

March 11, 2000 (3:42PM)

Macroparasitism and Microparasitism in Mesoamerica

The Maya

Why did greatness collapse, why did misery survive? -Carlos Fuentes, The Orange Tree - 1994

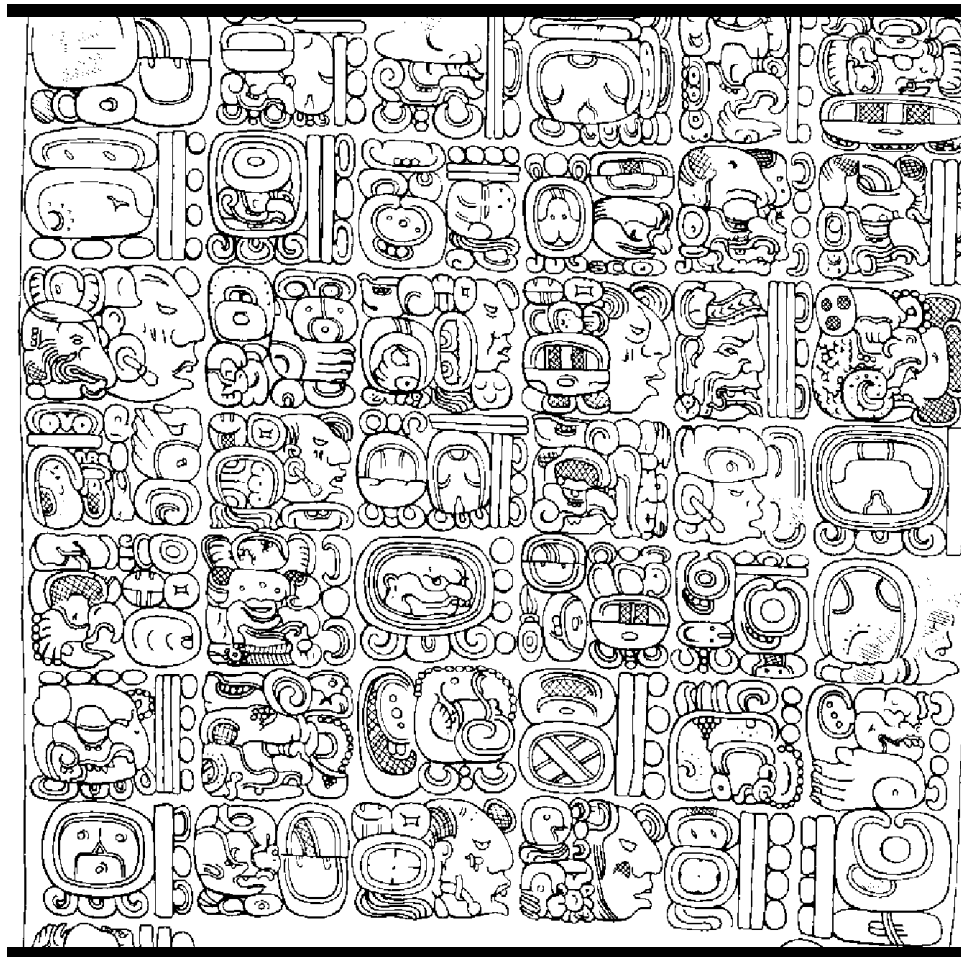


Figure 1. Mayan glyphs tell of 25th anniversary of Ruler 3's inauguration to the throne of Piedras Negras - Marcus 1992 p.348

Anyone who studies history and still expects human beings to be rational is truly an optimist. The most encouraging thing about history is that it shows that the species can survive one blunder and disaster after another. That of course is not always true of individuals or nations - Thomas Sowell, 1995

*What keeps a man alive?
 He lives on others:
 He likes to taste them first,
 Then eat them whole if he can;
 Forgets that they're supposed to be his brothers,
 That he himself was ever called a man.
 Remember if you wish to stay alive,
 For once do something bad
 And You'll survive!
 -Bertold Brecht, *The Three Penny Opera**

Much of the central flood plain of the ancient Euphrates now lies beyond the frontiers of cultivation, a region of empty desolation. Tangled dunes, long disused levees, and the rubble strewn mounds of former settlement contribute only, featureless relief. Vegetation is sparse, and in many areas it is almost wholly absent. Rough, wind-eroded land surfaces and periodically flooded depressions form and irregular patchwork in all directions, discouraging all but the most committed traveler. To suggest the immediate impact of human life there is only a rare tent...Yet at one time here lay the core, the heartland, the oldest urban, literate civilization in the world [Robert McAdams 1981, quoted in Tainter p. 1]

...civilizations are fragile, impermanent things [Joseph Tainter p. 1].

*Say first, for heaven hides nothing from thy view,
 Nor the deep tract of hell, say first what cause
 Moved our grand parents in that happy state,
 Favored by heaven so highly, to fall off
 From their creator, and transgress his will..
 Who first seduced them into that foul revolt?
 John Milton, *Paradise Lost*, Book I*

*On that day, dust possesses the earth,
 On that day, a blight is on the face of the earth,
 On that day a cloud arises,
 On that day, a strong man seizes the land,
 On that day, things fall to ruin,
 And they are scattered afar in the forests
 -The Books of Chilam Balaam*

The mystery unfolds

Having heard rumors of the ruins of a mysterious vanished civilization in the jungle of Central America, John Stephens and Frederick Catherwood set off in 1839 to find them. They explored nearly 50 archaeological sites and were stunned by what they found. Like the first European visitors to see the Moai of Easter Island, Stephens and Catherwood opined that these vanished cities were not the work of the “savages” that now lived there, but of a very highly evolved civilization. In his book *Collapse*, Jared Diamond excerpts some of the passages from their books which, by the way, contain many exquisite drawings by Catherwood :

The city was desolate. No remnant of this race hangs round the ruins, with traditions handed-down from father to son and from generation to generation. It lay before us like a shattered in the midst of the ocean, her mast gone, her name effaced, her crew perished, and none to tell whence she came, to whom she belonged, how long on her journey, or what caused her destruction Architecture, sculpture, and painting, all the arts which embellish life, had flourished in this overgrown forest; orators, warriors, and statesmen, beauty ambition, and glory had lived and passed away, and none knew that such things had been, or could tell of their past existence Here were the remains of a cultivated, polished, and peculiar people, who had passed through all the stages incident to the rise and fall of nations; reached their golden age and perished ... We went up to their desolate temples, and fallen altars; and where ever we moved we saw the evidence of their taste, their skill in arts ... We called back into life the strange people who gazed in sadness from the wall; pictured them in, in fanciful costumes and adorned with plumes of feather, ascending the terraces of the palace and the steps leading to the temples ... in the romance of the world's history nothing ever impressed me more forcibly than the spectacle of this once great and lovely city, overturned, desolate and lost ... overgrown with trees for miles around, and without even a name to distinguish it [p. 158].

There is indeed something “romantic” about such a mysterious place and this no doubt explains why tourists by the millions have flocked to the Mayan ruins in the Yucatan and, now that it is safe, in Guatemala and Honduras. But be not misled, there is little about the Maya that was actually the stuff of romance. Like all other civilizations it was ruled by parasitic “savages” who mercilessly exploited the people, engaged in relentless dynastic wars, and built monuments intended only to glorify themselves and to intimidate others, and who ultimately were the leading force in the destruction of the natural capital that sustained the entire enterprise. It may be that nature was the ultimate force in the decline of Mayan “civilization,” but surely the leaders of these city states were all running at top speed toward the cliff and taking their people with them.

The way we never were

John Milton, in *Paradise Lost*, was not the first human, and surely not the last, to ask

why humans had destroyed something good. Milton lamented the "loss of Eden" that brought "death into the world and all our woe." Milton blamed the "first disobedience" on the "infernal serpent" who with his "guile Stirred up with envy...deceived the Mother of mankind." Humans have always been prone to looking for demons to blame for their own inadequacies and failures.

While past "civilizations" have not always been paradises, humans are quite naturally interested in past, and most especially, mysterious "lost civilizations." Our interest in the past is inherent in our quest to find our own demons. While, in part, the simple curiosity of the antiquarian, our interest in failed civilizations is the consequence of our alienation in the present. We romanticize the exotic, out of a sense that we have lost something that made life better in the past, or the sense that others had found the secret to contentment that escapes us. We are also fascinated with failed civilizations because, always residing in us, there is the fear that our civilization is on the verge of disintegration. We no longer hold the "unquestioning faith in the future and the absolute value of our civilization" that might have been characteristic of past generations [Christopher Dawson quoted in Tainter p. 3]. In the United States we see the signs of degeneracy all about us: poverty, homelessness, random murder, rising crime, drug addiction, family disintegration, the emergence of new diseases and the revival of others we thought we had conquered. While anxiety about nuclear Armageddon has lessened of late, it is an attitude that is yet unwarranted. We now commonly speak of generations that will not live as well as their parents.

The world, and now after September 11, 2001, the United States has witnessed an explosion of terrorism, civil war, genocide, massive famines, and epidemics of such frightening virulence, that should they spread out of their limited domains, they would produce death tolls that would make the Black Plague look like the common cold. Untold millions stand poised in Africa and Mexico waiting for collapse to push them into massive migrations into Europe and the United States. Much of Africa is already in a state of anarchy, many South American nations are not far away from it either.

It has been said that every generation is obliged to rewrite its history; an obligation to which, much more than many others, we dutifully attend. In a very apparent way our history is constructed as much, or more, out of the needs of the present than from the raw facts of the past. Our view of the past is invariably biased by our own contemporary experience. Thus, at the height of the British Empire elitist, aristocratic, historians were inclined to seek the explanation of the rise and collapse of the Roman Empire in terms of the failure of elites to adequately manage the Empire. This failure was rooted in deviations from the quintessential, ideal, Victorian moral code e.g. greed, promiscuity, adultery, homosexuality. Of course, in light of the imperial racism of England, one should also expect to find "racial theories" suggesting Rome failed because rule was assumed by inferior types. What one is unlikely to find are theories that suggest that empires are, due to an inherent set of contradictions, naturally inclined to disintegrate, e.g. the sun does tend to set on all imperial systems. Moreover, given the arrogant presumption that man had subdued nature, one is not likely to find the realization that many empires failed under the stresses produced by the reactions of nature to the human predation on it.

Case in point...

In a 1985 article, anthropologist Richard Wilk revealed distinctive correlations between the nature of emerging new theories of the Maya collapse, and the political problems emerging in the United States. During the Vietnam War, Mayanists were blaming warfare for the “collapse.” As the environmental movement exploded so did "environmental" theories of Maya collapse. With the revival of religious fundamentalism in the United States, Mayanists began to assert theories emphasizing the fatalism produced by the Mayan religion.

A very good example of this process is evident in the words of Mayanist Kenneth Baker pertaining with our "fascination of the Maya":

Every thoughtful person who ponders the bureaucratic and technological pressures on ordinary life today must wonder whether it is possible for a society to strangle on its own complexities...Sensing our own collective future is in jeopardy...we are hungry for historical analysis to help us imagine the direction events might take [Quoted in Tainter p. 2]

The study of history cannot, therefore, be undertaken without an understanding of the context in which it was written. Hence, Wilk's warning to archaeologists should be taken to heart and mind by all students of history:

Archaeological discourse has a dual nature: at the same time that it pursues objective knowledge about the past, it also conducts an informal and often hidden political and philosophical debate about the major issues of contemporary life...The task is to recognize the nature of the dialogue and to take responsibility for it [Richard Wilk quoted in Sabloff p. 167].

What makes a "paradise"?

If we are going to speak of lost "civilization," metaphorically as "paradise lost" we must first define "paradise." We can define the essential elements of “civilization” in a negative way by defining its collapse. According to Joseph Tainter a civilization has collapsed when it "displays a rapid, significant loss of an established level of sociopolitical complexity" [Tainter p. 4]. Collapse is evidenced by our observation of [Tainter p. 4]:

- ▶ a lower degree of stratification and social differentiation
- ▶ less economic and occupational specialization, of individuals, groups, and territories
- ▶ less centralized control; that is, regulation and integration of diverse economic and political groups by elites
- ▶ less behavior control and regimentation
- ▶ less investment in the epiphenomena of complexity, those elements that define the concept of "civilization": monumental architecture, artistic and literary achievements, and the like;
- ▶ less sharing, trading, and redistribution of resources;
- ▶ less overall coordination and organization of individuals and groups;
- ▶ a smaller territory integrated within a single political unit.

- ▶ less flow of information between individuals, between political and economic groups, and between center and periphery.

Civilizations, in short, are complex societies that integrate the economic and social activities of many individuals and groups. The individuals and groups are specialized and hierarchically arranged. It is generally supposed that only State level societies achieve the complexity that warrants the title of civilization. Anthropologists consider the power to coerce an essential dividing point between complex civilizations and complex "primitive" organizations such as Chiefdoms.¹ While Chiefdoms may be complex Chiefs are too often bound by kinship obligations to have true coercive power [Tainter p. 26].

In a civilized state social organization becomes independent of kinship and is instead based on some common legitimating ideology. The sociologist Emile Durkheim made the distinction between "mechanical solidarity" and "organic solidarity" to describe societies organized around kinship and those organized around a common ideology.

In primitive groups the sense of "groupness" comes "mechanically" (instinctively) from ties of blood and kinship. In State level societies, however, people are very heterogenous, that is, they are not unified on kinship, cultural or economic grounds. The ruling class is professional and outside the obligations of kinship and has great coercive powers. Loyalty to such a system must be produced by a legitimating ideology (e.g. divine right of Kings, special relationship to Gods etc). It is imperative that States "establish and constantly reinforce legitimacy" [Tainter p. 27]. While coercion may sustain order, it is costly and, in the final analysis, ineffective. Ideology that establishes "moral validity is a less costly and more effective approach" [Tainter p. 27]. This is why every complex society has an official religion [Tainter p. 27]. By linking the font of power with the supernatural, the leadership is stripped of any characteristic such as class or clan background that might have undermined his perceived fairness and legitimacy should any challenge arise [Tainter p. 28]

Lies are at least as old as language - Roy Rappaport, 1979

Mesoamerican writing is best compared to Egyptian hieroglyphics in both form and function. Both were hieroglyphic and both were tools of royal propaganda. Mayan writing uses pictography in which pictures act as signs and sometimes act as sounds. For example, the Sun - sign acts as idea (heat, light, day). It also uses the so-called rebus principle; a series of signs that sound like things appear in a string - I saw ant rose (eye, saw, ant, rose). In some cases, signs stand for words, syllables, or for phonemes (sounds) [Marcus p.18-19]. The attempt to decipher Mayan writing occupied the minds of scholars from all over the world for decades. This task was both greatly complicated and yet simplified by the Spanish. On the one hand, Diego de Landa, a Spanish friar, burned every Mayan codice he could get his hands on. At Mani in the Yucatan, in 1562, Diego de Landa who thought the books "words of the devil" set them to fire [Marcus p.76]. He wrote that, "these people also made use of certain characters or letters, with which they wrote in their books ancient matters and their sciences, and by these and other

¹ Recall Sahlin's comment, "the chief gives the orders and then everyone does as he pleases."

drawings and by certain signs and in these drawings, they understood their affairs and made others understand them and taught with them. [However], as they contained nothing in which there was not to be seen superstition and lies of the devil, we burned them all, which they regretted to an amazing degree, and which caused them much affliction” [quoted in Fagan 1995 p. 194]. Only three codices survived² the Spanish [Gallenkamp p. 12].

On the other hand, de Landa wrote *Relación de las cosas de Yucatán* in which he detailed the Mayan calendar with the appropriate glyphs and he wrote out the Mayan alphabet. In so doing, he laid the foundation for the ultimate decipherment of Mayan writing several centuries later. De Landa believed the Mayan hieroglyphs were a phonetic code, that is a true written language [see box], an assertion that would be proved essentially correct. De Landa’s manuscript was not “discovered” until the middle of the 19th century. Despite the enormous assistance provided by this work, it took another century to “break the Maya code.”

Part of the translation problem was that there was some disagreement about what the writing was all about. Some believed the glyphs were written Maya history, but the leading Mayanist, J. Eric Thompson vehemently rejected this idea:

It has been held by some that Maya dates recorded on stelae may refer to historical events or even recount the deeds of individuals; to me such a possibility seems well nigh inconceivable. The dates on the stelae surely narrate the stages of the journey of time with a reverence befitting such a solemn theme. I conceive the endless progress of time as the supreme mystery of Maya religion, a subject that pervaded Maya thought to an extent without parallel in the history of mankind. In such a setting there was no place for personal records, for, in relation to the vastness of time, man and his doings shrink into insignificance. To add details of war or peace, of marriage and giving in marriage, to the solemn roll call of the periods of time is as though a tourist were to carve his initials on Donatello’s David [quoted in Schele and Freidel p. 47].

To keep their image of the peaceful, theocratic Maya intact, Thompson and others who shared his view, had to ignore stone monuments and murals that showed warriors, military weapons, captive taking, human sacrifice, and fighting between men armed with spears and shields. They also had to ignore a rich vocabulary of conflict recorded during the 16th and 17th centuries [Marcus p. 412]. Thompson would live to admit that he was utterly wrong [S&F p. 47].

In addition to the controversy over what the glyphs said, there was ongoing uncertainty as to the true nature of the Mayan glyphs, that is, were they merely picture writing or a phonetic

2 These codices were not of ancient origin, they were produced in the 15th century. Moreover, while useful to those researchers interested in Mayan calendrics, ritual, and astronomy, they contain absolutely no useful historical information [Gallenkamp p. 13]. Maya history was carved in stone on Stelae and on monuments.

script? In 1952, Yuri Knorosov, a young Russian student of comparative languages published a paper making the claim that Mayan script was both a phonetic and syllabic hieroglyphic script similar to Egyptian hieroglyphics, cuneiform and Chinese [Fagan 1995 p. 198]. With this discovery it was clear that the Mayan hieroglyphics were true writing, that is, “they could write everything that is in their language” [Michael & Sophie Coe, *The True History of Chocolate*, p. 43].

Tatania Proskouriakoff, then at the Carnegie Institution,³ with a “barrage of papers” published between 1960 and 1964 “convinced” Mayanists that the glyphs did indeed “record the deeds of rulers and nobles” [S&F p. 48]. After an intensive study of the carved stelae at Piedras Negras she concluded she was reading not “religious inscriptions” but a “record of once living men and women.” [Fagan 1995 p. 198]. “In retrospect,” she wrote, “the idea that Mayan texts record history, naming the rulers or lords of the towns, seems so natural that it is strange it has never been thoroughly explored before.” [quoted in Fagan 1995 p.198].

History is written by the winners

As wrong as Thompson may have been, the proponents of the idea that the Maya glyphs were “history” were also in error. It is part of the “conventional wisdom” that writing was a necessary component of civilization. But, many complex societies, such as Peru (Inca) and Teotihuacan, in the New World and many other old world societies never invented writing. So, asks Maya scholar Joyce Marcus, “if writing not a necessary component of major state why did it develop where it did?” [Marcus p. 3]. In the Near East writing evolved from economic activities associated with temples; to record transactions such as the sale of land [Marcus p. 19]. But,

Technically, a writing system will allow the full representation of all speech. The Aztec system, using pictographs, could represent only numbers, dates and names. The Mayan system was closer to writing in that it used morphemes and phonemes represented by glyphs to represent words. To say that “writing” was unknown to the “relatively advanced Aztecs” is very misleading. Although, strictly speaking, they did not have writing, they had a writing system which they used to record astronomical observations, tribute lists, details of conquests, court proceedings and other aspects of daily life [M. Weaver, p. 457]. The Aztecs used the same methods as other Mesoamerican cultures, a combination of pictographs and ideographs to “convey meaning and action.” [M. Weaver p. 457]. It is true that many of the famous Aztec codices (that were burned by the Spaniards) were written “post-conquest” but they were in the style of Aztec writing found in stone carvings from the pre-conquest era [M. Weaver p. 457]. In any case, the Aztecs had no need for more sophisticated writing forms at their stage of development, or they surely would have developed them. Although the last of the classical Mayan cities was deserted by 900 A.D., the Aztecs were in contact with the Mayans in the Yucatan region. The Mayans did develop a true system of writing based on the representation of sounds and syllables that could relocate the spoken language.

³Actually, she was an architect employed by the Carnegie Institution to draw an artist rendition of all the Mayan cities then being excavated [Fagan 1995 p.198].

Mesoamerican writing had a different function. In Aztec, Mayan, Mixtec, Zapotec society writing was a tool of the state. It was monopolized by the elites (hereditary rulers, priests and scribes); "elites "monopolized the ability to read and write just as they had monopolized a number of other skills and privileges" and the monopoly was "jealously guarded" [Marcus p. 7]. It was handed down from elite father to son and jealously guarded. In fact, all elites were periodically examined to The Maya elite also used an esoteric language to reinforce social distinctions and to keep out pretenders. weed out usurpers [Marcus p. 78].

Writing was just another political tool used by the elite rulers of complex societies to legitimate their power [Marcus p.4], " it was used to make public and permanent, a whole series of messages that hereditary leaders of society deemed important." [Marcus p. 4] In short, "writing was a propaganda tool of the state,...for all four Mesoamerican systems elites had "a monopoly on truth" [p. 7] and made no distinction between "myth, history and propaganda" [Marcus p. 5].

The Maya produced propaganda on a "monumental" scale; the staircase at structure 26 at Copan is 50 feet wide, 85 feet high, has 72 steps and 2500 hieroglyphs [Weaver p. 285]. The staircase hieroglyphs, which constitute the longest Mayan text in existence, document the entire dynastic history of Copán to the year 755 A.D. [Weaver p. 285]. The stairway was constructed after the humiliating defeat of Copán's ruler XVIII-Jog at the hand of Cauac Sky, the leader of Quiriguá, [a city some four days of hard walking away] in a battle fought in 738 A.D.. The stairway was started by Lord Smoke-Monkey, the successor to XVIII-Jog and finished by his son Smoke-Shell. The message was pure propaganda; an attempt to rebuild the pride and the respect of the people of Copán for their leaders.⁴ The direct message conveyed by the "text" is the glorification of ancestors and the benefits of war and sacrifice [Weaver p. 285]. Archaeologist William Fash describes the tone of the staircase message as that of a "revivalist movement" [Quoted in Fagan 1995 p. 207].

All Mesoamerican writing seems to have arisen to record "history," that is, things that happened in the past, but there was no allegiance to facts or timing; the past was routinely distorted to serve the current need of a hereditary ruler to establish the legitimacy of his rule. To do this he would give himself ancestors he did not have i.e. link himself to venerated individuals of myth to establish himself as the "predestined reincarnation of a hero from mythical times" [Marcus p. 14]. It was also common to time his birth to a propitious day, award himself military victories he never garnered [Marcus p. 9] and to time his ascension to coincide with some mythical event. "Mesoamerican texts manipulated dates, life spans, astronomical cycles, and real events to put myth and history into a single chronological framework." [Marcus p.9]

Mesoamerican writing a particularly important "tool and a by-product of intense

⁴The stairway was poorly built and soon disintegrated. Brain Fagan suggests this indicates that the people may not have been in full support of Smoke Shell. But, all of the structures at Copan were poorly built due to a lack of limestone in this region. The structures were built of rubble held together with mud and then covered with plaster. Eventually, the plaster cracked leaving the structure vulnerable to fenestration by roots and water. Over time the structures crumbled and were shaken by earthquakes. What is seen today at Copan has been painstakingly reconstructed out of a pile of rubble [Fagan 1995 p.205].

competition for prestige and leadership positions"[p. 15] Propaganda was means by which ideology was disseminated downward to the masses, say to prepare them for a war with a hated enemy, and horizontally to other elites, to keep them in line [Marcus p.11, 15].

Joyce Marcus believes that writing began in prestate societies around 700-400 B.C.. In particular, in "ranked and stratified societies that are characterized by intense competition for positions of leadership"[p. 15] . For example, " chiefly societies characterized by a high level of raiding among villages and the competition between chiefs and subchiefs and early states was characterized by bitter conflicts over ascension to the throne, with warfare and assassination well documented" [p. 15]. Chiefs, unlike rulers in State level societies, had less "institutionalized power" than they wanted or needed so they used elaborate feasts and gift-giving to keep potentially competitive elites from other areas happy. They also relied on propaganda to "make the case for their special rights and privileges" [Marcus p. 32]. The means of propaganda included monuments stressing genealogical right to rule, their special relationship to the supernatural, important captives they have taken, and general battlefield prowess [Marcus p. 33] Marcus believes that Easter Island is a good example of the type of Chiefdom⁵ were writing first evolved. The Easter Islanders developed writing primarily it seems to record genealogical records. Easter Island was a Chiefdom with marked social differentiation between long ears short ears. There were frequent battles between Chiefs, and genealogies were manipulated as a competitive strategy [Marcus p. 29]

Real History

Thus, the study of the Aztec and Maya civilizations in more than an exercise in antiquarian studies. Antiquarians study the past for its own inherent interest and without any attempt to generalize about the "human condition." For example, until the 1960s Maya scholars revealed no interest in "theory or explanation:"

While their discussions were replete with much detailed archaeological information, they rarely asked explanatory questions, such as, "what caused the rise of ceremonial centers" and "why did they expand?" What role did the environment play in the growth of complex social and political organization? How did the rise of cultural complexity in the Maya lowlands fit in with general theories of cultural development? [Sabloff p. 64]

The Mayan and Aztec Civilizations in Mesoamerica provide us with case studies that illustrate many of the important "general" themes developed in this course within the context of western European and North America culture. Both civilizations seem to track the path we established earlier for state formation. Both built cities that rivaled any in Europe at the time. Both developed writing and calendric systems. Both became highly stratified and militaristic. Both built massive and elaborate monuments to honor their Gods and to glorify their leaders and in each case put great strains on the "producers" and on the ecosystem. In both the elites used

⁵ Societies with individuals of elite status, but no kings living in palaces, no state religion, no temples, no urban centers, and no standing armies (although raiding and captive-taking were well known)[Marcus p. 33].

propaganda and ideology to consolidate power. Both came to be dependent on elaborate and massive irrigation systems and certainly qualify to join the ranks of hydraulic despotisms. Both suffered from population pressure and turned to macroparasitism to deal with it.

The Aztecs provide a classic case for the study of Macroparasitism and maladaptation attendant to what may have become dysfunctional ideas. We will never know whether the Aztec would have tragically disintegrated from their own internal problems. The contact with Europe was the direct cause of their downfall. Consequently, Aztec history also provides a model for the study of microparasitism.

The Aztec mode of production was highly developed and the structure, i.e. class and gender relations, were also very well delineated. The Aztecs also provide a very good example of how a cultural system influenced, in a sometimes bizarre fashion, by the peculiarities of the local environment. Finally, the Aztecs provide an interesting case study of the relative importance of material and ideological forces in the shaping the trajectory of cultural dynamics.

More specifically our attention is focused on the practice of cannibalism by the Aztecs. Was cannibalism as "rational adaptation" to the peculiarities of the environment in the valley of Mexico? Or was cannibalism an "epiphenomenon" of Aztec imperial macroparasitism? I will argue that cannibalism is best understood as a manifestation of a dysfunctional idea imposed by "usurpation" by an imperial elite bent on expanding the Aztec empire for their own benefit. By dispensing with the "organic fallacy" one can better see that it was not in the interests of "Aztec society" to practice cannibalism, but in the interests, and only incidentally at that, of an elite pursuing imperial expansion.

Mayan Civilization illustrates the verity in Thomas Sowell's observation that individuals and nations do not always survive their mistakes. More generally, history is filled with examples of civilizations that could not overcome the internal contradictions in their cultural and economic systems especially as the latter related to the ambient ecological system. Thorstein Veblen once complained that the industrial civilization of Twentieth Century America was based on a structure of "imbecile institutions." We shall return to his comment in the context of our study of North American Civilization. At this point we note only that Twentieth Century industrial America was not the first "American" civilization to contain within it certain elements that were clearly dysfunctional and a general thrust or basic foundation that placed it on a tragic, terminal trajectory. As in a true tragedy, the Mayan civilization, like many others before and since, had a basic character flaw. Despite a native genius as manifest in its intellectual achievements, the Maya could not overcome one fundamental problem: given the infrastructure they were able to develop, *they had built their civilization in the wrong place and could not find a "technological fix."* Under the pressure of growing population the Maya had developed a very complex society. Although the Maya had persevered for about 1400 years in the lowland environment, population growth had pushed the system to a level of complexity that was unsustainable in the lowland ecosystem. The Maya then fell into a pattern of response to the emerging crisis that only made it worse.

The Politics of Mayan Studies.

Until fairly recently the Mayan Civilization has been an enigma; no one could explain its sudden disintegration. In part, no one could understand the sudden abandonment of Mayan cities

beginning at about 800 A.D. because no one could understand how these cities sustained themselves, that is, how these cities were possible. We understand much more about the Maya since archaeologists deciphered the Maya hieroglyphics carved on Stelae and temples in the ruins of the fabulous Mayan cities such as Tikal (Guatemala), Copan (Honduras), and Palenque (Chiapas, Mexico). Moreover, while early Mayanists focused their intellectual energies on the activities of the elites, since the 1970s archaeologists have devoted more energy to studying the day-to-day lives of the Mayan masses, the way they "earned their daily bread," and have produced radical new interpretations of Mayan history. Recent discoveries have revolutionized our understanding of the Mayan subsistence system and thereby reconciled possibility and existence. Furthermore, it has become clear why the Mayan cultural fluorescence progressively faded and then disappeared.

The Maya, it turns out followed a path very similar to that of the Rapa Nui, indeed, the parallels are quite striking. Like the Rapa Nui, the Maya over exploited and depleted their environment. As food grew scarce the Maya paradoxically took more manpower from agriculture and devoted it to monument building. Like the Rapa Nui, and the Aztec, in the face of evidence of impending disaster, the Maya elite chose a highly destructive path; they resorted to increased warfare and an expansion of monument building in an attempt to regain the cooperation of the Gods, to maintain the legitimacy of their rule and to intimidate potential aggressors. Furthermore, the new "revisionist" Mayan archaeology questions whether the Mayan "collapse" was tragic at all.

Traditional Mayan archaeology had focused on Mayan "civilization" which was for all intents and purposes the study of the culture and intellectual achievements of the elite macroparasites. Archaeologists marveled at Mayan architecture, mathematics, astronomy, calendrics and art produced in the "cities" then thought to be inhabited only by the elites. Quite naturally when the "cities" were abandoned it was assumed that Maya culture tragically collapsed. The new archaeologists bring a new perspective to Maya studies.

The traditional Maya model was developed by "elites," that is by men who came from the upper classes. Their perceptions and perspective on the Maya was therefore subjectively informed by an elitist worldview. The new generation of Mayan archaeologists comes from working and middle-class backgrounds. They were beneficiaries of the postwar explosion of affordable education and the explosion of academic jobs in state universities that made a career in archaeology available to the non-privileged. These scholars were not only less pietistic toward the social role of elites they were inclined to see elites as social parasites rather than creators of culture [Sabloff p. 168].

The traditional model had gone on uncontradicted for decades for a number of "nested" reasons. First, urban population densities were underestimated. In a classic illustration of the important difference between facts and inferences, traditionalists simply presumed (inferred) the ancient Maya used the same agricultural methods as the contemporary Maya without doing the empirical work to verify the hypothesis. The traditionalists were vulnerable to this error because they had an elitist worldview and shared the "fear and dislike of urbanism then prevalent in English thought" and a great admiration for Mayan culture [Sabloff p. 53]. The traditionalists did not want to see the elites they so admired as inhabitants of "cities." In their minds cities were peopled by the impertinent *bourgeoisie* and the unwashed masses. Moreover, the attention of the traditionalists was drawn to the monumental architecture, the intellectual achievements of the

elites as manifest in science and art; they rarely ventured beyond the immediate vicinity of the structures in the ceremonial centers, hence non-elite structures were ignored [Sabloff p. 61].

Yet another prejudice blinded the traditionalists to the error of their inference - the traditionalists were idealists. Idealists focus on a top-down understanding of culture. Idealism is an affliction to which elitists are pathologically prone. Visible culture is understood by idealists to be mere material manifestation of the ideas of the "best" people. Thus, idealists have no interest in the mundane activities of commoners. Actually they have no interest in the material world at all except as it is formed into the "shadows of ideas."⁶ Idealists believed in "possibilism,"⁷ that is, the notion that the environment was neutral in cultural development [Sabloff p. 72]. Any number of cultural forms could inhabit an area depending only on the ideas of the elites to shape them. This attitude was reinforced by a gut reaction against the materialist ideas of Karl Marx and the abuse of environmental determinism by racists intent on proving every race was inferior to northwestern Europeans [Sabloff p. 72].

They early Mayanists were obsessed with the details and description rather than theory and explanation. Rather than exploring the role of the environment in the formation of Mayan culture and how the Mayan pattern fit into general theories of cultural development, the Mayanists indulged in a "great deal of obsessive wallowing in detail of and for itself" [Sabloff]. General theories of historical development were not the exclusive domain of Marxists, but general theories of historical development that were based on material factors were. Thus a visceral reaction against Marxism, no doubt accounted for the lack of interest in "general theories."

One should not attribute such attitudes exclusively to the individual prejudices the men, [principally Englishmen J. Eric Thompson and Sylvanus G. Morely], but also to the intellectual temper of the time. In the last two decades of the 19th century and the first three of the 20th there was a sustained attack on materialism and scientism.

Although its roots lie deep in ancient Greek Philosophy, by the late 19th century materialism was intimately identified with political radicalism, especially Marxism:

As the political struggle for control of the bourgeois state intensified, learning and lore were swept up in the battle. Conscious as well as unconscious attempts were made on a wide front covering all intellectual media to annihilate the subversive doctrines. In the rapidly expanding and highly competitive subcommunity of professional intelligentsia, prestige and emolument closely adhered to the contribution which one made to the rout of the materialists. Science itself became the object of suspicion...Everywhere voices were raised arguing for the return to life of mystery [Harris 1968 p. 271].

The reactionary idealists rejected the epistemological value of generalizations derived from reason and systematic empirical observation. One contemporary observer complained in

⁶ I refer here, of course to Plato's famous cave image. The material world is analogous to shadows cast on the wall of a cave. The shadows resemble the form of the real object, but only imperfectly. Ideals are perfect, the material world is a poor reflection of the perfect.

⁷ Recall the earlier discussion. Many different systems can be possibly observed, but this does not alter the fact that the one actually observed is one that has been shaped by the ecological system.

1925 that the popular philosophers and artists of these times attached "greater value to novel impressions and vehement expression than to coherency and order" and "dismissed physical science as devoid of any genuine knowledge." [Quoted in Harris 1968 p. 272]. The idealist, elitist historian, Croce, writing in 1923, reveals the temper of the times, and gives us some insight into the what may have informed the worldview and the methodology of the early Mayanists. Croce attacked the basic premise of the Enlightenment that universal laws regulate the phenomena of the universe and these laws can be derived using reason.

Do you wish to understand the true history of a Ligurian or Sicilian Neolithic man? First of all, try if it be possible to make yourself mentally into a Ligurian or Sicilian neolithic man; if it be not possible, or you do not care to do this, *content yourself with describing and classifying and arranging in a series the skulls, utensils, and the inscriptions belonging to those neolithic peoples*. Do you wish to understand a blade of grass? First and foremost, try to make yourself into a blade of grass, and if you do not succeed, content yourself with analyzing the parts and even with disposing them in a kind of imaginative history [Quoted in Harris 1968 p. 273, emphasis added].

Whether the early Mayanists were consciously influenced by such thinking cannot be determined, but they certainly acted "as if" they were. The combined effect of these forces was to produce a corpus of knowledge about Mayan Civilization that was "weighted overwhelmingly" toward the intellectual accomplishments of upper end of the hierarchy and that was little more than "reformed antiquarianism" [Sabloff p. 65]. In 1948, in a "landmark book," *A Study of Archaeology*, W.W. Taylor summarized the current state of the Mayan research programs and the knowledge they had produced. According to Taylor the field work and the analyses were mere "chronicles;" the description of artifacts toward the purpose of putting them in chronological order, beyond that Mayan studies

have hardly touched, and then only incidentally, the cultural remains of the common Maya. But even within the hierarchal culture, the emphasis has not been to construct a picture of how the Maya hierarchy lived: what they did and where, when and how and with what. Such intensive excavations as have been made have not been directed toward the clarification of these problems, but rather toward finding the material for comparative and chronological studies or, many times, just to excavate structure which appeared to be of a rare and unknown type or was prominent or artistically beautiful.

Enter Cultural Ecology

Cultural Ecology has come to be widely accepted among anthropologists and may be the dominant paradigm in the discipline. It was not always so. The founder of the cultural ecology school, Julian Steward, like Marx insisted that a society be studied from the bottom-up. Steward's studies used a concept called the "cultural core" and emphasized "food-getting activities." Steward's conception of the culture core was "in fact, a clever way of masking the Marxian concepts of the forces and relations of production." Steward developed and published his theory in the early 1950s, the height of the McCarthy era in the United States. Like others he

had to code his work to avoid persecution by McCarthyite witch hunts for communists [Halperin p. 65].

As noted above, after World War II, and most notably in the 1960s the class composition of the archaeology profession began to change. One no longer needed to be rich to acquire an education and, due to government research grants, only merit decided who could do field work: in short, archaeology was no longer the exclusive domain of the wealthy, upper-class with its visceral distaste for things ordinary. Many of the new scholars, from State Universities, were suspicious of elite values and often hostile toward them [Sabloff p.168].

One of the key tools of the new "more egalitarian" ecological school was to study the extensive "settlement pattern" beyond the urban center to see how ordinary people actually produced their food [Sabloff p. 72, 169]. When this was done at Tikal the lid was blown off of the "traditional model."

It was not until the late 50s and 60s that areas beyond the "central elite core" were mapped and studied. At Tikal, for example, it was discovered that settlement was more extensive and population densities much higher than previously believed [Sabloff p. 77]. It is estimated that at 500 A.D. Tikal controlled a territory of nearly one thousand square miles and controlled the lives of some 360,000 people [Fagan 1995 p. 201].

Thompson assumed that the ancient Maya used the same agricultural techniques as the contemporary Maya. In the past, with urban population densities underestimated there was no reason to wonder about how they were sustained; slash/burn was adequate so there was no need to further explore the material domain. The circle is complete. The "fact" of higher population density forced researchers to look for evidence of another more intensive agricultural system.

When evaluating the Mayan "tragedy" the revisionists are inclined to ask, "tragic for whom?" If the Mayan peasantry was indeed increasingly burdened with the exactions of macroparasites, and there is no doubt it was, they might have welcomed the collapse of the complex city "civilization" as much as they would have welcomed relief from the microparasites that caused syphilis or yaws.⁸ As Joseph Tainter notes in his book, *The Collapse of Complex Societies*; "To a population that is receiving little in return on the cost of supporting complexity, the loss of complexity brings economic gains" [Quoted in Sabloff p. 175]. In addition, to sustaining the conspicuous consumption of food, ornamentation, and palaces of the elites:

For over 1000 years the Maya peasantry supported upwardly spiraling numbers of monuments [glorifying elites], agricultural projects, military and civil specialists and artisans. But a peasant's hard work did not bring a better diet; on the contrary the health and nutrition of the population was

⁸ Late-classic burials reveal signs of childhood malnutrition and related childhood diseases. The burials also revealed signs of syphilis or yaws. Science has had great difficulty determining whether the person had syphilis or yaws because the spirochetes that cause these diseases are so similar. The difference in the diseases is not in the effects but in the mode of transmission. Syphilis is sexually transmitted while yaws enters through lesions in the skin. Since syphilis has been found in New World it was presumed that in addition to the many gifts the New World gave to the old, it gave syphilis. Syphilis first appeared in Europe in 1494 in the French Army which in turn spread it all over Italy in the Italian Wars of 1494-1559. The disease was spread to China and Japan by Vasco De Gama's sailors by 1505. Some have maintained that the spread of syphilis in Europe was not necessarily a consequence of contact with the new world. They hold out the possibility that the Yaws spirochete could have mutated into one that was sexually transmitted. The timing of the spread of the disease to Eurasia is thought to be a coincidence [McNeill 1976 p.92, 193, Stuart & Stuart p.92].

low, and they further deteriorated in classic times. With the investment in complexity bringing a lower standard of living to the majority, it is no surprise that the civilization of the southern Classic Maya eventually collapsed [Sabloff p. 175]

The Maya

Taking care of the land was their fundamental mission; they were the servants of the land - that's why they'd been born. Their magic stories, their ceremonies, their prayers, ...had no other purpose than to keep the land alive and fertile, to honor the ancestors who had in their turn kept the land alive and fertile,...and had passed it quickly on, abundant or scanty , to their descendants....Endless obligation, long succession, which at first seemed to us like the eternally repetitive labor of ants, until we realized doing what they did was its own reward. It was the Indian's daily offering: in serving nature, they created themselves. It's true they lived in order to survive; but they also lived so the world would go on feeding their descendants when they died. Death for them was the price for the life of their descendants.

..we saw the fragility of the land and wondered...how the life of the great abandoned [Mayan] cities could be sustained by such meager soil and such impenetrable forests...as sons of farmers we had the answers of our ancestors: Exploit the riches of the forest lightly, exploit the riches of the plains well, and take care of both. This had been the behavior of the peasants since time immemorial. When it coincided with the behavior of the dynasties, Yucatan lived. When the dynasties put the greatness of power above the greatness of life, the thin soil and the thick forests could not produce enough to meet the demands of kings, priests, warriors, and bureaucrats. Power fell. The land remained. Those who remained had no power other than the land.

- Carlos Fuentes, *The Orange Tree*, 1994

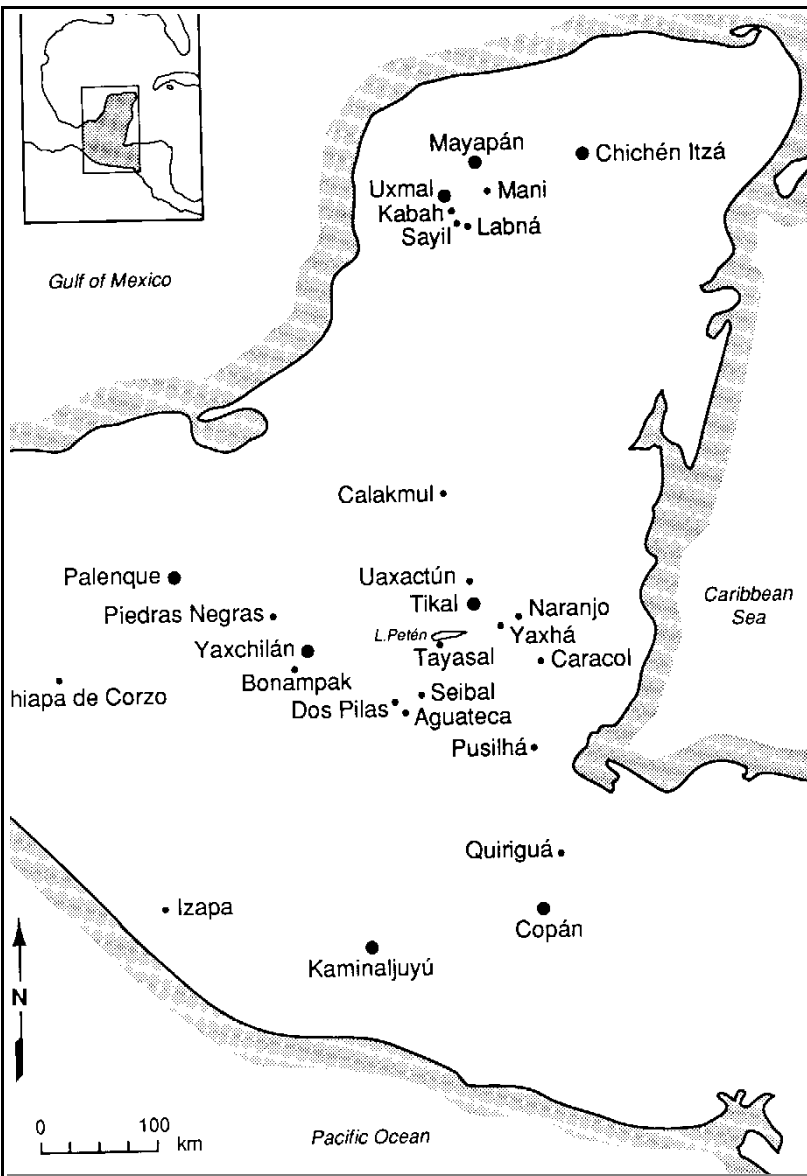


Figure 2. Source: J. Marcus 1992.

The Maya civilization is unique in that it is probably among very few complex civilizations that did not develop in an environmentally impacted, semi-arid river valley.⁹ The Maya culture began some 3000 years ago in the lowlands of the Yucatan and appears to have been every bit as vibrant as the Aztec culture (if not less blood thirsty) and certainly the rival of the pristine states in Egypt, Mesopotamia, the Indus Valley and China [S&F 19]. Maya culture lasted six times longer than the Roman Empire and blossomed while Europe stagnated in the Dark Ages [Garret p. 434]. The Maya had developed mathematical and astronomical knowledge that may have been the most sophisticated in the world at the time [Ponting p. 62]. "They lived by a calendar the equal of ours, developed the concept of zero in mathematics, predicted the eclipse of the sun and moon, and traced the path of Venus with an error of only 14 seconds per year [Garrett p. 434]."

The Maya were also brilliant engineers. Their roads rival those of the Romans and their pyramids those of the Egyptians. The Maya canal and irrigation systems were engineering marvels. The Maya excavated ten million cubic meters of earth to build their canals; a volume ten times the amount of fill in the Pyramid of the Sun in Teotihuacan [Tainter p. 161].

Maya culture reached its peak in an area of northern Guatemala called the Peten - "a 14,000 square mile sweep of uneven

tropical forest and savannah" [Stuart 1992 p. 95] where the Maya built magnificent ceremonial centers such as Tikal (Guatemala) which covered 50 square miles [Garrett p. 468], and had a population of 50,000, [S&F p. 57]. Many smaller cities (30,000-50,000) such as Copán

⁹ Copán may be a partial exception to this rule. Copán's most fertile lands were in several alluvial river valleys, but for the most part agriculture, like that in the lowlands was based on tropical rain-dry agriculture. In the arid winter months some irrigation was possible, but only in areas where the tributaries to the Copán river did not dry-up [Webster et al, p.17].

flourished for 1000 years before being abandoned by about 900 A.D., and then redeemed by the jungle [Ponting p.80]. R.E.W. Adams estimates that the population fell from three million to about 450,000 over the period of collapse. Others have produced estimates as high as a one million person population loss. A key issue is whether population fell because of higher mortality or because of emigration [Tainter p. 167]. In any case, by the time the Spanish arrived the population of the Peten area had returned to prestate densities and remained so into the 1950s. Since then the population has "skyrocketed to more than 300,000 [Harris C&K p. 138, Stuart 1992 p.96].

The great mystery of the Maya is "their *abrupt* departure from the stage of world history" [Tainter p. 152]. Between 790 and 890 A.D. the population in the Peten crashed, the ceremonial centers were for all intents and purposes abandoned. Much evidence suggests that the Maya had lived under crisis conditions for about two centuries before the "collapse." Population growth which had proceeded at a rate of about .17% per year through the preclassic and classic periods, had leveled off and population had stabilized by as early as 550 A.D. in some locations [Tainter p. 159]. There is also evidence that the classic cities such as Tikal had lost their power and political power had become decentralized before the final collapse [Tainter p. 166]. New cities began to sprout up around the perimeter of the Peten and each began to undertake monument construction [Tainter p. 166]. Nevertheless, when the main centers collapsed the satellites went down with them.

Maya civilization entered its highest or "classic phase" at about 300 A.D. By 900 A.D. Mayan Civilization and for that matter, all the Mayan people, had vanished from the southern lowlands. The sudden termination of a vibrant culture posed a great mystery and many causes were put forward: disease, rebellion, natural catastrophe, a religion induced psychological fatalism to mention just a few. The explanation most popular today is that the Maya destroyed their environment making it impossible to sustain the dense urban populations any longer. Indeed, the parallels between the Maya and the Rapa Nui collapses are striking.

Maya origins

Little is known about the infrastructure of the early occupants of the Maya lands. Evidence of hunting has been found near Guatemala City in the highlands. Several Clovis points dated at about 8-10,000 years ago and the bones of extinct Pleistocene fauna

In 1549, Diego de Landa, a friar in the Franciscan order arrived in the Yucatán to serve in a monastery. He took up his mission to cleanse the natives of their Pagan ways with alacrity, and with no compunction against using torture to do so. Wherever he went in the Yucatán he ravished all vestiges of the native religion. In the town of Mani, some 40 miles south of Merida, he came across a substantial number of ancient hieroglyphic books. Without a second thought he ordered that the books be publicly burned. . In his mind, which burned with the passion of the Inquisition, these books "contained nothing in which there was not to be seen superstitions and lies of the devil."

*Landa produced his own manuscript on the Maya titled, *Relación de las Cosas de Yucatán*. Ironically, Landa's work in one of the most comprehensive ethnographic works available on early Mayan civilization. Indeed, Landa's attempt at reconstructing the Mayan language "has often been called the nearest thing to the Rosetta Stone (the celebrated key to the decipherment of Egyptian hieroglyphics) ever to come out of the Maya area." Gallenkamp pp.12-17]*

have been “associated” but the evidence of hunters remains scant. In any case there is no evidence of hunters after 7000 B.C. which one would expect given the animals which they hunted had long ago gone extinct [Gallenkamp pp. 58-59].

The Archaic Period

The hunters were replaced by a semi-sedentary people who lived in caves or under cliff overhangs in structures made of animal hides and brush. These people mixed hunting and gathering with the cultivation of plants. The presence of this infrastructure marks the *Archaic* period. Archaic period sites are widely distributed in the Americas, most notably in the American southwest and in central Mexico. Archaic sites provide evidence of technical advances such as milling stones, weaving, basketry and plant domestication [Gallenkamp p. 59]. Excavations in the Tehuacán Valley (southeast of Mexico City) show evidence of maize cultivation (and chilies, squash, avocados and pumpkins to name just a few) by 3500 B.C.[Gallenkamp p. 59]

Archaic sites in Maya lands were established by 8000 B.C. and the evidence points toward the beginning of sedentary life no later than 5000 B.C.. It is not known whether these original Maya were descendants of the archaic Maya or were immigrants from another area [Gallenkamp p. 60].

The Preclassic

Maya culture began to form in what is known as the Pre-classic period which began around 2000 B.C. and continued to the beginning of the classic period, the period of Maya florescence, that began about 250 A.D. The artifacts of the pre-classic period suggest an infrastructure on par with those of Neolithic Europe and Asia [Gallenkamp p. 62]. The artifacts include, in addition to the usual stone implements, beads, pottery, earplugs and pendants, the ubiquitous assortment of clay figurines of animals and humans, most especially of females [Gallenkamp p. 62].

The pre-classic shows a growth in complexity. The division of labor includes craft specialists and traders and social and political heterogeneity emerge and become more salient culminating in the rise of hereditary Chiefdoms. We also see, in the construction of “huge complexes of temples,” the rise of ritual, that is, “the desire to deify nature and thereby environmental forces on which survival depended” which, in turn, gave rise to a “power priesthood” [Gallenkamp p. 63]. The management of labor and resources required in the construction of these magnificent edifices also reveals a high degree of socio-political organization.

The environment

Despite the fact that the highlands were a better place to establish an agricultural society, much of the Mayan civilization was confined to the lowlands of the Yucatan. The highlands offered a temperate climate, abundant resources and fertile soils. Yet, while “one can hardly imagine a more unfavorable setting” for a civilization, thin if sometimes fertile soils, poor

climate and the “constant encroachment of vegetation,” it is in the “inhospitable” setting of the lowlands virtually all Mayan centers developed [Gallenkamp p. 72].

Several explanations have been offered to explain this apparent anomaly. First, there is evidence that the highlands were at risk of incursions from Teotihuacán. By 400 A.D. much of the highlands were under the domination of Teotihuacán.

Second, one early classic Maya culture in the highlands came to an abrupt end when a volcanic eruption [Ilopango in El Salvador] covered 60 mile radius with volcanic ash that left the area uninhabitable for 200 years [Gallenkamp p. 71]. Not only did this disaster hurt the cities in the immediate area, it disrupted trade networks in the entire highland region on which most of the cities had become dependent. Many cities were abandoned and many others suffered into a long-term decline in population [Gallenkamp p. 72].

Mayan Hydraulics

Since climate change is now a popular topic, and with good reason, let us first dispense with the idea that climate change alone was the factor that brought the Maya down.

As impressive as the Mayan canals and other hydraulic projects may have been, the bulk of Mayan farming depended on rainfall. No less than other farmers in monsoonal climates, Mayan farmers were plagued by unpredictable fluctuations in rainfall. To make matters worse there were, for the most part, no rivers of any consequence to provide regular supplies of fresh water. For fresh water for drinking, the Mayans had to rely on *Cenotes*, circular sink holes in the limestone bedrock of the Yucatan, or man-made cisterns. As one moved toward the south, the water table fell and ground water became less accessible. Even a 75 foot well, more than adequate in the North, could not reach it.

For farming there was no substitute for rainfall and the Mayans relied on the tropical monsoon. Of course, here is the source of one of the problems that plagued the Mayans.

Monsoon rains and intense tropical sunlight wreaked havoc on land that had been cleared of forest. Over time the soil turned to a crusty laterite that was impossible to farm. Moreover, on denuded hillsides, intense tropical rains over extended periods, can produce severe erosion.

The Yucatan, and indeed most of Mexico, is strongly influenced by the Inter-Tropical Convergence Zone (ITCZ). The ITCZ moves north in the northern hemisphere’s summer bringing with it monsoon rains for the period April through October. In the winter, the ITCZ moves south and Yucatan has a dry season. However, as it interacts with other weather systems, the course of the ITCZ is highly variable. In particular, the ITCZ is influenced by the El Niño Southern Oscillation (ENSO). When El Niño conditions prevail in the tropics, the ITCZ does not move as far to the north in the summer and, hence, the Yucatan experiences drought conditions. Just recently, in the El Niño of 1997-98, all of Mexico experienced severe drought and wild fires consumed tens of thousands of acres of rainforest. At the same time, wild fires raged out of control in Indonesia for the same reason. In both cases, small farmers had set fires to clear land as they had done for thousands of years. This time, however, the fires burned out of control and precipitated an “ecological disaster of the first order” [Brian Fagan (1999), *Floods, Famines, and Emperors: El Niño and the Fate of Civilizations*, p. 142]. Noting the coincidence of drought, fires and El Niño, Brian Fagan observed that “El Niños and drought in Mexico are inseparable and devastating.” With the droughts come “fires and hunger, failed crops and

economic devastation, which can be especially severe in environments with fragile tropical soils and growing population densities” [p. 142]. So it is now, and surely it was in Mayan times.

Lake Chichancanab is in the Northern part of the Yucatan and is the site of climate research intended to plot out the patterns of rainfall and drought in the Yucatan. Researchers take cores from the lake bottom and then use them to trace the climate back in time. In particular, they examine the ratio of oxygen isotopes (16 and 18)¹⁰ in the shell carbonate in the sediments and the quantity of gypsum in the sediments¹¹ [Fagan 1999, p. 143].

The analysis showed the Lake filled-in at about 6200 BC. Wet conditions prevailed on the Yucatan for the next 5000 years, but at about 1000 BC the climate began to dry. The drying continued at was at its maximum between 800 AD and 1000 AD - precisely the time when the Classic Mayan civilization was disintegrating [Fagan 1999, p. 144]. There were two years, 862 and 986, of particularly acute droughts “The drought cycle of these two centuries was the driest period of the last 8000 years” [Fagan 1999, p. 144]. Other evidence indicates that the drought spread beyond the Yucatan. Studies in Mexico and in Central America also indicate drought conditions prevailed. Ironically, by 1020 the drought ended rather abruptly and the wettest conditions in 8000 years prevailed [Fagan 1999, p. 145].

More recent research has show the same overall pattern of drought but has also identified a 208 year cycle that corresponds with changes solar activity. It is not known, however, how the minute change in solar flux can cause climate change. Some sort of amplifier is needed. The researchers some effect of change in solar-forcing on the Hadley circulation in the tropics may be involved. As the Hadley circulation is a critical part of movements in the ITCZ one can see how rainfall in the tropic might be affected [David A. Hodell et al, Solar Forcing of Drought Frequency in the Maya Lowlands, *Science* 292 18 May 2002, pp:1367-1370].

One should be careful to blame the Mayan disintegration solely on the weather. The Mayans had prospered over the entire period of the drought, and had surely survived acute drought many times. What was different in the late classic period was the size of the population and the growing stresses on the Mayan infrastructure and within the Mayan structure - the were more people and more Nobles. One estimate places the Mayan population at about 8-10 million in 800 AD, which was surely “a staggeringly high density for a tropical environment with such low natural carrying capacity” [Fagan 1999, p. 148]. And, there was more environmental stress than ever before from the processes the Mayans used to cope with their problems - the competitive monument building and warfare. The drought was merely the last insult to an ecosystem that has been pushed well beyond a sustainable level of population.

¹⁰All atoms of an element are nearly the same. All atoms have the same number of protons, but may have a different number of neutrons. Oxygen, for example, has 8 protons but can have 8,9 or 10 neutrons. Hence, oxygen 16,17,18 with 18 being the “heaviest.” About 99.8% of oxygen is O-16 and 99% of hydrogen is hydrogen -1 (one proton, 0 neutrons), hence most water as an atomic weight of 18. Under dry conditions the water containing the lighter isotope will be lost due to evaporation. Thus, a rising ratio of O18 to O16 suggests drought. The shells of ostrapods and gastropods found in the sediments will have more O18 in periods of drought.

¹¹Gypsum is at saturation levels in the lake. When there is a drought the volume of water in the lake declines and the gypsum saturation is exceeded so it is precipitated to the lake floor.

The Rise of The Maya State

Some time about 1200 B.C. the Maya people migrated into the southern lowlands from the highlands of Guatemala. Until that time the area had been occupied by gatherer-hunters. The Maya lived in small villages and grew maize and beans. Over time the population and the number of villages grew. By 300 B.C. the Maya had developed a number of urban centers, extensive trade networks and began to build huge temples. As population pressures increased, competition for land probably provoked warfare between these urban centers. Following the progression laid out by Carneiro, the warfare probably produced the drive to State formation. Jeremy Sabloff lays out the scenario:

Conflict would have forced people to group together for security. The elite in the centers may have encouraged migration to the cities in order to obtain larger labor and military forces. In turn, large cities would require greater planning and organization in order to provide and distribute food to the urban laborers and to form and equip a militia, as well as to build defensive structures [Sabloff p. 117]

The root cause of Maya warfare lay in the ecological homogeneity of the Peten. The ecological homogeneity of the area reduced the benefits of cooperative behavior regarding the spreading of the risks of fluctuations in food production due to the vagaries of nature - pests, weather, floods, plant diseases etc. If groups subsist in ecosystems that are diverse the chances that all will be simultaneously affected by natural adversities is reduced. When such conditions prevail human groups usually establish (institute) what one anthropologist has labeled an "energy averaging system:"

Where food procurement systems with different productivity cycles exist in close proximity, it is common to alleviate resource fluctuations by developing regional systems of economic [mutualist] symbiosis. By forming trading or reciprocal trading relationships, or by contributing to a hierarchically- administered regional resource pool, a local group can insure itself against lean times by converting temporary surpluses into reciprocal obligations that are called in during times of scarcity [Tainter p. 170].

Of course, we have seen such systems manifest as "reciprocity" among gatherer-hunters, "Big Man" systems, and redistributive Chiefdoms among horticulturalists. In addition to averaging out energy fluctuations such relationships will often promote regional peace which redounds to the benefit of all. However, under conditions of ecological similarity and/or high transport costs the motive toward cooperation is turned into one toward competition:

When a number of local groups each experience lean times concurrently, their behavior is largely without option, and is entirely predictable; competition, raiding and warfare [Tainter p. 170].

The "topological redundancy" of the Peten, at least within boundaries of reasonable transport costs, did not provide the diversity necessary to sustain cooperative relationships; instead

warfare became a staple of Maya life [Tainter p. 171].

What exists is possible

The early Mayanists constructed an image of the Maya as a race of pacifists. The elites who inhabited the ceremonial centers were assumed to be astronomers and mathematicians, "time worshipers" as it were. It was presumed that the elaborate hieroglyphics contained little more than astronomical observations and time records. To be fair, as far as these early investigators could see there were no signs of warfare; most especially fortifications. Over the past several decades, however, evidence of warfare has been discovered not only in the form of extensive fortifications such as those at Becan and Tikal, but also in the art (murals, pottery, and writing) and the recently deciphered carvings on Stelae and monuments. It appears that the Mayan rulers were as bloodthirsty and despotic as any leaders of any state anywhere. The carvings on Stelae, burial stones, and pyramids reveal the real history of the Maya. Most of the carving simply dates the birth, genealogy, accession and death of Mayan rulers along with any major victories they may have gained in war. The famous Bonampak murals show the torture and execution of prisoners. Indeed, Tainter claims that Mayan art depicts the abuse of prisoners more "conspicuously" than the art of other imperial states [Tainter p. 173]. Tainter sustains that the massive investments in monument construction, especially toward the end of the classic period (before collapse) and in "art" were actually "propaganda" or "signals" to potential enemies to deter the latter from aggression:

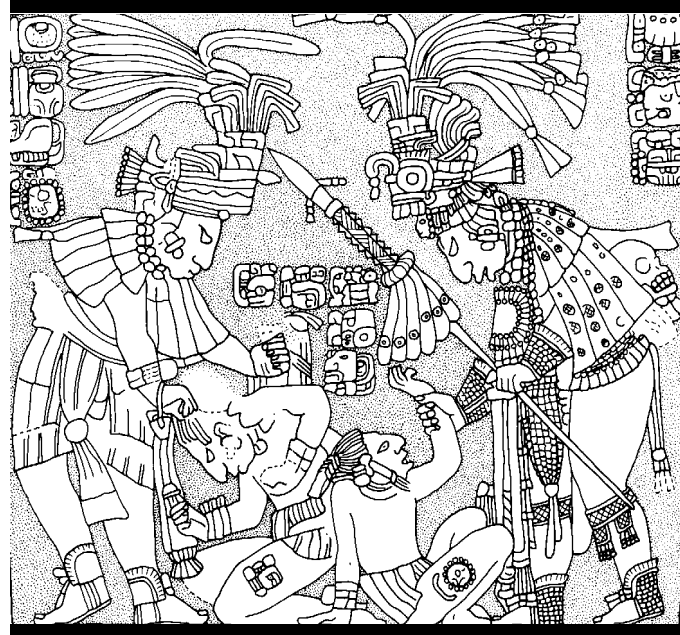


Figure 3. Bird Jaguar, King of Yaxchilan taking a captive named "Jeweled Skull" (note names glyphs on thighs of captives). Bird Jaguar's prestige was enhanced by this exploit - he became known as "Captor of Jeweled Skull." Marcus, 1995 p. 419. This event took place on May 9, 755 A.D. [Schele and Freidel p. 297]

Without large standing armies, some signaling system was needed to communicate relative strengths, to deter aggressors, and to facilitate resolution without violence...monumental architecture, painting and sculptural art would have served such a system. Massive, labor consuming investments in public display would communicate quite effectively the relative strength of political centers. By engaging in architectural display a center could signal to potential competitors the relative population numbers it could mobilize. It could also, in effect, convey the message that a polity which could squander so much wealth and labor on something as inconsequential as architecture,

could easily mobilize vast resources to cope with an external threat [Tainter p. 172].

"The reason they waged war with one another was to take their property from them and to capture their children and wives, and because it was the custom among them to pledge what they possessed to each other; upon collection and payment they began to quarrel and attacked each other, and then the lord of the town armed his people against each other, and for that reason the engaged war upon each other [16th century observer, quoted in J. Marcus p. 415]

Warfare may have begun as an alternative subsistence strategy to even out crop fluctuations, but it soon turned into a deadly and terminal spiral. Over time, as population growth stressed the environment, the pressure to go to war was certainly increased. But, warfare itself requires rapid population growth. Everything else equal the group with the larger population has both offensive and defensive advantages in warfare. Thus, warfare and population growth reinforce each other in a deadly positive feedback loop from which "no single polity would dare " withdraw [Tainter p. 172]. Warfare not only existed among the Maya, it was endemic, and had been for at least 600 years before the collapse.¹² Ironically, warfare may have contributed to the well-being of women. While studies of skeletons of males reveals a definitive decline in stature over time no such decline is observed for female skeletons. It may be that females were always undernourished, that is were fed the minimum diet necessary to secure life. But, Tainter argues that the Maya state may have protected women from declines in nutrition to insure they remained healthy enough to sustain the high rates of population growth necessitated by the needs of the State to conduct warfare [Tainter p. 175].

The Mayan Infrastructure

The sudden termination of Mayan culture has been a mystery for some time, in part, because archaeologists had not been able to figure out how Mayan civilization had been possible in the first place. It had been presumed that the Maya grew their food using a swidden system of agriculture like the one that contemporary Mayans use. The problem was that no one could understand how swidden could support the population densities [200 persons per sq. km] the Maya achieved. The enigma was solved when new methods such as remote sensing discovered canals and ridged fields.

The "traditional" model of Maya life assumed that the cities were not cities at all but mere ceremonial centers inhabited by priests. The peasants could not live in urban concentration because slash/burn required they be dispersed over a large area [Sabloff p. 24]. From this proposition it followed that the Maya ruling elite probably had little power over the dispersed population of peasants and it was therefore unlikely that a state level society could have formed in the southern lowlands. A 1975 anthropology text starkly reveals the erroneous chain of reasoning set off by the "inference" of the early Mayanists. Recall that the critical prerequisites of state formation are intensive, irrigation agriculture, high population density and an "impacted" environment.

All the lowland Maya civic centers are ...located in the vicinity of natural water holes or

¹² The fortifications at Becan are dated from 150 A.D. to 300 A.D. [Tainter p. 157]. The warfare surely had been well established by then.

are associated with natural reservoirs. Thus it is possible that the Maya ruling class controlled access to sources of drinking water, which was critical to survival during years of drought. Barring this means of control, it is unlikely that Maya social life was initially afflicted by extreme difference in power, since *dispersed villagers* could not be easily rounded up for corvee (forced labor). This would mean that much of the labor input in the lowland areas was voluntarily donated or at least compensated for in food or trade goods rather than coerced [Harris 1975 p. 219, emphasis added]

The potential of this ecosystem for state formation and for urban nucleation, however, was not as great as that of early dynastic Mesopotamia or highland Mexico or Peru. The main limitation seems to have been *technical and environmental obstacles to the development of irrigation agriculture* under the auspices of rulers of the temple centers [Harris 1975 p. 219, emphasis added]

Tikal lay buried in a forest covered mound in the Peten for centuries before some 40 acres of it was excavated in the 1980s. Based on these excavations, the population of Tikal proper was estimated to be about 10,000 people with another 40,000 living in the "suburbs"! [Thomas et al p. 55]. This population was three times greater than could have been supported by slash/burn agriculture [Thomas et al p. 56]

Recent field work has discovered a much more intensive agricultural system using extensive canals, terraced hillsides, and the Mayan version of *Chinampas*; ridged fields that had been artificially raised above the level of the river flood plain or swamps by the piling up of mud dredged from canals [Sabloff p. 81]. The ridged fields allowed the Maya to renew soil fertility by adding nutrient rich soil from the annual flood deposition thereby allowing intensive use of the fields i.e. to grow crops continuously rather than having to allow for long fallow periods for soil regeneration.

Mayan irrigation canals ranged up to one mile in length, one hundred feet in width and ten feet in depth. These canals supplied drinking and irrigation water as well as enriched mud, the result of the fish excretions, to replenish *chinampa* fields [Harris 1977 p. 138]. The water in these canals was protected from evaporation by a layer of waterlilies. These fields were difficult to maintain, but their high productivity, two to three crops per year, made the effort worthwhile [S&F p. 93].

The coordination of this very intensive agriculture was the responsibility of the Maya kings [S&F p. 93]. Thus, the importance of waterlilies in the Maya cosmology, and the reason why nobles were called Ah Nab, "waterlily people" [S&F p. 94].

The Maya grew maize, beans, squash, breadfruit, manioc, cotton and cacao [Ponting p. 82, Sabloff p. 79]. The American Trinity, "maize, beans and squash," combined to provide a protein rich diet without any meat.¹³ Indeed, the Maya had no significant source of meat. While

5. While maize is not very nutritious, it provides carbohydrates, beans are high in protein and fat content [Wolf p.64]. The type of beans eaten varied with climate. The Aztec ate kidney beans. The Maya ate lima beans [Wolf p. 64] Squashes were eaten before both maize and beans and were prized, at first, for their "oily, protein bearing seeds rather than their flesh. Squash flowers and leaves are also eaten. Chili peppers are an important source of vitamins [Wolf p. 65].

they ate deer, peccaries, turkeys and dogs, it was often only in ritual situations [Kent V. Flannery Ed., *Maya Subsistence*, p. 299-304]. Pigs and chickens were introduced by the Spanish.

The maize, bean and squash plants were wonderfully mutualist so were grown simultaneously in the same fields. The beans, a legume provided nitrogen fixing bacteria to the soil which nourished the other plants. The maize provided support for the beans. The squash grown in the rows very rapidly produced broad leaves to shade the ground. The shade reduced evaporation of moisture and prevented the growth of weeds. After just a few weeks the gardens needed no weeding. The maize complex was so nourishing that it diffused from Mexico and Central America to North America. It traveled up the Mississippi and then to the east. When Louis Henry Morgan encountered the Iroquois in the middle of the nineteenth century the staple of their diet was succotash, a stew of maize, beans and squash. It was the very success of this these crops to nourish the Maya that precipitated the problems that caused the Maya culture to disintegrate.

As we have seen the Maya practiced intensive agriculture using irrigation and swamp reclamation to add new fields. Indeed, it seems that most of the centers of power were located near swamps [Tainter p. 160]. The fields, the earliest date to 1100 B.C., were raised above the swamp by draining them into canals. The Maya harvested water lilies from the canals and used them for compost. They also dredged the bottom of the canals and used the fertile soil to replenish their fields. With this technology the Maya could have cropped continuously, but we do not know if they actually did. R.E.W. Adams estimated that the Maya may have created as many as 2500 sq. kilometers of raised fields in the southern lowlands (compared to the 120 the Aztecs created) [Tainter p. 160]. The canals, about 180 documented kilometers of them, also produced fish, an important source of protein [Tainter p. 161]. It appears that toward the late classic period there was a concerted effort to increase the number of reclaimed fields.

The Maya understood the vital role of ecology and their agricultural system. The water lily with a fish nibbling on it was a symbol of power in the glyphs depicting royal figures. The water lily not only composted the fields, it fed the herbivorous fish that the Maya harvested from the canals. The water lily also symbolized the barrier between life and death. Underwater lay the underworld and death. The only barrier between death and the Maya was the water lily.

The collapse of the Maya civilization in the Peten followed from the "vulnerable ecological base" on which it rested [Harris C&K p. 139]. Pollen studies of the Copán Valley reveal that by the Late Classic period virtually all of the trees in the valley had been cut down [Sabloff p. 109]. Unfortunately for the Maya, the soil in tropical forests is quite vulnerable to erosion and loss of nutrients once the tree cover is removed. As the soil lost its vitality and was eroded by wind and water, crop yields surely fell. At present the rainforest of Honduras and Guatemala is being resettled using the traditional method of burning the forest. Unfortunately, the poor rainforest soils will yield only 3 years of maize before a 2/3 drop in productivity occurs [Garrett p. 439]. As a result of deforestation and erosion, the rivers carried more silt into the raised fields making it more difficult to keep them above water, especially with the distractions of war and civil strife undermining maintenance [S&F p. 380].

The decline in soil fertility took its human toll predictably on the most vulnerable. Examination of skeletal remains reveal that by 800 A.D. both female and infant mortality were rising along with other signs of malnutrition [Ponting 83]. Bones and Skulls from graves at another site show signs of scurvy, anemia and periodontal disease [Gallenkamp p. 151]. Burials

from the late classic period also reveal evidence in the teeth and bones of a high incidence of syphilis or yaws [Stuart & Stuart p. 92].

The burden of the crisis eventually befell even the elites:

By about A.D. 1 marked stature differences had developed at Tikal between tomb (higher status) and non-tomb (lower status) segments of the population. By the early classic tomb populations averaged seven centimeters taller, suggesting preferential access by elites to nutritional resources during the childhood growth years. Yet during the late classic both groups were affected by the stressed of the time. Stature among males declined markedly, in both the tomb and non-tomb segments [Tainter p. 174].

At several sites there is evidence of childhood anemia resulting from malnutrition and parasitic infestations and even a very unusual increase in the death rates of older children and adolescents [Tainter p. 174].

Copán

Human occupation of the Copán Valley, as evidenced by the presence of charcoal in sediment cores, began somewhere about 3600 B.C. [David Webster et al, *Copán: The Rise and Fall of an Ancient Maya Kingdom*, 2000, p. 117]. The first signs of the cultivation of maize appearing in the sediments as maize pollen, is seen at about 2000 B.C. [ibid. p. 117]. Yet, by 550 A.D. the population of the valley was a mere 5000 [Elliot Abrams and David Rue, *The Cause and Consequences of Deforestation Among Prehistoric Maya*, *Human Ecology*, 16(4), 1988, p. 381]. Then around 650 A.D., a population explosion began, due in part to in-migration [Webster et al, p. 163] At its peak in the Classic period, say about 750-900 A.D. the population of Copán was about a steady 27,000 [Webster et al, p.163, 166]. The people of Copan lived in four alluvial pockets that were strung out over about 12.5 km of the Copan river valley in what is now Honduras. The main population center was in the western most of these pockets. While crops were grown in the other pockets, farmers generally lived in the main pocket and walked to the distant fields [David Webster et al, p. 187].

Crops were grown in the “vega,” the rich alluvial bottomland of the valley which was about 4km wide [Abrams et al, p. 378]. Flanking the vega was the “upsloping foothills or piedmont zone” which was “covered with mixed tropical deciduous trees and brush” [Abrams & Rue, p. 379]. Some 300 meters above the river, the foothills merged into an “upland forest zone” which was a reservoir for a wide range of floral and faunal resources. While the piedmont is currently used of agriculture and habitation, and was most surely so used by the Classic Mayans, the upland zone is not, and was not used for agriculture or habitation [Abrams & Rue, p. 379]. According to the palynological evidence (pollen studies), the predominant flora of the upland was the *pinus oocarpa*.

The agricultural method used by the early settlers was long-fallow swidden. Over time as population pressures increased, the fallow period was shortened and the other pockets were put into production. Eventually an intensive permanent (year round) irrigation agricultural system was established on the valley floor [Webster et al, p. 169].

Deforestation is the removal of trees at a rate faster than they grow back. Because the

soils of the Peten are known to be highly vulnerable to erosion, Mayanists have long suspected that “torrential tropical rains” produced a great deal of erosion when the piedmont and upland forests were cut for firewood (the primary reason), construction materials, and to clear land for agriculture [Abrams & Rue, p. 380]. By 800 A.D., all of the foothills were bared, and Abrams & Rue estimated that over 23 square kilometers of upland forest were denuded, in short, “no pine was left standing over the entire 12 km run of the Copán Valley [p. 391]. Sometime around 700-800 A.D. there was a “rather massive erosional event” that drastically reduced production in the main pocket [Webster et al, p. 169].

As if the erosion of alluvial soils into the river wasn't bad enough, the rains also caused relatively inferior upland soil to run downhill and cover the higher quality alluvial soil. Tragically, to compound the difficulties, the loss of soil productivity due to erosion was eventually accompanied by a shortage of firewood. Thus, while the Copanecos suffered from malnutrition they also suffered from epidemics of gastrointestinal and respiratory diseases because they had insufficient fuel wood to heat their homes and cook their food [Abrams & Rue, p. 381]. Little wonder then that between 850 and 1000 A.D. the population of Copán fell by 50% and by 1200 A.D. it had fallen to about 2000. By 1250 the valley was completely abandoned [Abrams & Rue, p. 381]. While other cities of the Maya civilization, namely those in the Yucatan lowlands are known to have experienced severe droughts during the period of collapse, there is no evidence in the sediment cores of any significant climate shift in the Copán Valley for the previous 3000 years [Webster et al, p. 117].

Given the degraded state of the production system it is reasonable to presume that the “catastrophic demographic loss” had a “strong biological component” [Webster et al, p. 123]. Excavations at Copan have provided scientists with a large representative sample of all segments of the Maya population - royalty, nobility and commoners of all ages and both sexes - only infants are under-represented [Webster et al, p. 124-5]. The analysis of burials reveals that the Copanecos endured poor health and high rates of child mortality.

Rebecca Storey examined the classic period skeletons (122 or 46% of the total sample) of sub-adults (under 15). 85% of these individual died before the age of 5 years and that mortality rates between 5 and 15 were higher than expected suggesting to her that these children came from a “high mortality population” [Webster et al, p. 126]. Examination of the teeth of the children revealed they had suffered from malnutrition and infection early in life. Indeed, there was evidence that many suffered from malnutrition *in utero* suggesting the mothers were also suffering from malnutrition or some sort of infection.

Another survey of 144 skeletons of low status adults (those found in the more common houses) by Stephen Whittington found a high prevalence of porotic hyperostosis on the skulls and other bones which is indicative of anemia, a not uncommon finding among Mesoamerican populations due to lack of iron in the diet [Webster et al, p. 127].

Whittington's general findings were as follows:

1. The Copaneco diet was high in carbohydrates.
2. Infants and children experienced extreme stresses from infection and malnutrition.
3. Infants were weaned late -3.5 to 4-5 years of age.
4. High incidence of infections over the entire life cycle.
5. Iron-deficiency anemia was quite common and probably reduced female fertility.

6. Diseases such as TB and pellagra were probably present.
7. Low incidence of trauma suggests a peaceful existence.

Most notable of all was the fact that Whittington found no evidence of any class or sex differences in the incidence of ill-health [Webster et al, p. 128].

Art historian Linda Schele and David Freidel authors of *A Forest of Kings: The Untold Story of the Ancient Maya* give us a glimpse of the Mayan world through the eyes of King Yax-Pac [First Dawn] of Copán in 792 A.D.. Yax-Pac would be the last leader of Copán to build a monument. His reign produced more art and inscription than any other because no ruler followed to build over his works [Fagan, 1995 p.208]. His successor's reign was too brief.

The Population of Copán had increased “dramatically” over the years, in part due to natural increase, and in part due to immigration. William Demarest has argued that these immigrants came from El Salvador following the volcanic eruptions that had made the highlands in that region uninhabitable [Weaver p. 283]. In any case, by 800 A.D. there were about 80,000 people in the area, most of whom lived densely packed within a half-mile of the ceremonial center [Fagan 1995 p. 208]. Moreover, the nobility had grown to “almost unmanageable size” [Fagan p.208]. Aside from the factionalism this produced, the expectation of these elites in terms of consumption proceeded uninfluenced by the growing shortage of resources [Fagan, 1995 p. 208]. The relentless pressure of population on resources combined with Copán's foolish waste of good land [see box] took eventually took its toll:

Yax-Pac's eyes swept across the valley, catching an occasional glimpse of light from the distant waters of the river. Mostly he saw the white houses of his people- hundreds of them- filled with children, many of them sick and hungry. Smoke still rose from the kitchen fires, but Yax-Pac knew the young men had to walk many days now through wider and wider strips of barren land to find firewood. From time without beginning, the earth had yielded up her abundance - wood to cook the bountiful harvests of earlier generations and to make the plaster covering for buildings and plazas commissioned by the ancestors. What is one to make of a world without trees? The earth itself is dying, and with it all must die.

In the glory days of the grandfathers, his people had believed in the favor of the Gods and in the endless cycles of wet and dry that gave rhythm to the passage of days and life to the earth. More and more children had been born, and more and more people had come from distant lands to live in his valley. The more there were, the more they need fuel and lumber, and the more they cut the forest. The river ran red with the soil of the mountains, naked now, having given up their flesh to the hard storms of summer and the floods of the winter months...The hard rains washed away the earth and the rock below could no longer nourish the seeds of the sacred maize. Too much of the good land along

the river was under the houses of the noble clans. The farmers had been driven higher and higher up the stony mountainsides looking for land that could hold their crops. Some of them even had to tie ropes around their waists as they worked the very near vertical walls of the mountainsides. Anywhere the hard rock cradled a shallow pocket of earth, they planted their seed...[p. 336]

Yax-Pax was not the last king of Copán: "He lived long enough to gain a place in history, but he died soon enough to avoid the final tragedy." It was his successor U-Cit-Tok who is, according to Schele and Freidel, the "saddest story of all of all the Maya Kings, for he inherited a world that had already fallen apart:

there were too many people,
too much of the forest gone,
too many nobles grabbing
honor and power for their
own benefit, too little faith in
the old answers, too little rain
and too much death. [p.343].

Copán - we did it to ourselves

Copán was located in a broad valley of the Copán river in western Honduras. The fertile alluvial soils of the valley provided a felicitous environment for agriculture compared to the that of the Peten. By 200 A.D. the "green sea of maize and forest gave way to a city of white and red plazas" [S&F p.308]. The city today measures about 9.25 square miles and contains about 2500 mounds under which lie the remains of the great city [Weaver p. 273]. Because of its extraordinary natural endowment the city prospered and became a victim of its success as affluence produced a competitive quest for status and social standing. "Soon, social standing and proximity to the dynamic pulse of the city became more important to these exuberant people than their own food production. Meter by meter, over the centuries, they usurped the richest cropland, constructing their lineage compounds on acreage that used to be fields, gradually forcing the farmers up into the margins of the valley [S&F p. 308]. The farmers, pressed for land began to fell trees in the upland areas, then the foothills and finally on the mountain slopes, thereby exposing the surface to the press of erosion [Weaver p. 286]. Ironically, and tragically as soil fertility fell, cropping cycles had to be shortened, only exacerbating the growing problem of supplying food to the city [Weaver p. 286].

An altar with carved glyphs depicting the succession of Yax-Pac by U-Cit-Tok was never finished. Central authority in Copán collapsed, "the sculptor picked up his tools and went home." [p.344] So ended the classic period of Maya history. Mayan civilization, as manifest in urban centers and political stratification came to a catastrophic end "in which elite and peasant went down together" [Stuart & Stuart p. 91].

Tikal

There was never a political unification of the lowland Maya region under the rule of a single city. Yet, some cities did rise above others in terms of prominence. In the sixth century, Tikal was such a city. Tikal, due to its fortuitous location at the “cross-roads of communication from highlands to lowlands and between rivers flowing west and east” was a natural center for commerce [Weaver p. 249]. Tikal was also endowed with deposits of flint, an important material for making tools.

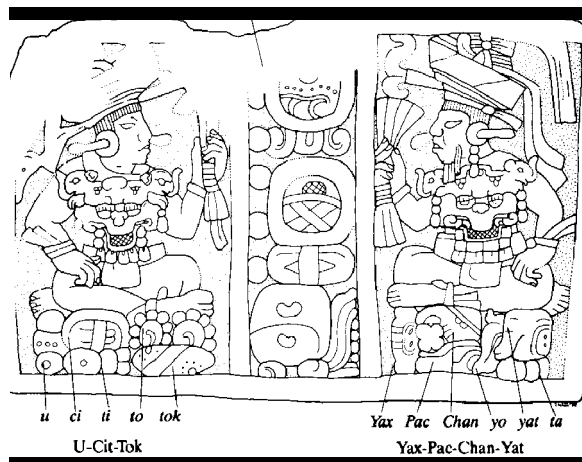


Figure 4 - The succession of U-Cit-Tok after Yax-Pac from Altar at Copan. Schele & Freidel p. 344.

Tikal’s domination of the central Petén began after it vanquished the nearby city of Uaxactún in 378 A.D.. These cities were simply too close to each other to allow independent development. There had apparently been a long antagonism between these cities, manifest in mutual raiding for captives for sacrifice. To protect itself from such raids Tikal had constructed a defensive wall and a 9.5 km moat around the center of the city [Weaver p. 252]. The battle in 378 was different because rather than the typical, simple taking of captives for sacrifice, Jaguar Paw III, demolished the town [Weaver p. 252]. With this war the “idea of

empire” entered the Mayan superstructure [Schele & Freidel p. 131].

Tikal’s war with Uaxactún in 378 A.D. marked a significant turning point in the nature of Maya warfare. Schele and Freidel call it the Tlaloc-Venus War or more simply “star wars.” This type of warfare is so named because of its representation on Stela 5, the Stela commemorating the victory of Tikal over Uaxactún. The Stela shows Smoking Frog, the commander of the Tikal forces dressed in the distinctive Tlaloc¹⁴- Venus costume. This costume was borrowed from Teotihuacan, but rapidly became an integral part of Maya culture. “The Maya borrowed the idea of the imagery of conquest from Teotihuacanos and made it their own [S&F p. 159]. The “star wars” tag is based on the fact that from then on the Maya “began timing their battles to particular points in the Venus cycle (especially the first appearance of the evening star) and to the stationary points of Jupiter and Saturn [S&F p. 147]. The new warfare of conquest would dominate the life of the Mayan low lands until the ninth century.

14 The stelae show Tlaloc glyphs with Mexican year signs. See Schele & Freidel p. 148. Tlaloc was the Mexican god of rain, but the Maya associated him with war [S&F p.160] .

Tikal would prosper for another 150 years, but by 534, it was evident that something was amiss: there were no inscribed monuments constructed between 527 A.D. and 570 A.D. followed by a second gap until 692 A.D. [Weaver p. 253]. While this “hiatus,” first noticed by Tania Prouskoriakoff, is suggestive of “political troubles” and there is evidence of the defacement of some monuments. The city was not sacked however, the evidence is clear that the city did continue to develop if at a diminished pace: building of monuments and infrastructural improvements continued. Indeed, it was during this period that one of Tikal’s most beautiful buildings (5D-33-2) was built [Weaver p. 254]. The most visible effects of hard times is seen in the graves of the nobles, “the well-stocked tombs of the Tikal nobility gave way to meager caricatures of their former glory, lacking in both the quantity and quality of grave goods.” [S&F p. 174]. While it is clear that Tikal continued to produce wealth, it is equally clear that it was accumulating in hands other than those of Tikal’s nobles.

The reason for Tikal’s silence and noble impoverishment was discovered in 1986 during an excavation at nearby Caracol. In the center of the ballcourt at Caracol an inscription was found telling of the defeat of Tikal’s ruler Double-Bird by Lord Water, ruler of Caracol in 562 A.D.. “Now we can better understand the ensuing silence from Tikal, and why its monuments were being uprooted,

deliberately broken and defaced around 557-682 A.D.” [Weaver p. 255]. The defacements, once thought to have been done by the people of Tikal who had become disillusioned with their defaeter ruler, and now believed to have been done by “none other than Lord Water, the rapacious King of Caracol” who defeated Tikal on May 1, 562 (9.6.8.4.2).

Caracol went on a war rampage that lasted over 100 years. In later years the “party was joined by Dos Pilas and then by Naranjo. Finally, under the leadership of Ah-Cacaw, the man who built the “breathtaking” Temple 33, the glory of Tikal was restored. On March 3, 695, Ah-Cacaw captured the King of Calakumul. Tikal was back, its past ignominy as forgotten as the defaced stelae that Ah-Cacaw had buried [S&F p. 203] just a few years earlier.

These centuries of warfare were a period of “cruelty” that is sometimes masked by the “beauty and delicacy of Maya art. For example, high ranking captives taken in battle were not merely tortured and sacrificed but death might be prolonged for several years, during which time they were brought out periodically to participate in gruesome rituals and be publically humiliated

The Venus Almanac

The complete cycle of Venus across the earth sky takes 584 days or eight 365-day earth years. The Mesoamericans, first in Mexico, had created an eight year almanac based on the interlocking Venus-sun schedule. This almanac was then combined with the 260 Sacred Round to produce the great Venus Almanac; a combination of 65 Venus cycles and 146 Sacred Round cycles. These tabulations are recorded in the so-called Dresden and Grolier Codices (two of the four surviving Maya texts). The almanac was used to determine the propitious time for ritual combat something like a medieval joust), war, and sacrifice. The first appearance of the evening star, for example, was considered a most propitious time for war. Human sacrifices were also timed by the Venus cycle [John B. Carson, National Geographic, March 1990]

”[Weaver p. 256].

Tikal was “finished” in 810 A.D.; building had ceased and population had begun to decline. At its apogee the central core of Tikal contained over 3000 structures including temples, palaces, tombs, and five ball courts [Weaver p. 263]. An impoverished population known as Eznab by the type of pottery associated with it, lived on for another century in the palaces of the vanished nobility ‘like barbarians living untidily among the ruins of a vanquished city” [Gallenkamp p. 155]. Over a period of five or six generations the population of the area of Tikal fell by about one million. Some of the decline was surely due to migration and the rest was due to “subtle changes in fertility and morality rates” brought forth by the poverty of the area that inhibited replacement of the population [Gallenkamp p. 156].

There appears also to have been a general failure of trade, but this was surely an effect rather than a cause of the general decline. Cities generally thrive on trade and die when it dies. This seems to have been the fate of Tikal which depended on the export of religious cult items and other luxury goods related to religious ceremonies to finance imports. Tikal was also the center for the salt trade. Tikal was located in the center of a portage route between two river systems. One river system connected Tikal to the Caribbean coast, the other to the Pacific coast. Thus, all trade across Central America went through Tikal. In the environment of economic hardship, political instability and warfare trade almost certainly broke down. Most especially vulnerable was trade in luxuries [Stuart & Stuart p.92].

People trade to get things they cannot get from within their own ecosystem. The Maya lowlands were ecologically undifferentiated, that is, each community produced essentially the same goods, and thus, there was little basis for intraregional trade [Parsons and Price 1977 p.166]. What trade existed in the Maya system was long-distance exchange of "exotic sumptuary goods," that is, goods such as clothing and feathers desired by elites to demonstrate status and rank or luxuries goods. Only a few "utilitarian" goods such as salt, obsidian and basalt were obtained through trade. Trade was then a minor enterprise the cessation of which would likely only harm the elite. This not to say that the elites were of no consequence, but for the average Mayan trade was of no importance.

Et tu Maya?

The traditionalists were in for another shock. Rather than peaceful "time worshipers," the Maya elite seemed to be as warlike and bloodthirsty as any elite anywhere. Based on their observation of Maya art, textiles, writing, mathematics, and astronomy, Mayanists Morely and Thompson considered the Maya to be "the most brilliant aboriginal people on this planet" [Morely quoted in Sabloff p. 57]. Given the relatively low level of their material technology, which Morely [incorrectly, of course] placed at the early neolithic, these accomplishments are indeed impressive. Both men admired the ancient Maya a great deal and were inclined to take a "see no evil" attitude. They assumed that the Maya were peaceful and that the ceremonial centers had peaceful relationships with one another.

In 1946 an itinerant photographer, Giles Healy, was taken by a native guide to an unexcavated ruin in Bonampak. On the wall of large chamber he found a vivid mural portraying "frantic battle in the jungle- a turbulent scene white-eyed warriors, shields, spears, and chaos [Stuart & Stuart p.73]." The mural also shows decapitated captives and another pleading for

mercy. Some captives have had their fingernails extracted and blood drips from their fingers. When confronted with the Bonampak mural Thompson initially refused to accept its apparent implications; he insisted what was depicted was merely a "raid"- not warfare. He believed that the Maya operated according to the philosophy of "live and let live" [Sabloff p. 86]. Eventually he relented and accepted that the ancient Mayan State was not transcendent of violence, war and cruelty. Part of the reason why Thompson resisted accepting a warfare interpretation was the "absence of fortifications" [Sabloff p. 86]. Thompson because of his prejudices, never really considered looking outside the ceremonial centers for economic life, and probably never looked for fortifications either. But, others did, and they found them.

As excavations at Tikal proceeded a system of moats and parapets some five miles long was discovered. Indeed, "once archaeologists started looking for it, the evidence of warfare turned up everywhere" [Thomas et al p.57]. At Becan archaeologists discovered fortified walls some twenty feet high fronted by a ditch twenty feet deep [Thomas et al p. 57].

Finally, in 1960, Harvard scholar Titania Proskouriakoff, translated a Mayan hieroglyph leading to the eventual "decoding" of Mayan writing. Ironically the first glyph translated was that of the captor/captive. The translations are replete with accounts of raids on neighboring centers. The translations revealed "themes of prisoners or military triumphs." [Sabloff p. 57] Some texts appear to be "propaganda" produced by a leadership that was insecure in its power [Sabloff p. 89 and Thomas et al p. 56]. Sabloff worries that these hieroglyphs might be little more than the "mendacious or fanciful boasting of Maya rulers" that may have little bearing on the reality of the period [Sabloff p. 169].

The Mayan elite may have had good reason to bolster their egos. A good deal of archaeological data indicates that the Mayan centers were being invaded by people from the Gulf Coast lowlands at about the time the classic period ended. In some cases, Mayan rulers were deposed and replaced by a foreign elite [Sabloff p. 89]. It would appear that warfare was an important element in the cultural evolution of the Maya lowlands and perhaps an important element in the ultimate and mysterious collapse of Maya civilization:

Competition for resources and labor, and perhaps for markets for goods, probably incited conflict throughout ancient Maya history [Sabloff p. 91]

The Mayan Structure - Political economy

Maya society, in every regional manifestation, displayed a singular political economy: "a rigid class structure dominated by powerful priests and nobles in whom all authority resided." They ruled over the masses of commoners for whom "life was an endless round dedicated to cultivating the soil, public service necessary to construct, maintain, and enlarge cities, and the adoration of the Gods through strict observance of rituals, offerings and sacrifices." At least, "in the beginning..they willingly upheld the mandates of rulers they believed were divinely chosen to guide their destinies" [Gallenkamp p. 73]. So dominant were the elites that any images in Mayan art of the common man, the peasant farmers and laborers who built the roads, palaces and temples, that define Mayan civilization are "conspicuously absent"[Gallenkamp p. 90].

According to Mayanists Linda Schele and David Freidel, the institution of the Mayan Kingship was the equivalent of a technological innovation "that transformed and coordinated

such age-old institutions as the extended family, the village, the shaman, and the patriarch into the stuff of civilized life” [S&F p. 97]. The invention of hierarchical institutions, “the hallmarks of civilization” was the consequence of the need to solve the problem of “cultural strife.”

Like all traditional systems, the Mayan system instituted forces that carefully maintained egalitarian social relations. According to Schele & Freidel, however, the Mayan egalitarian structure was under pressure from “outside forces:”

Trade, both between Maya communities and between the Maya and their Mesoamerican neighbors..was generating a flow of wealth that was unequally distributed among the people. In a culture which regarded the accumulation of wealth as an aberration, this turn of events created unease and social strife. At the same time, the development of raised-field agriculture and extensive water-management systems created prosperity in regions which had the means to organize the labor pool necessary maintain these systems. As contacts with trading partners already organized into kingdoms intensified, ideas of rank and privilege further exacerbated the differences in wealth and status that had grown with the success of these commercial and agricultural enterprises. A new leadership appeared in Mayan communities - one that was hierarchical in nature [S&F p. 97-98]

Schele and Freidel see the emergence of Kingship as entirely salutary. “The development of high civilization,” they write, “always creates problems of social inequality, but such differences between people need not be manifested negatively.” [S&F p. 98]. The institution of the Kingship benevolently solved the problem of social inequality by defining it as “legitimate, necessary and intrinsic to the order of the cosmos”[S&F p. 98].

For the Maya, kingship became the primary symbol of and rationale for the noble class, in the *ahauob*. Kingship addressed the problem of inequality not by destroying or denying it, but by embedding the contradictory nature of privilege into the very fabric of life itself. The rituals of the *ahauob* declared the magical person of the King was the pivot and pinnacle of the pyramid of the people...His person was the conduit of the sacred, the path of communication to the Otherworld, the means of contacting the dead...the clarifier of the mysteries of everyday life, of planting and harvesting, of illness and health. He wielded his knowledge and influence to create advantageous trade agreements for his people...[F&S p. 98].

Following others in the “voluntaristic” or “instrumental” and “trickle-down” theories of the rise of the state, Schele & Freidel conclude that macroparasitism was absent from the Maya scene; the people and the king lived in a mutualist symbiotic relationship:

The farmer, the stonemason, and the craftsperson might have to pay tribute to the king, but the king compensated them for their service by giving them a richer, more enjoyable, more cohesive existence. The people reaped the spiritual benefits of the king’s intercession with the supernatural world and shared in the material wealth his successful performance brought to the community [S&F p. 98].

Plus ça changer...The shadow of despotism and degeneracy.

Greece in Plato's time faced similar problems of social strife and for the same reasons. Plato insisted that strife could be avoided only by the rule of a few "guardians." Plato recognized that people might have difficulty or reservation about giving power over them to a handful of guardians so he had Socrates create the "royal lie" to justify or legitimate the rule of the guardians. In Plato's Republic, then, Socrates describes the character of the different social classes. Socrates asserts that each person is naturally suited for their social role and for the most part this role is bred into their biological nature:¹⁵

Citizens..you are brothers, yet God had framed you differently. Some of you have the power of command, and in your composition he has mingled gold wherefore also they have the greatest honor; others he has made of silver, to be auxiliaries; others again who are husbandmen and craftsmen he has composed of brass and iron; *and the species will be preserved in the children* [Plato, Book III].

Thus, according to Plato, people should be placed in the social hierarchy according to their inherited talents be they for war, guardianship, or for being a producer of goods and services. For Plato warns "when a man of brass or iron guards the State, it will be destroyed." Given the potential calamity it is imperative that the people accept the rule of the men of gold. When such acceptance is achieved justice results. Justice, which we can presume to mean social peace, can be achieved only when the naturally inferior accept the rule of the naturally superior:

...when the trader, the auxiliary, and the guardian each do their own business that is justice, and will make the city just.

The tribute which the commoner was obliged to give up was, according to Schele & Freidel, a "real burden, but not necessarily a severe hardship." It is their contention that severe "exploitation" would produce "catastrophic shifts in allegiance to neighboring kings, or simple migration into friendlier territory" [S&F p. 92].

If the relationship between elites and the people was ever "mutualist" it almost certainly became parasitic in late classic times. The assertion that Mayan civilization vanished because starving, overburdened peasants revolted was commonplace among Mayanists during the 1940s, 1950s and 1960s:

Probably the people, weary of the yoke of the priesthood, with their interminable demands for building and ceremonies, revolted...Too long had the masses remained in a static state of servitude; to exacting was the endless labor required to construct temples and palaces, tend the fields of the wealthy nobles, pay tributes, and supply luxury goods.

15 Plato does allow that sometimes parents of gold will have children of silver and that parents of bronze will have children of gold. In each case Plato insists that there be social mobility, upward or downward as appropriate. Plato insists on rule by inherited merit not by inheritance of social position.

And too blatant were the tricks with which the priests wove their cabalistic patterns of psychological control, the system of religious punishments and rewards to coerce the populace into strict obedience.

For centuries the masses had willingly submitted to the ruling elite, until perhaps the shadow of despotism and degeneracy brought about an outcry for rebellion [Gallenkamp p. 149].

When asked to address a seminar on the Maya demise, the late Mayan scholar Sir Eric Thompson replied: "no need for a seminar. Peasant uprising" [Quoted by Garrett p. 463]. He believed that the combination of excessive exaction of the agricultural product and the hard labor required to build the massive temples provided all the incentives the people needed to walk off into the jungle and leave the cities and the autocrats behind [Garrett p.463]. There is, however, no direct evidence of a violent uprising or the rapid end to Maya civilization that this hypothesis suggests. If the peasants did revolt one still must explain why the peasants and the elites disappeared at the same time. Moreover, the rebellion argument depends implicitly on the assumption that the elite "was in no way indispensable to management and administration of subsistence activities [so] it would have been extremely easy to get rid of them" [Cowgill 1966 p.198]. This supposition in turn is dependent on the assumption that agriculture was more complex than slash/burn, a presumption which new evidence supports. One scholar thinks that Thompson's hypothesis is rooted more in the elite's fears of communist uprisings in the 1950s than any "facts" discovered in the southern lowlands [Sabloff p.54].

The Mayan civilization ultimately fell due to a complex interaction between macroparasitism, microparasitism and the parasitism of the Maya on their environment. The demands on the natural capital of the Peten by the growth of population and the increased intensity of resource exploitation required by the extraordinary demands of elites for monuments, palaces, and luxuries, were simply overwhelming.

Maya society was highly stratified into a ruling class of nobles, whose needs were served by a middle class of artisans and bureaucrats and the masses of peasants. Membership in the nobility was hereditary. The Maya elite engaged in the usual elite practices of alliances sealed by royal marriages, war and intrigue [Tainter p. 163]. The nobility obviously enjoyed a higher standard of living than the peasant. After centuries of privilege, the average noble had grown in stature; they averaged ten centimeters taller than the rest of the population. Also their better nutrition and their prerogative to practice polygyny greatly increased their numbers relative to the monogamous, undernourished peasant producers. The nobility became a greater burden to farmers and to nuisance to governments [S&F 380]. Warfare spread as rulers, driven by the rapacious nobility, but faced with a declining surplus, attempted to substitute macroparasitism for production.

As noted earlier, much of the ceremonial construction was intended to glorify elites by providing a conspicuous display of their predatory powers, and by by recounting their accomplishments. They were intended to impress the exploited and to intimidate potential enemies. The archaeological evidence suggests the late-classic building-boom was intended in part to re-establish the legitimacy of the ruling elites. Some evidence from Copan suggests

monument construction was intended to fortify Copan's warriors after a humiliating defeat at the hands of a small neighbor¹⁶ [Sabloff p.161]. But, in the context of population pressures and food shortages such a use of resources was counterproductive:

There are many indications that the Maya elite were aware of the threats to their way of life in the century before the collapse. For example, they intensified efforts to reclaim more swampland. Yet, with the luxury of hindsight, we can see that one of the principal responses to the crisis seems to have exacerbated the problems. Within the worldview of the time, it assuredly made sense to build newer and larger monuments to glorify the Gods, who might then intercede on behalf of the beleaguered cities. Perhaps the Maya also felt that by demonstrating wealth and strength to hostile neighbors, the impressive buildings would gain the city an edge in regional conflicts. However, the ambitious building projects actually accelerated the decline, by drawing more resources and people from agriculture and by encouraging warfare and thus stressing the land even more than before [Sabloff p. 173].

The Maya elite had become isolated from the people. At a time when the Maya needed rulers who were the "best and the brightest" they got leaders through inheritance from the ranks of a macro parasitic class. Such leaders, chained by their habitual modes of thought, as infused by their class experience, are not likely to produce the novel ideas needed in crisis situations. Instead, the leaders crushed the already malnourished food producers under the additional burden of accelerated monument construction, more wars, the and the support ever larger armies of soldiers, artisans, and bureaucrats. Little wonder Maya civilization eventually collapsed [Sabloff p. 175].

Domestic Economy

The Mayan were organized as patrilineal families that reckoned descent through males. Maya families were "extended" and large; several generations lived within a single household compound. The families organized into lineages based on relationships with common male ancestors. These lineages combined into clans [S&F p. 84]. Although clans are generally egalitarian, in the case of the Maya, some families did rise to a position of power within the clans and this power came to be hereditary. Ancestry was therefore very important if one wanted to rule the Maya. Kings had to be able to trace their lineage back to some distinguished ancestor if they wanted the chance to rule. Authority in any clan or family was passed according to the principle of primogeniture - all power goes to the eldest son. The same would apply to the succession of a King. It was a matter of great importance that there be a male heir if a violent contest for the right to succession were not to ensue.

¹⁶ In 737 A.D. Copan's leader for some 50 years, XVIII Jog, was captured in battle and decapitated. Immediately following his death the Maya rebuilt a temple and added a monumental stairway covered with hieroglyphics. The wall of the reconstructed temple were covered with majestic representations of Copan's warriors. Archaeologist, Jeremy Sabloff sees this as a conscious attempt on the part of the elites to glorify its new leadership or as Sabloff puts it, they were saying "we are still the greatest." [Sabloff p. 160-161]

There was no event more significant among the Maya than the birth of a child. The birth of a child was a sign that the family was favored by the Gods, most notably *Ix Chel*, the patroness of childbirth [Gallenkamp p. 126]. The Maya followed a very traditional division of labor within the family. The men did the farming and women prepare the food at home. Women also did the cooking, spinning, weaving and pottery making. Gender identity was destiny among the Maya. Little boys are given toy field tools and weapons and girls are given miniature household utensils [S&F p. 42].

Mayan aesthetics favored children that were cross-eyed. To create this effect a small bead was hung between the eyes of the child to focus the eyes inward. The Maya also favored flat foreheads, so “shortly after birth an infant’s head was tightly bound to wooden boards” to achieve this effect. Older children had pierced earlobes, septums, lips, nostrils to accommodate body ornaments [Gallenkamp p. 126]. Pre-pubescent boys also wore a single white bead in their hair. Girls wore a single red shell on a string around their waist. At the age of puberty, after an elaborate ceremony these particular ornaments were removed.

Girls continued to live with their parents until married. Unmarried males painted their bodies black to indicate their unmarried status. Boys lived in communal houses where they were taught the arts of war, and basic crafts. While the girls were compelled to remain virgins until marriage, the boys openly consorted with prostitutes. The prostitutes were paid for their services, but “were besieged by such great numbers of young men, that they were harassed to death” [Gallenkamp p. 128].

Marriages were arranged by parents, through matchmakers, typically when the girls were 14-15 and the boys were 18 [Gallenkamp p. 128]. The family of the girl paid a dowry to the family of the husband. Marriage between people in the same clan was prohibited.

After the marriage the husband moved in with his wife’s family and worked for his father-in-law for up to six years.

Divorce was easy, all that was required was declaration to that effect, by either spouse, and the marriage was terminated.

Adultery was a serious offense. Men who violated another man’s wife [or violated a maiden] were subject to the death penalty, by having a rock dropped on their heads “from a great height” [Gallenkamp p. 129]. Despite the severe penalties, one 16th century observer, noted a high “susceptibility to weakness of the flesh” hence adultery and promiscuity were widespread [Gallenkamp p. 129]. Men who were unfaithful to their wives had more to fear than official reprisals; Mayan women were notoriously jealous and “would tear their husband’s hair no matter how few times [he] may have been unfaithful [Gallenkamp p. 128].

Generally women were subordinate to men and in the marriage wives were subordinate to husbands:

When passing a man she was required to lower her eyes, turn her back, and step aside. A wife never ate or drank with her husband; she did not laugh with him or engage in long conversations, and only rarely, during certain festivals, did she dance with him. Girls were expected to be chaste before marriage, and those who violated this rule were whipped, rubbed with pepper, and held up to public ridicule [Gallenkamp p. 128].

The Mayans were pagans who worshiped a variety of gods that seemed to correlate well with important infrastructural realities. As in all Mesoamerican cultures, the Sun and water were important elements as was maize. *Kinich Ahau* was the god of the Sun. *Chac* was the god of rain, thunder, lightning and storms. *Yam Kax* was the god of maize. *Ix Chel* was the goddess that controlled childbirth, medicine and floods. *Ek Chukah* was the God of merchants and travelers and *Ah Puch* was the god of death. In addition, there were special deities for hunting, fishing, war, poetry, music, weaving, suicide, human sacrifice and the numbers 0-13, the 19 months, twenty days, and *Katun* cycles of the calendar [see appendix] [Gallenkamp p. 106].

These Gods appear in Maya iconography as “fantastic” mixtures of humans, animals, reptiles and birds. These gods have multiple personalities, can be malignant or benign, or merely capricious [Gallenkamp p. 107].

The Maya, like the Aztecs, imagined the world as residing on the back of a crocodile that floats in a lily pond. And like the Aztecs, they imagined the world had been created and destroyed several times in the past [Gallenkamp p. 106]. The Maya divided their world into three parallel domains; heaven, the Middleworld of earth, and the Underworld. These worlds were not separate, but rather coexisted in different dimensions. Each domain was thought to be alive and sacred. The Underworld, known as *Xibalba*, is not like the Christian “Hell.” It is better understood as the Otherworld into which Shamans and Kings might travel in a trance induced by drugs or bloodletting [S&F p. 66].

Some "shocking" elements of Maya culture are beginning to emerge as excavations of Maya ruins continue. The Maya, indeed, had an active ritual life that involved human sacrifice and the use of hallucinogens to produce visions. Mayan ritual painting reveals graphic scenes of ritual sacrifice of children and the decapitation of war captives. In one scene, a man, apparently in the throes of an ecstatic experience decapitates himself. Other scenes reveal the source of the ecstasy; alcoholic beverages, either imbibed or taken as enemas. Other scenes show men smoking cigars made of a tobacco that was so high in nicotine content and of other alkaloids as to produce hallucinations. All the ritual art indicates the Maya were

Sacrifices played a vital role in Maya ritualism. Animals such as iguanas, crocodiles, turtles and dogs, peccaries, jaguars and turkeys were occasionally sacrificed....But the supreme sacrifice was human life itself, and all too frequently humans were consigned to be slaughtered in the course of elaborate rituals. Such scenes are clearly depicted in sculpture, ceramics and murals, and this gruesome practice grew out of the conviction that human blood was essential to sustain the Gods. Victims for these rites were provided by slaves, captures enemy soldiers, bastards, criminals, or orphans, and included children of both sexes.

Landa gives a vivid description of a common method of human sacrifice wherein the victim, his body painted blue (the sacrificial color) was led to the summit of a pyramid and stretched over a stone altar, with his legs and arms held firmly by four chacs. Next the nacom, using a flint or obsidian knife, cut open his chest, tore out the heart, and handed it to a high priest whose task it was to anoint the faces of idols with its blood. Finally the corpse was thrown down the temple steps to a waiting priest who flayed it and danced in the skin, after which the onlookers ate the rest of the body, reserving the hands and feet for the officiating priests.

Other sacrificial techniques included hanging, drowning, beating, mutilation, and decapitation and one particularly grisly scene painted on a late classic vase shows a victim being disemboweled. -from Gallenkamp p. 110-111

engrossed with blood and the afterlife.

As for all Mesoamerican peoples, blood was central to the Mayan ritual life. Bloodletting was, in a sense, an enticement to lure the gods and their ancestors from the Otherworld so that they might communicate with them. The Otherworld was a parallel universe that could be accessed only in a “vision quest” evoked by bloodletting. The symbols of this ritual were the Vision Serpent and the Double-Headed Serpent Bar. Males would draw blood from their tongue or penis, females from the tongue only. Carvings on stelae show women drawing “finger-thick” ropes through wounds in their tongues. Men would stick sharp spines into their foreskins and “whirl in a dervish dance.” The spilled blood would be collected on paper and burned to entice those from the Otherworld to pierce the barrier and enter the material world [S&F p. 911].

These rituals took place at the top of the sacred pyramids imagined to be mountains. The temples on top of the Pyramids were thought to be caves within which grew the sacred tree. It was imagined that the mountain-top ritual opened up a connection to the Otherworld along the trunk of the sacred tree. The slab-shaped monuments (stelae) carved with images of Kings were called *te-tun*, “tree stone.” The plazas filled with these monoliths represented the earth covered by forests.

It is, nevertheless, an exaggeration to claim that the Maya were “obsessed with blood.” The blood rituals were performed only by nobles and rarely and always only in the presence of other nobles [Marcus p. 298]. The Myth that the Maya were “obsessed with bloodletting” is no more true than the myth that they were “obsessed with time.” Nor were the Maya obsessed with human sacrifice. Captives were used as slaves and were only occasionally sacrificed [Marcus p.413].

The middle-world was divided into four sections with the sun cycle the key to the division. The east, where the sun rises, or was “born,” was colored red.¹⁷ The west, where the sun “dies,” was colored black. North was the direction from which the cooling rains of winter came and was colored white

If there was a “central metaphor” for the Maya life it was the Tree [S&F p. 90]. In the Maya cosmology the Ceiba tree passed through all three domains: its roots in the underworld, its trunk in the Middleworld, and its branches in the heavenly Otherworld. The Gods and the souls of the dead moved between worlds along the trunk of this tree [Fagan 1995 p.202] The Maya word for tree sap was the same word used for blood. The Maya, somewhat ironically, also believed [emic mental, obviously] that “he who cuts trees as he pleases cuts short his own life [Stuart 1992]. The Maya recognized the many ways in which trees sustained their lives:

For the Maya, trees were the ambient living environment, the material from which they fashioned homes and tools, the source of many foods, medicines, dyes, and vital commodities such as paper. They provided the fuel for cooking fires and the soil-enriching ash that came from the cutting and burning of the forest. Trees were the source of shade in the courtyards and public places of villages and cities, and the home of teeming life in the forest [S&F p. 90].

¹⁷ In the Maya conception, a map showing the four quadrants should place east at the top [S&F p. 66]

The King was the “Tree of life” and was frequently displayed as such in many monumental carvings. In the Maya religion, it was the King (*halach uninic* =true man), a more general term for king or great lord was *Ahau*) that sustained the people. It was the King that performed the rituals central to sustaining the Maya material existence. It was the King who shed his blood, to make the Middleworld of earth “flower and bear fruit” and to open the portal to the supernatural Otherworld [S&F p.66]. Little wonder then that trees are integral parts of Kings as they were depicted on monumental structures such as Stelae and Temples (see Figure 5).In exchange for performing his duties, the King demanded and *quid pro quo*:

The King and his court commanded the skilled and unskilled labor of many craftsmen and commoners, whose needs had to be met by and even larger population of farmers, hunters, and fishermen [S&F p. 92].

However, the parasitism of the Nobility and the King was constrained by the ability of the people to migrate and/or to shift allegiance to neighboring Kings. Severe exploitation, then, was probably a desperate measure limited to desperate times [S&F p. 92].

The major and minor noble elites (almehen= lower strata, yalba uninic=upper strata)“were the consumers” of some 90% of all trade goods [G. Marcus 1992 p. 12], virtually all of which were luxuries. The King would use traders to convert “tribute” into trade goods and then distribute them to their constituents in the form of gifts [S&F p. 93].

The tree affected the life of the Maya in many ways that they did not understand. The trees protected soil from the harmful rays of the sun and from soil erosion. Moreover, it was the trees that provided, through their transpiration, the moisture that fell downwind and protected the soil from dessication (the evaporation of moisture). Surely, the ultimate disappearance of the Maya “civilization” was a consequence of the large-scale deforestation of the lowlands at the hands of the Maya. The strands of forest that once covered the region were, at the end, no longer in the memories even of the very old. The story of Copan is illustrative of the effects of deforestation.

The Rise of the Mayan States

The Maya King played a role something like that of redistributor chiefs. The King was responsible for gathering the goods from his domain and exchanging them over great distances for goods desired, but not produced in his region. The King would distribute these trade goods to his lords and allies who, in turn, distributed them as gifts or exchanges. Eventually, some of these goods may have “trickled down” to the common people. Most often, however, the goods were of the nature of luxuries consumed only by elites.

Maya trade used precious commodities, such as polished greenstone beads, cocoa beans, measures of cotton cloth or sea salt for money. The exchange rate of these currencies for each other and for goods were established by the Kings in the various regions. Merchants were often able to exploit differences in these exchange values across domains to their profit. Arbitrage, it would appear is not a strictly capitalistic enterprise [S&F p. 92]

Mayanists are actively engaged in a debate over the origins of the Mayan State. The polar positions in this debate are the “idealists” who insist that religious ideology was the central force in producing the State and the “materialists” who see the State emerging as a consequence of warfare and/or the need to manage a complex agricultural system. The idealists contend that none of the material factors usually associated with the rise of the State e.g. a dry arid climate, hydraulic agriculture and environmental circumscription, are not present in the tropical Mayan lowlands. The Maya lowlands although not endowed with a wide variety of wild food resources, were nevertheless unbounded [p. 189]. Pressures of population leading to fighting did not build up because of the option to migrate to open lands. Population pressure would be felt only when farmers had to begin to shorten fallow periods. The lack of circumscription delayed amalgamation of villages [p.190]. Large-scale unification, idealists contend, was not possible with little environmental circumscription. Idealists contend that the same pattern of warfare and state formation was observed in the Southeast Asian rainforest environment - “like conditions produce like effects” [p.190] The difficulty of building a state in such an environment is similar to that experienced by US troops fighting Viet Cong in Viet Nam. The troops could not defeat the guerillas - they would just vanish into the rain forest [p, 203].

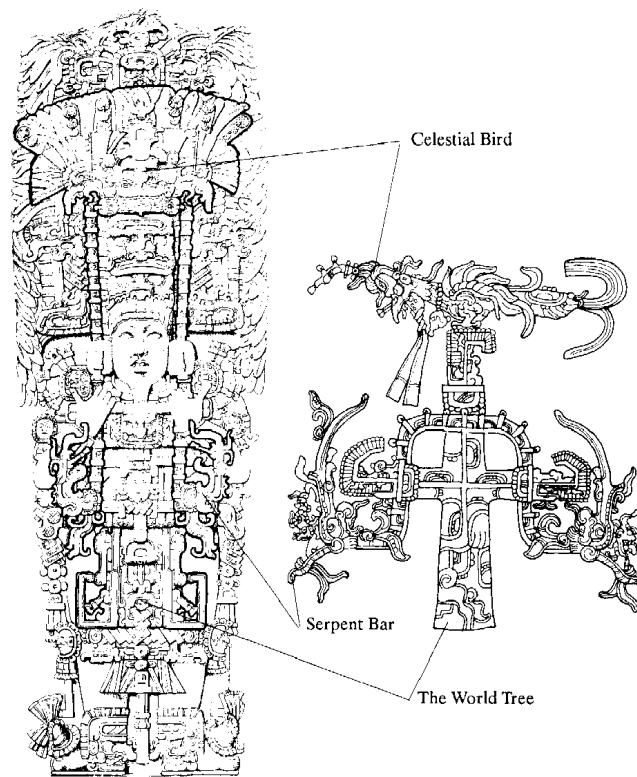


Figure 5. A Maya King dressed as the World Tree [S&F p. 91]

Materialists agree that the rise of the Mayan states can't be explained by the hydraulic theory or circumscription. Warfare produced by population pressures is not, however, ruled out. Robert Canerio insists that warfare played a “vital role” in state development. However, rather than being a “single-minded and unending struggle for territory,” Maya warfare resembled that “up and down” pattern” manifest in the competitive states of Mesopotamia and Southeast Asia rather than centralized regional polities like Teotihuacan or early dynastic Egypt each of which had a “more secure and coercive basis of power”[p.186].

Teotihuacan was, unquestionably, the greatest aboriginal urban center ever to arise in the new world. Imposing and enduring it dominated central Mexico for seven centuries. Canerio, a materialist uses population pressure, military prowess and location to explain the rise and persistent dominance of Teotihuacan. Teotihuacan arose in an environmentally circumscribed area. Its arable land was sharply bounded by a ring of mountains. Nevertheless even before agriculture the area supported a large population with ample supplies wild food, such as fish, reptiles, amphibians and aquatic birds. As the population expanded a shortage of land led to

fighting. The fighting promoted the rise of Chiefdoms as a way to become more efficient at war. The circumscription of the valley of Mexico impeded the retreat of defeated groups and “favored rapid unification”[p.188]. The new state proved so dominant that a pax *teotihuacani* emerged and warfare ended. There is no warfare depicted in the art of Teotihuacan [p. 188]. Under the environmental conditions faced by the Maya, however persistent warfare may have been, no such dominance proved sustainable.

The idealists reject the hypothesis that warfare and population pressure were a source of state power as the evidence of the former are chronologically preceded by the latter [p. 138]. Demarest insists that war came too late to explain rise of Maya States, but does allow that warfare allowed chiefs to extend power beyond kinship-defined systems, but not so far as to state formation. Nor was the management of trade significant as most areas were self-sufficient in necessities. What trade that existed was in the form of trade in elite goods related to rituals and status. Most significantly, the idealists contend that there was little need of elite management of agriculture. Recent data shows that earlier estimates of the intensification of agriculture through raised fields, terraces etc were exaggerated [p.145], in most cases due to misidentified information from satellite images. They take the position that “soil types and lacustrine hydrology are inappropriate for extensive raised field agriculture.” The Maya used raised fields at best “occasionally”[p. 146]. Maya agriculture was adapted, in complex ways, to “specific types of eco-niches” but did not need central management.

Idealists such as William Demarest maintain that the Maya states derived their power from Ideology rather than from managerial functions related to agriculture, warfare or the management of trade. Rituals were the source of elite power. These rituals were not merely a mask or legitimization of elite power. Rather, the rituals were autonomously generative of power. According to David Freidel, the Maya kings played a shamanic role.

In shamanism the material everyday world is paralleled by a supernatural world in which gods, spirits and ancestors live. Shamans pass between these worlds to deliver the power of the gods spirits and ancestors to the material world [p. 116]. Thus, “in exchange for privilege and power, elites provided religious services in their role as intermediaries with the spiritual world” [p.148]. Moreover, the ritual role of elites provided an important integrative function. Maya society was not “all sweetness and otherworldly light” there was great inequality. Some Mayas were rich, many were poor and some were deprived. Yet, Freidel insists, that all workers voluntarily paid their tribute and participated in the construction of the monuments in exchange for the supernatural services of the shaman king [p.116-117]. The Mayan elite, according to idealists, provided important spiritual services, and a significant integrative function. It was not “parasitic and ultimately dysfunctional” or a mere epiphenomenon of underlying material factors [p.121].

The Post-classic

New evidence from Copan suggests that the Mayan decline was not so precipitous as previously believed. The evidence from Copan indicates that the rule of Kings came to an abrupt end following the death of Yax-Pac in the winter of 820 A.D.. However, the dating of artifacts and pollen studies reveal that life in the environs of Copan went on for another four

centuries. It was only after 1200 A.D. that the valley became totally depopulated [Stuart p. 504]. The ultimate demise probably followed a trajectory based on declining soil fertility, gradual abandonment of land and the gradual encroachment of the forest [Stuart p. 504]. In less than a century a population estimated at three million had fallen to about 450,000 [Stuart & Stuart p.92].

Further evidence indicates that Maya civilization did not collapse as much as relocate. Civilization did disappear from the southern lowlands and has yet to return; the area is still sparsely populated. The southern lowlands suffered from severe soil erosion at the time of the ninth-century collapse and forced a migration north to the Yucatan and places such as Uxmal and Chichen Itza. In this period, known as the "Terminal Classic" classic civilization had its "final flowering." By 1200 Chichen Itza had gone into decline. Chichen Itza's decline was followed by the rise of cities such as Mayapan, Tulum and Cozumel which lasted until about 1450 [Sabloff p. 123]. All were vital and prosperous trade centers dominated by a mercantile elite more interested in keeping their wealth liquid than in building religious monuments or indulging in conspicuous displays of wealth [Sabloff p.134].

Traditional archaeology considered the Terminal and post-classic periods to be "decadent" because of the alleged downfall of religion and the obvious deterioration in quality of the artifacts they found at places like Tulum. The mass-produced pottery and ceramics were dismissed as "tacky" but nevertheless it was available to the middle and lower classes which seemed to have achieved a higher standard of living than in earlier times. Goods formerly reserved only for elites were now common place [Sabloff p. 132-133]. Something like a religious reformation appears to have occurred. Religion did not disappear, it became less centralized, that is, transformed into a more egalitarian modality. Religion was no longer under the control of elite priests, but rather "in the hands of the lowly individual" [Sabloff p. 133]. Individual households worshiped at family shrines using mass-produced incense burners. In the post-classic period, life did go on without elites and, free from the energy drain of macroparasites, most Maya probably lived better [Sabloff p.168].

Much less is known about the Maya of the highland areas during the classic period. According to Mayanist Richard Adams, by 1000 A.D. these cultures began to disintegrate also. Before 1000 A.D. highland cultures were located in mountain valleys. Later they relocated to more defensible and fortified positions on mountain ridges. The last such site, *Ixmche*, was founded in 1470, but was destroyed by the conquistadors.

After the exodus from the ceremonial centers the population dispersed into the Yucatan and the highlands of Guatemala and Chiapas. The people were organized, in the so-called post-classic era, into 30 or so warring kingdoms. It was this disorganized and antagonistic agglomeration of people that attempted to fight off the Spanish [Perera p. 2].

There can be little doubt that the European invasion administered the coup de grace to the Maya post-classic civilization. Yet there is "considerable evidence" that Mayan civilization was "plagued by internal problems long before the arrival of the Spaniards" [Gallenkamp p. 18-19]. Both the Yucatan and Guatemalan highlands were afflicted with internecine warfare among rival Chieftains and civil unrest manifest in ubiquitous militarism, uprisings, assassinations and "smoldering enmities"[Gallenkamp p. 19].

In the midst of all of this the Maya were hit with several natural disasters. A severe hurricane wasted the Yucatan in 1464. A plague of locusts ravaged the peninsula for five years producing in its wake a great famine. In 1480 a pestilence rampaged through the same region followed just a few decades later, in 1514, by an epidemic of small pox imported from Spanish colonies in Panama [Gellenkamp p. 19].

Beware of the pale rider

A Mayan prophet once predicted that "men with beards would come from the east. And so they did" - starting with Pedro de Alvarado who invaded Guatemala in 1517 and finishing with Francisco de Montejo in 1542. The Spanish marched through the Yucatan leaving death and famine in its wake. The disorganized and mutually antagonistic Maya offered little effective resistance [Stuart & Stuart p. 199].

The Spanish attempted to subjugate the Maya in order to exploit their labor. Ironically, the pestilence the Spanish brought with them -small pox, measles, plague, cholera, tuberculosis, typhoid, typhus and malaria - wiped out nearly 90% of the Indian population in Mesoamerica [Stuart & Stuart p. 122]. Of the estimated two million Maya in Guatemala about 750,000 died in the first decade after contact from disease and violence. Another million had died of disease by 1650 [Perera p. 5]. The Spanish exported many Maya to the Caribbean Islands as Slaves to replace the aboriginal populations they had exterminated there, but the Maya proved an elusive labor force. The Spanish complained constantly about Maya mobility. The forest proved and safe haven for the Indians who saw little difference between Mayan and Spanish overlords [Stuart & Stuart p. 120]. The environmental impact so necessary for despotism to reign did not exist in the Yucatan.

The Spanish instituted in the Yucatan the same economic system they imposed on the vanquished Moors in Spain. The system called *encomienda* reduced the Maya to that status of serfs. The villages were allowed to keep their ancestral lands, but were now required to pay tribute to their Spanish "protector" in the form of goods and labor services. In many cases the tribute the villagers were obliged to pay was exactly that they were required to pay to the former Indian overlord [Miller p.98].

By 1800 the decimated Indian population of the Yucatan had begun to grow. At the same time the Spanish demand for land and labor also escalated. Growing demand for sugarcane and sisal (used to make rope) made these crops quite valuable. The state sold vast tracts of land, at very favorable prices, to plantations to raise these crops. The Haciendas conscripted more Indian labor who lived as virtual slaves. In 1870 the coffee boom began and more Maya land was stolen. Too add insult to injury, having stolen their land, the government then passed peonage laws which permitted debt slavery and a vagrancy law that required landless people to work 100 days per year [Perera p.9]. Moreover, grievances had been accumulating between cattle ranchers and Indian farmers as cattle ate and trampled their sacred maize. Added to the injuries of class were the indignities of a caste system:

Racism was a basic fact of life. Caste distinctions determined rank in society and business. At the top: the Spanish. Stepping down: the *crillos* - white but born in the New World; *mestizos*, part white, part Indian; *mulattos* - white and black; *pardos* - black and

Indian. At the bottom, like Hindu untouchables: the Indians [Garrett p. 463].

A Maya could not stay overnight in the city of San Cristobal de Las Casas until 1965 and could not walk on the sidewalk until 1960 [Stuart & Stuart p. 128].

To the growing cancer of class and race hatred came a religious insult that provoked the so-called caste war of 1847. The Maya of the Yucatan, who had become devout Catholics, were incensed when the Mexican Government rejected Catholicism. Led by the cult of the "talking cross"¹⁸ the Mayans took control of most of the Yucatan and had Merida, the capitol city under siege, when suddenly they returned to their homes to plant their crops. Throughout the balance of the century the Mayans and the Ladinos traded massacres. Peace was not restored until 1901 with the formation of a separate Maya state called Quintana Roo. To this day white people are not welcome in many villages in this area [Stuart & Stuart p. 126]. Another "caste war" broke out in Chiapas in 1867 but had petered out by 1871.

The hostility between the Maya and the Mexican and Guatemalan Governments, and the handful of Hacienda owners who control most of the land and keep Mayans in peonage, goes on despite the fact that a great deal of land has been returned to Mayan hands since the 1920s [Stuart & Stuart p. 128]. The *National Geographic* warns, "Maya guerrillas have held out for 450 years or so, and there are still towns that outsiders should leave before dark." [Garrett p.463]. It is the same Maya guerrilla movement that led the recent, and as of 1999, ongoing uprising against the Government of Mexico in the state of Chiapas. Centuries of Guerilla war, uprisings, and union organization have been countered by violent repression from the landowning class, including a coup in Guatemala, organized by the CIA in the interests of the United Fruit Company. President, Jacobo Arbenz, an outspoken communist, had made the mistake of nationalizing land "owned" by United Fruit.

In 1954 Gen. James Doolittle wrote President Eisenhower that regarding the use of the CIA in the cold war, "there are no rules...hitherto acceptable norms of human behavior do not apply." Thus began the "ugly American" presence in Latin America. Recent documents released by the Guatemalan Truth Commission reveal the United States, through the CIA has been complicit in a reign of terror conducted by the government of Guatemala against its people, in particular the Mayan Indians. The CIA knew that the Guatemalan government, which had been put in place and armed by the United States, was massacring entire Mayan villages. The Reagan government meanwhile lauded the human rights record of the military regime [Clifford Krauss, New York Times, March 7, 1999]. The most recent government "counterinsurgency" in Guatemala produced 120,000 dead and 46,000 "disappeared" [Perera p. 9]. As late as 1994, the CIA turned its back as the army destroyed evidence of torture centers and mass graves [Clifford Krauss, New York Times, March 7, 1999].

¹⁸ The cross was made to talk by a Mayan ventriloquist. Naturally the Cross urged the rebels to fight.

The status of poor Mayan *campesinos* in Chiapas and Guatemala, Nicaragua and Honduras has changed little in three hundred and fifty years. The Maya remain the "most cruelly exploited native underclass in the Americas." [Perera p.7].

For some thousand years the Peten remained sparsely populated. The forest was restored and is now the largest expanse of forest left in central America [Stuart 1992 p. 95]. However, since 1950 the population of the Peten has exploded from 15,000 to over 300,000 and once again the forest is being cut down to make way for maize. In 1990 some 40% of the Peten was set aside by the Guatemalan Government in what is called the Maya Biosphere Reserve. Only sustainable forestry such as chicle tapping and allspice harvesting are allowed in the Reserve. Logging was prohibited because the roads made it too easy for settlers and cattle ranchers to invade the area. The invasion has come from both Southern Guatemala and from Mexico, but the Government does not have the resources to protect the reserve or even its own borders [Stuart 1992 p. 100].

The Peten Maya use the system used by their ancestors; slash/burn the forest to create a field (milpa) to grow corn. Each family also devours about 20 cords of wood each year for fuel. Unlike their ancestors they do not need to fell thousands of trees each year for fuel to burn limestone to make stucco and mortar for monument construction [Stuart p. 103].

Appendix- The Mayan number and calendar system

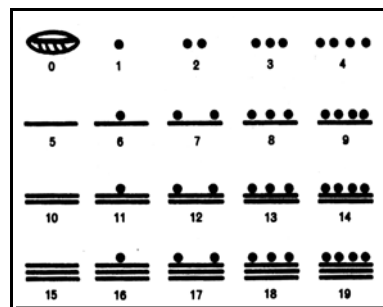
The Maya were obsessed with the "passing of time." To the Maya time was imagined to be a "supernatural phenomenon involving omnipotent forces of creation and destruction, with all of its aspects directly influenced by the Gods who were believed to be either benevolent or evil." [Gallenkamp p. 74]. These deities, represented in hieroglyphic form, are imagined to carry the "burden" of a given period of calendar time, thus every date has names as well as numbers.

In the Mayan mind time was not linear and progressive, but was cyclical and repetitive. It was fully expected that a date 52 years in the future would produce the same events as the current day, thus each day had a specific degree of luckiness or unluckiness associated with it, and thus, some days were better than others as dates for ceremonies, and it was simply unlucky to be born on certain days. Indeed, being born on an unlucky day may seal one's fate, that is, be a stigma

My mother was kidnaped. And from the very beginning she was raped by the town's high ranking army officers...after that they took her down to the camp...They have little pits there where they punish the people they have kidnaped and where my little brother was tortured as well. Then she was raped by the officers commanding the troops. After that she was subjected to terrible tortures. The first day they shaved her head, put a uniform on her and then they said, "if you're a guerilla why don't you fight us here?" But my mother said nothing. While they beat her they asked where we were, and said that if she made a confession, they'd let her go. But my mother knew very well that they did that so they could torture her children and would never let her go. She pretended she knew nothing. She defended everyone of us to the end. On the third day of her torture, they cut off her ears. They cut her whole body bit by bit. They began with small tortures, small beatings and worked up to terrible tortures...It was her turn to suffer the terrible pain her son had suffered too. They tortured the whole time and did not give her any food for many days..starving, my mother began to lose consciousness and was in her death throes. They gave her medicine. They gave her food. Then they started raping her again. -- Rigoberta Menchu from *I, Rigoberta Menchu: An Indian Woman in Guatemala*

that one may never overcome. Quite naturally then, the Mayans practiced and gave great weight to divination and astrology [Gallenkamp p. 75]. Given the great “burden” of time, it is little wonder then that the “keepers of time,” the priests, had great power in Maya society. It is also not surprising that the Maya developed a system of numbers and date keeping that was profoundly complex.

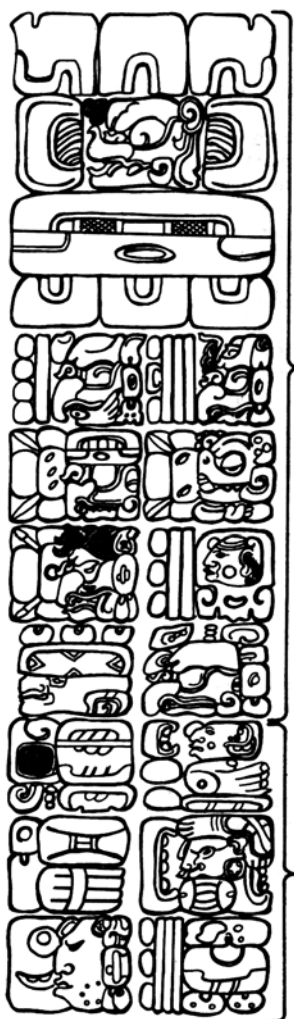
The Mayan system of numbers consisted of bars and dots. Each dot had a value of one and each bar a value of five. The Mayan number system is based on 20, that is they “counted



with the full person, both fingers and toes” [S&F p. 78]. The numbers from zero to 19 are shown in the

figure. Numbers greater than 19 were created by using vertical column of bars and dots.¹⁹ The first place in the column was in simple units. The second place was a multiple of 20. The third place was 20 x 20. Thus, the number 847 would be represented by two dots in the third place in the column (2 x 20x20 = 800), two dots in the second place (2x20), and a bar and two dots in the first column (7). Note the existence of the number zero. The number zero was invented by only two other peoples, the Babylonians and the Hindus. The concept of zero did not find its way to Europe until the middle ages [Gallenkamp p. 80].

The calendar was also based on units of 20. A day was a *kin*. A *Uinal* consisted of 20 *kins*. 18

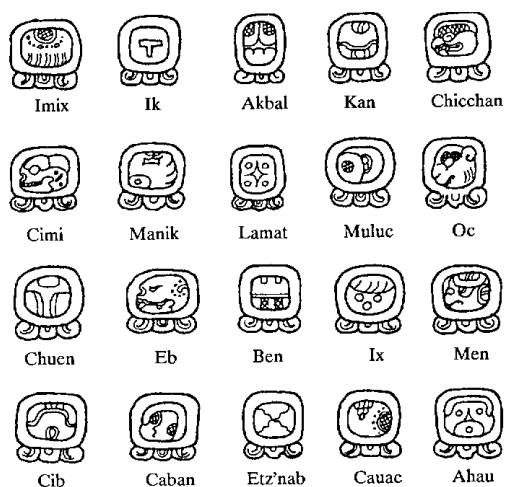


How a Long Count or Initial Series date is read; an inscription from Stela E at Quirigua, which records the date 9.17.0.0.0. 13 *Ahau* 18 *Cumku*, or January 22, A.D. 771. (Redrawn from *The Ancient Maya*, Fourth Edition, by Sylvanus G. Morley and George W. Brainerd; revised by Robert J. Sharer, with the permission of Stanford University Press. Copyright 1947, 1956, and 1983 by the Board of Trustees of Leland Stanford Junior University.)

LONG COUNT INTRODUCING GLYPH
Grotesque head in center is the only variable element of this sign. This is the name glyph of the deity who is patron of the month (here *Cumku*) in which the Long Count terminal date falls.

9 <i>bakuns</i> (9 × 144,000 days = 1,296,000 days)	17 <i>katuns</i> (17 × 7,200 days = 122,400 days)
0 <i>nuns</i> (0 × 360 days = 0 days)	0 <i>uinals</i> (0 × 20 days = 0 days)
0 <i>kins</i> (0 × 1 day = 0 days)	13 <i>Ahau</i> (day reached by counting forward above total of days from starting point of Maya Era)
GLYPH G9 Name glyph of the deity who is patron of the Ninth Day in the nine-day series (The Nine Gods of the Lower World)	GLYPH F Meaning unknown
GLYPHS E AND D Glyphs denoting the moon age of the Long Count terminal date, here “new moon”	GLYPH C Glyph denoting position of current lunar month in lunar half-year period, here the second position
GLYPH X3 Meaning unknown	GLYPH B Meaning unknown
GLYPH A9 Current lunar month, here 29 days in length. Last glyph of the Supplementary Series	18 <i>Cumku</i> (month reached by counting forward above total of days from starting point of Maya Era). Last glyph of the Long Count

19 The number 20 was signified by the zero glyph in the lowest position and a single dot above it [S&G p. 82].



The Tzolkin day signs from the 260-day calendar



The Haab month signs from the 365-day calendar

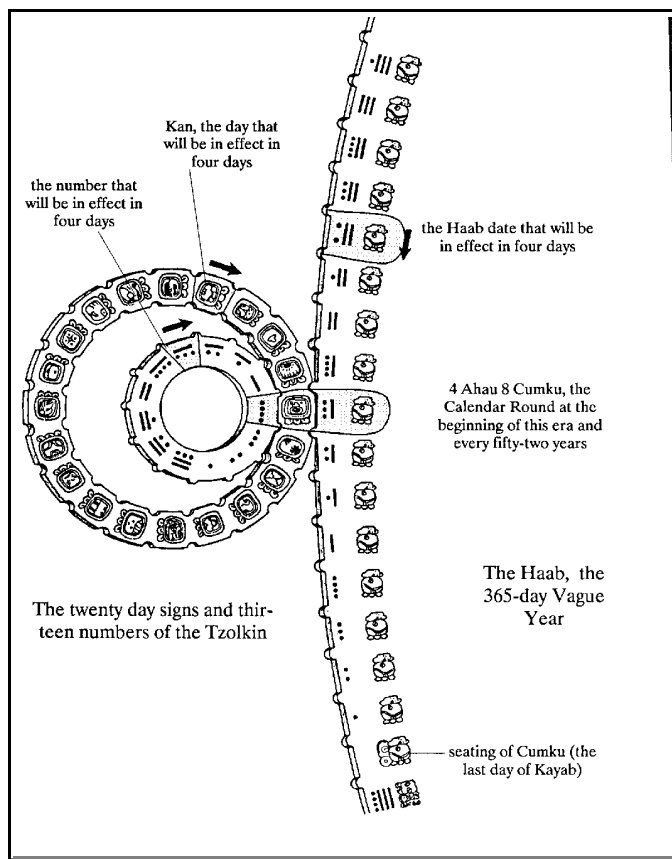
uinals made up one *tun*²⁰(360 days). 20 *tuns* was one *Katun* (7,200 days). It goes on in the same manner through *Baktuns* (144,000 days), *Pictuns* (2,880,000 days) etc. Thus, a typical date would be 8.14.10.13.15. Which is read as 8 baktuns, 14 katuns, 10 tuns, 13 uinals, and 15 kins. The number gives us the total number of days that have elapsed since the beginning of the so-called Long Count, that is, the day the Maya chronology began. The dates in the Maya calendar could be matched to the Christian calendar if we knew the date on which the Mayans began counting. Maya scholars have determined that the so-called “zero date” was 13.0.0.0 or 3114 B.C. [Gallenkamp p. 77].

Recall the unfortunate Maya ruler *Yax-Pac*. We know from inscribed dates that *Yax-Pac* set up altar G3 at Copán on 9.16.15.0.0 (766 A.D.). On 9.17.12.5.17 9(783A.D.) *Yax-Pac* celebrated his first *Katun* as King by dedicating Altar 22A and by erecting Stelae 8. On 9.19.10.0.0.0 *Yax-Pac*'s “apotheosis as an ancestor” is noted on Stelae 11 at Copán [S&F p. 31].

The Maya also named each day with a name and a number. The “Sacred Round” (*tzolkin*) consisted of the permutations of 13 numbers and twenty names that produced a 260 day ritual year. The “Vague Year”(*haab*) consisted of the permutations of 18 months and of twenty days each with 5 days added on at the end [all activity ceased in these days and children born on these days were considered to be very unlucky]. Thus each day has two names: one from the Sacred Round and one from the Vague Year. Hence, the full date of the day of creation was 13.0.0.0.0 4 *Ahau* 8 *Cumku*. Given all the permutations possible on the two cycles a given day appears once every fifty-two years (18,980 days=52x365). The 52 year cycle is called the Calendar Round.

It is now generally agreed that the Maya did not independently develop either hieroglyphic writing or the elaborate calendar. It is believed that the people responsible for these

20 “Tun” means stone. The passing of each Tun was marked by the setting of a stone in the ground. Each month was a “uinic” meaning “human being” since each human had 20 fingers and toes.



innovations were the Olmec who inhabited the lowland areas of Tabasco and Veracruz. The Olmec are believed to be the “mother” of all Mesoamerican cultures. The Olmecs developed the first “major art style” in the Mesoamerican region. “It is centered on full-figure and bas-relief depictions of fat, “baby-faced” humans, often displaying pronounced Negroid or Oriental features as well as anthropomorphized monsters or werejaguars with flat noses, flamelike brows, fangs, and snarling, downturned mouths” [Gallenkamp p. 68]. In 1939, anthropologists discovered a stelae inscribed with a typical Olmec werejaguar, but on the other side was an inscription of a date using the bar and dot system. It recorded a date of 31 B.C., a date quite a bit older than any know Maya dates [Gallenkamp p. 68].

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