shrine or a 70 meter high pyramid. If this is the case, then the multiple pyramid temples in Maya sites may in part represent the ancestors of the various important lineages. While it now appears that stelae contain portraits, for the most part, of living rulers, we do find ancestral figures on the roof combs of pyramids, and, of course, buried inside the pyramids like Lord Pacal at Palenque. Some of the iconography is intricately sophisticated, including carvings at Palenque (if Linda Schele is correct) which depict an already deceased ancestor transmitting the royal power to his living son! Schele (1978: 69), quite correctly in my judgment, concludes that, "genealogy and ancestor 'worship'

were major concerns of Classic Maya royalty and culture in general."

6) Mountains and pyramids are conceptual and conceptual equivalents in Maya culture in that they both serve as dwelling places for the ancestral gods. In Zinacantan shamans and cargo holders go in procession from their hamlets to the mountain shrines to pray to the ancestral gods who live inside the mountains. They first light candles, burn incense, and pray at a shrine at the foot of the mountains; then they climb to the summit to pray to another shrine which is said to be the patio shrine of the ancestral god who lives inside the mountain (Vogt, 1976). One can imagine groups of ritualists coming to Tikal to pray at the foot of the pyramid and then climbing the steps to pray again to the ancestral deity at the top.

When a Zinacanteco was taken to Palenque for the first time a number of years ago, he drew a parallel in his own mind between the sacred mountains housing the ancestral gods in Zinacantan and the pyramids he climbed. In fact, he immediately conceptualized the tunnel inside the pyramid of the Inscriptions as a cave of the type that penetrates deep into the sacred mountains of Zinacantan. The parallels are striking!

7) The Maya have a peculiarly strong preoccupation with the passage of time. Little need be said today about this pattern, since the evidence is overwhelming and has been significantly added to by Dr. Miguel León-Portilla in his classic book on *Tiempo y Realidad en el Pensamiento Maya*.

8) The Maya universe is a layered quincunx —that is a spatial arrangement with four corners or quarters or zones and a center, and three layers —underworld, this world, and the celestial sphere. While many Maya scholars have approached the study of this problem with the concept of the European compass (with North, South, East, West) in their minds, there have been doubts the cardinal directions among the Maya as early as Alfonso Villa Rojas' monograph on Quintana Roo published in 1945. In now appears from the work of Villa Rojas, as well as that of Anthony Aveni (1980), Gordon Brotherston, and Clemency Coggins that we must profoundly revise our thinking about

this matter. The solution is not as simple as assuming (as I did in earlier publications) that if not cardinal points, then either inter-cardinal or solstitial points represent the four directions or quarters.

As Brotherston (Brotherston and Ades, 1975; Brotherston, 1976) points out, the ancient Maya were the *only* tropical astronomers of note in the ancient world and they worked with a different kind of behavior of the sun and stars than people in north latitudes. I do not have time to go into the intricacies of this problem today, but what seems to be the case is that the rising and setting sun (for which there are words in all Mayan languages) form the basic orientation in the universe. The other two points are most probably as Brotherston and Coggins (1980) suggest, the "top" and "bottom" of the daily path of the sun. This is certainly suggested by some of the glyphs for *K'in*, as well as for the *Kan*, *Cross*, *Lamat*, and the Maya completion sign. And it seems most likely that the Yucatec Maya words —*xaman* and *nohol*— that have been translated all these years as "north" and "south" really mean "up" and "down". In any event, many modern groups of Maya, when they are speaking and thinking in Maya rather than Spanish, can only differentiate between the two sides of the path of the sun (what we call north and south) by using left and right hand symbolism.

9) Maya ceremonial circuits are counterclockwise. This counterclockwise movements in ceremony seems universal among contemporary Maya and is also described by Landa (Tozzer, 1941; Coe, 1965) in the Uayeb ceremonies of the aboriginal Yucatec Maya, and indicated in the codices. Contemporary explanations of the movements by Maya informants in communities like Chamula and Zinacantan (Gossen, 1974; Vogt, 1976) are phrased in the following manner: the ritualists face sacred space and set out to the right—this automatically results in a counterclockwise movement enclosing the sacred space such as a new house being dedicated, a churchyard for a procession of saints, or a milpa being prayed over.

But more recently I have begun to think again that these ritual circuits may be modeled on the behavior of the sun, especially since our Tzotzil Maya informants *always*

speak of a ritual procession as moving along the path of the sun —with the most senior ritualist at the rear, i.e. closest to the position of the rising sun. We know that northern latitude cultures, like the Navaho Indians, also speak of their ritual circuits as moving “sunwise”. In high northern latitudes, the sun always appears to the earth-bound observer as moving clockwise at all seasons of the year. But to the tropical observers at 15 and 20 North Latitude, the sun moves clockwise during the months of late August through April; then moves counterclockwise from May through early August when the sun is in the northern plane. Since the sun moves counterclockwise for less than one-third of the year, how could this have been a model for the ceremonial circuits? But consider the span of time being covered by this one-third of the year: the growing season of Maize from planting time to the appearance of the first ears of green corn in August. Perhaps these powerful associations were enough for the ancient Maya to have selected counter-clockwise as the movement to replicate the path of the sun.

To conclude, I believe it is the view of most Mayan specialists that we are currently on the track of a cluster of structural and conceptual principles revolving around settlement patterns, lineages, ancestral gods, mountains and caves, pyramids, and certain types of ceremonial activity that can explain much not only in the Maya past but also in contemporary Maya culture if we can unravel all the threads. The next generation of Maya studies promises to be even more exciting as the archaeological, linguistic, ethnohistoric, and ethnographic work goes forward using our new methods and fresh hypotheses.

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