
The Origin of the 260-Day Calendar: The Gestation Hypothesis Reconsidered in Light of Its Use Among the Quiche-Maya

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One of the most important features of Mesoamerican calendrical systems is the 260-day cycle, often referred to as the "sacred almanac" or "*tzolkin*" by scholars. It is widespread, and is at once perhaps the most ancient and the most durable component of Mesoamerican calendars. It still survives in many places. Despite its antiquity and importance in the generation of the 52-year cycle, there is little consensus regarding its origin. Some authors, such as Adams (1977:301-303), simply avoid the issue of origins, and concentrate on describing the cycle and its role. Others, such as Weaver (1972:103), state flatly that it is not based on any natural cycle and that we cannot account for its invention.

One can argue that the number thirteen existed for some independent reason, and that its permutation with twenty in the vigesimal system produced the 260-day cycle. Thompson (1971:99) discusses the reversal of cause and effect implied in this argument, but ends the discussion ambiguously. One can just as easily assume that the cycle of 260 began for some independent reason and that the factor of thirteen was derivative rather than generative.

Many of the published discussions of the origin of the sacred almanac seem to beg the question and little satisfaction is gained by reviewing them. The purpose of this paper is to return to a hypothesis that was rejected by Thompson early on, and to suggest that reconsideration of that hypothesis is amply justified. Curiously, Thompson's authority in such matters appears to have discouraged careful examination of the hypothesis by most others since at least 1950. The hypothesis is that the 260-day cycle began as an estimation of the observable period of human gestation rounded to the nearest multiple of twenty days.

A relatively recent published debate of the issue began with Malmstrom's (1973) revival of the hypothesis that the 260-day cycle originated near the latitude of 15°N, where the sun passes its zenith at alternating intervals of approximately 260 and 105 days. Copan lies at about this latitude, but the site's origin postdates the origin of the sacred almanac, and Malmstrom reasonably suggests

that Copan was more likely to have been built where it was because of the sacred almanac than the other way around. Nevertheless, he likes the idea of tying the 260-day calendar to the period of zenithal sun positions, and has searched for sites that are both early enough and located near enough to the line of 15°N latitude to qualify as the birthplace of the sacred almanac. He settles on Izapan, even though he has no calendric evidence from the site to back up his claim.

Henderson (1974) points out that Malmstrom was not the first to advance the zenith hypothesis. It is discussed by Nuttall (1928) and Merrill (1945), and both of these sources are discussed critically by Thompson (1971). Henderson repeats Thompson's objection that while the 260-day almanac runs continuously, the zenith cycle does not. The latter is a cycle of alternating 260- and 105-day periods. But Henderson (1974:542) like Thompson seems to us to beg the question by suggesting that the 260-day cycle "could simply have resulted from the permutation of its subcycles," an argument that quickly becomes circular if one assumes that thirteen was important because of its role in the sacred almanac. He also notes that archaeological evidence suggests that the 260-day cycle was in use in Oaxaca prior to the occupation of Izapa, but offers no alternative hypothesis regarding its peculiar length.

Malmstrom argues that one zenith day falls on August 14th, that this is very close to the beginning date of the long count in either the Goodman-Thompson or the Spinden correlation, and that the correspondence is in turn evidence in support of the zenith hypothesis. Thompson (1971:98) anticipates Malmstrom on this point in his criticism of the hypothesis, pointing out that the complexities of the calendrics indicate that it is a lucky coincidence and only a rough one at that. Even if one were to ignore the problem of the fit between the solar year and the 260-day round, the zenith hypothesis fits no known early site, and therefore does not really help us understand the origin of the cycle.

Fitchett (1974) reintroduces the possibility of the correspondence of the 260-day cycle with a natural phenome-

non by linking it to the agricultural growing season. This runs up against the same problem that all other solar-cycle hypotheses encounter, of fitting cycles of 360 plus five with those of 260 days, but in addition does not address the tremendous variation in the Mesoamerican growing season, which depends primarily on altitude. The idea of a linkage with a natural phenomenon is consistent with our position but it must be one that is neither as variable as plant cycles nor determined by solar phenomena. On the basis of evidence not considered by most Mesoamericanists, we have reexamined the human gestation hypothesis that Thompson rejected, for in it we find compelling evidence for a linkage. Thompson's rejection of the hypothesis is based on two main points, and we quote his entire paragraph on the subject so as not to misconstrue his argument.

The choice of the number 260 has given rise to much speculation. It has been suggested that the number was chosen because it approximates the period of human pregnancy, but that is not a very happy explanation because there is no logical reason why the period of pregnancy should be considered in establishing a divinatory almanac. Moreover, it is probable that the 260-day almanac evolved before the exact length of gestation was known, for one must be able to count days before such a reckoning is made. Furthermore, once the biological facts of pregnancy were known, it should have been simple to get a closer estimate of its duration than 260 days. It has also been suggested that the period derived from nine lunar months each of 29 days, although why the Maya should have regarded the lunar month as of 29 days is not clear, and even at that one has to reckon the lunation as of 28 days (Thompson 1971:98).

We will deal with Thompson's second point first. Here he says that people could not estimate the period of gestation before the development of a calendar, a point contradicted by the practice of many contemporary Maya women of calculating their due dates by the moon, without the aid of day-counting (Earle 1983; Neuenswander 1981). It is highly probable that a system of counting the nine lunations between the first absent menstrual cycle and birth was developed prior to a day-counting system, inasmuch as it is found frequently in the world ethnographic record in the absence of a calendar. If one is to use nine lunations as a gestation calculus, that is, from the observed absence of menses to actual childbirth, it is remarkably accurate, provided one employs the synodical lunar month. Here again Thompson fails us. It is true that a sidereal month approximates 28 days, but this is a lunation cycle measured against the stars. A full lunar cycle from a given phase of the moon to its reoccurrence, say new moon to new moon, is 29 days, 12 hours, 44 minutes and some seconds (or 29.306 days), and it is this synodical lunation of 29 full days that is easy to observe without complex stellar knowledge.

We now address the issue of gestation duration. It is not clear from Thompson's discussion what a good estimate might be, but we are informed by Fitzpatrick and Eastman (1960:85) that "the average duration, counting from the time of conception, is $9\frac{1}{2}$ lunar months, that is, 38 weeks, or 266 days. Counting from the first day

of the last menstrual period, its average length is 10 lunar months, or 40 weeks or 280 days." These authors are a nurse and a physician respectively, and they have chosen to define the lunar month rather simply as a period of 4 weeks or 28 days. This error does not alter the observed average human gestation period, which is either 266 or 280 days, depending upon whether conception or last menstrual period is used as the starting point. Nine synodical months total 265.7754 days, almost precisely the average period from conception to birth. If Maya lunations were measured as 29-day periods (without the fraction), as Schultze Jena claimed over fifty years ago on the basis of Maya ethnographic data (1954:76), then we come up with a cycle of 261 days. Perhaps Thompson was misled by the practice of counting forward 280 days from the first day of the last menstrual period. It is also possible to be misled by the apparent precision of the 266-day average. In fact less than 5% of all births occur on the predicted day. About 35% of all births occur within five days of the predicted date, and there is a tendency for more of the (18.5%) to occur before the average figure than after it. Another 35% occur before the 10-day "average" period, and 25% occur after that period (Fitzpatrick and Eastman 1960:87). Thus 266 days is an average, but the curve around the average is negatively skewed, not normal. In fact 260 days is a very good estimate of the period from conception to birth, and one needs only a counting system or a rudimentary understanding of the synodical month to come to it.

We can now turn to Thompson's first point, which is that there is no logical reason to propose the period of pregnancy as an origin for the sacred almanac. Research carried out in the early thirties by Leonhard Schultze Jena, and recent research carried out by one of the coauthors (Earle 1983), both with the Quiche of Highland Guatemala, point toward a very definite and extraordinarily logical connection between human gestation and the count of "the faces of the days", as the calendar is sometimes referred to. This sacred round is still extensively employed by the Quiche, as well as by speakers of Mam, Ixil, and Pokomchi (Miles 1952). Diviners still count out the twenty day names with their numerical companions, and are intimately familiar with a system of destiny-interpretation on the basis of their calendrical knowledge (Tedlock 1982; Earle 1983). It is the logic that *they* employ in the use of this calendar that we wish to submit in defense of the gestation hypothesis.

Our first point is that the Quiche make a firm connection between the moon, menstruation, and pregnancy, this being expressed in terms and beliefs about the relationship between them. Schultze Jena observed that in Chichicastenango, a Quiche township, the menstruation cycle is considered to be governed by the moon, the moon being referred to as *ratit*, "our grandmother". He also found terms that reflected this in the Quiche language. The terms he cited for menstruation are *rech ri ic'*, "with the moon", and *ri quic' rech ri ic'*, "the blood from the moon".¹ In nearby Chinique, another Quiche

township, Earle found that the most common term was *retal ic'*, "the sign of the moon" (Earle 1983). Schultze Jena also found one gloss for "human being" to be, "one of nine moons, one of nine stars", with the stars being subordinate to the moon (1954:74). Earle discovered in Chinique that the moon is considered the "planter" of women. When they are sufficiently "heated" by sexual intercourse, women are said to retain the "nine bloods" they would have otherwise lost, and these nine bloods constitute the life-blood of the infant. For the Quiche, then, the moon governs birth by both giving women their menstrual cycle and by taking it away for nine lunations.²

A second related point is the connection between the calculations employed by Quiche women, and midwives in particular, to predict approximate dates of birth, and the 260-day calendar. Because the moon is the pregnancy-determining deity, conception is measured from the point where "our grandmother" is expected to send menstruation but does not, rather than being measured by a presumed day of actual conception. This technique is understandable, for intercourse is rarely limited to periods of female fertility, and actual conception would be difficult to pinpoint, while absence of menstruation is uniformly observable. The day which does not produce the expected lunar "sign" is noted by Quiche women, and if possible a calendric diviner is consulted, who will provide the sacred calendar day-name. One diviner explained this process to Earle, pointing out explicitly the reason for uncovering the date the moon failed to give her sign. It is approximately the same day in the sacred round as the date of birth. For the midwives of Chinique, it is very useful to have an accurate system for calculating due dates, for the prenatal sweatbath treatments administered by the midwife in charge must be timed so as to intensify in the last forty days. If the due date is 8 *ak'abal*, those familiar with the calendar know that on 7 *ak'abal* there are forty days to go, and on 1 *ak'abal* there are only twenty. It is clear from this case that one explicit function of the 260-day calendar is the prediction of births, as the cycle of pregnancy measures out nine "absent" menstruations and the calendar 13 twenty-day months of gestation.³

There is also a belief among the Quiche that the day one is born on determines the fundamental nature of one's character (Tedlock 1982:110). In prehispanic times, one took the day-name one was born on, a practice destroyed after the Spanish Conquest, but the idea that one's fate is closely linked to one's almanac "birthday" remains. In Chichicastenango, Schultze Jena noticed that children are presented before the earth deity (*Dios mundo*), 260 days after birth, a practice carried out in other townships as well. He linked this practice to the additional fact that students of the divining profession must go through a 260-day initiation, a process the Quiche themselves liken to the gestation period (1954:75). All of these beliefs and practices indicate a strong connection between the gestation process and the sacred calendar.⁴

In addition to serving as a birth-prediction calculus,

the calendar, as it is employed in divination, has other vital functions in the dynamics of everyday Quiche life. The calendrical diviners serve as spiritual curers, marriage counselors, officiators of life-crisis events, and resolvers of conflicts within and between families, utilizing the calendar as their central tool for uncovering a cause and deciding upon a solution. The precise divining process is beyond the scope of this paper, but the outcome is largely determined by a series of four day-names and their corresponding numbers (see Tedlock 1982, for a detailed explanation of the process). In contrast to the more public, annual rites governed by saints' cults and focused around the agricultural year, the municipal church, and prominent elders at the service of the whole community, the activities associated with the divinatory calendar are, in general, more oriented toward the private, the lineage, and the immediate family. Hidden for centuries from the inquisitous eye of the Catholic church, divination addresses the fate of *individuals* as they relate to the ancestors, witches, kinsmen, sexual and other social transgressions, and of course sickness and death. It is a calendar that is quintessentially *human* in orientation, not only with regard to birth but also in relation to the cycles of destiny that constitute life, and that address those forces that bring life to its eventual termination.

The Quiche case lends support to our hypothesis, because those who employ the calendar in their daily practices explicitly point to human gestation as the temporal cycle to which the "count of the days" conforms, and they employ it as a calculus to predict human birth. Furthermore, the process of initiation into the ranks of calendrical diviners, a form of metaphoric rebirth, is consciously linked to the gestation period by diviners themselves.⁵ In addition, the use of the divinatory almanac indicates that it is ultimately a measuring device to determine human fate from birth to death, a fate set into being by the "owner" of the day of birth, that day being in turn the same day as the one that began the gestation cycle, the day of the moon's "planting". In dynamic juxtaposition to the calendar of the agricultural "solar" year, this "lunar" cycle has everything to do with human life and its development.

The gestation hypothesis may shed light on certain seemingly illogical evidence found in the archaeological record with regard to the development of Mesoamerican calendars. For example, if the 260-day round is not derived from annual solar cycle phenomena, as most now assume, then the confusion as to why such a calendar would develop *prior* to the 365-day year is removed. Recognizing the earlier dates for the first evidence of the almanac, Malmstrom posits, in defense of his inter-zenith hypothesis, the unreasonable idea that people in sites such as Izapa were measuring segments of the solar year centuries before "it was recognized that the year had 365 days" (1978:105). Accepting our position, the implication is that measuring human gestation with a calendar was an earlier and more fundamental concern than measuring precisely the solar year. To be sure, this is

difficult to prove, but a few additional data are suggestive.

One is the appearance in the Formative period of female figurines that emphasize procreative anatomical features. By contrast, there appears to be little iconographic evidence at this time for agricultural themes. Perhaps the domesticated maize "revolution" made food-procurement a less precarious endeavor, and therefore more emphasis was placed on reproduction. Or perhaps there was less concern for an absolute year calendar than one for birthing, due to the fact that maize farming in the tropics is usually pegged to the onset of rains, a time that varies from year to year and microclimate to microclimate. In the Central Quiche Basin, for example, agricultural scheduling is calculated from the first steady rainfall, a time that can vary as much as a month from year to year. Scheduling is not made from the Gregorian calendar. It is plotted in twenty-day intervals from rain onset. It is credible that ancient Mesoamerican corn farmers also keyed into temporally variable environmental cues, rather than following absolute time markers tied to a 365-day round. Birth scheduling, by contrast, has remained an invariable cycle since long before agriculture was practiced. If one accepts *utility* as a primary criterion for the creation of a calendar, then perhaps the prior appearance of the "human" calendar is sensible indeed.⁶

The logic of our argument in favor of the gestation hypothesis has been largely based on Quiche ethnographic data, and we invite others to test it against other data sources. For us, hypotheses based on astronomical, agricultural or purely numerological cycles are not very happy explanations for they lack significant confirmation in the ethnographic, ethnohistoric, or archaeological record. The Quiche case supports the idea that the sacred almanac of the Maya arose out of a desire to measure a profoundly human cyclical process. As Henderson (1974:542) says, "any argument for a correspondence with some natural phenomenon must be not merely plausible but compelling." The Quiche case supports well beyond mere plausibility the idea that the sacred almanac of the Maya arose out of a desire to measure a profoundly human cyclical process.

Notes

¹ The orthography employed for all Quiche language entries is the official one recognized by the Guatemalan National Indian Institute, and it is similar to Spanish in the majority of cases. The similarity between the Quiche word for blood and for moon is a fact they are very aware of, although they are considered phonologically distinct.

² Helen Neuenswander finds very similar beliefs among the Achi of nearby Cubulco (1981). She also notes that women will employ the system of moon counting only if they cannot afford to consult a calendar diviner, such that both a moon- and day-counting system are in operation in Cubulco simultaneously (personal communication, 1979, with Earle).

³ The use of the term "moon" for the 20-day month is common in Maya languages (e.g., Tzotzil, "u"), where the twenty-day annual calendar still exists (such as in the Tzotzil-speaking community of Chamula, in Chiapas). Since there is no 20-day periodicity associated with the moon in the ethnographic record, the implication is that the 20-day "month" is a later, derivative system linked to the sacred almanac, as 13 twenty-day "months" replaced 9 twenty-nine-day lunar months, within that system.

⁴ In another town of the same region, McArthur (1979:7-8) finds a related practice. Twenty days after the birth of a child, or as soon as financially possible (but always on the same day-name as the day of birth), a stone is "planted" in front of the sacred altar-mound, to represent that newborn person to the earth deity and the ancestors, and to provide him or her with protection. As one man described it, "Every nine months, when his day comes up, he remembers the fact of his day so that he will not go into harm, so that nothing will happen to him" (1979:8). Here again there is a strong linkage between one's day of birth, measured by the count of the sacred almanac, and one's future destiny, measured, in this instance, with regard to ceremonies carried out each 260 days starting from birth.

⁵ Barbara Tedlock finds this same conscious association between gestation and the divining calendar in the Quiche township of Momstenango (Tedlock 1982:93).

⁶ Schultze Jena (1954:76) argues for the primacy of the 260-day calendar, not on archaeological grounds (the data were not yet available to him), but rather on the grounds that the structure of the sacred calendar provides the numerological building blocks for the annual 365-day round. Starting with the vesigesimal system, the term in Quiche and some other Maya languages for twenty being "one man" (*jun winak*), presumably related to the ten fingers and ten toes that constitute one person, the permutations of this number with the observable gestation period of nine lunar months generates the dependent variable of 13. According to Schultze Jena, this hides the number 9 in the sacred round, but it surfaces in the 360 plus 5 system, as the numerical basis of the 18 twenty-day "months", that is, as the result of 2×9 , or alternatively 40×9 (360), or both. Last, the five "lost" days are tacked on to bring the system into rough alignment with the solar annual cycle.