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THE VENUS-RAIN-MAIZE COMPLEX IN THE MESOAMERICAN WORLD VIEW: PART I

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INTRODUCTION

The importance attributed to the planet Venus by the ancient Mesoamericans is well known. Most famous is its malevolent aspect: according to some written sources from the post-Conquest central Mexico, the morning star at its first appearance after inferior conjunction was believed to inflict harm on nature and mankind in a number of ways. Iconographic elements in various codices seem to confirm these reports. Although there is a considerable amount of data of this kind, some recent studies have revealed the inadequacy of the common assumption that the heliacal rise was the most, if not the only, important Venus phenomenon. It has been argued that "in spite of the obvious importance of the first appearance of the Morning Star ..., the Evening Star which disappears into inferior conjunction in the underworld had an equal, if not greater, significance".[1] The importance of the evening star and of events other than heliacal risings is also attested in Mayan inscriptions and codices.[2] Consequently, the symbolism associated with the planet Venus in Mesoamerica must have been much more complex than is commonly thought.

One part of this symbolism was related to rain and maize.[3] The conceptual association of the planet Venus with rain and maize can be designated, following Closs *et al.*, as the *Venus-rain-maize complex*.[4] The object of this study is to present various kinds of evidence to demonstrate the existence of this complex of ideas in Mesoamerica, to describe its forms and particularities associated with distinct aspects of the planet, to follow its development, and to explore its possible observational bases.

One of the basic assumptions of this paper can be summarized as follows: the beliefs about how the universe functions nearly always reflect, in one way or another, the observation of nature. The world view or *cosmovisión* of a people or a social stratum can be understood only in terms of its natural environment and cultural context. In varied sources containing information about the Venus-rain-maize complex (myths, iconography, etc.) we may thus expect to find reflections of the phenomena observed in the sky and of the correlations that apparently exist between celestial events and cyclical changes in the natural environment. Some easily observable characteristics of the apparent motion of Venus, which so far have not received enough attention, and seasonal occurrences of certain phenomena may have been at least partly responsible for the origin of the Venus-rain-maize complex; they are described in Section 1.

The evidence presented in Sections 2 and 3 reveals various aspects of the relationship of Venus with rain and maize in Mesoamerican world view. Since

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TABLE. 1 (*opposite*). Dates and values of extreme declinations of Venus as morning/evening star in various 8-year cycles in the first and second millennium A.D. (N = northerly declination; S = southerly declination). All dates are Julian. The calculations were based on Tuckerman's tables, employing values of the obliquity of the ecliptic obtained from Aveni's data.[304] The declination values are given in decimal degrees. Bold figures represent maximum northerly and southerly declinations in each 8-year cycle. The asterisks indicate that the planet would not have been visible, because its elongation in the moment of the extreme declination was less than 5°.

the Venus-rain-maize complex is attested in prehispanic Mesoamerica and, as a survival, in later periods, archaeological, historical, ethnographic and other data from different epochs and cultures of Mesoamerica have been employed and, moreover, considered to be complementary. Such an approach can be justified only if a certain 'horizontal' (in space) and 'vertical' (in time) continuity is postulated for the Mesoamerican culture area. Caso, Jiménez Moreno and other scholars have favoured this view of Mesoamerican cultural unity, while Kubler questioned it, invoking the principle of disjunction.[5] Nicholson, discussing the problem of continuity of form and meaning in Mesoamerican iconography from the Preclassic on, recognized the "basic cogency of some of Kubler's warnings", but noted that, in spite of many evident iconographic-conceptual disjunctions between Olmec and Aztec, there were a number of continuities as well.[6] Stressing the importance of contexts, he added:

> If the elements themselves are similar and occur in similar clusters then the likelihood of retention of similar meanings over time seems greatly increased. Even when the iconographic elements are isolated, the application of this approach at least makes possible the advancing of cogent hypotheses to elucidate their meanings, to be tested against further data as they become available.[7]

This basic principle is actually applicable to the culture in general. If in Sections 2 and 3 of the present study some relatively isolated data from different Mesoamerican cultures, widely separated in space and/or time, are compared and combined, the interpretations based on such comparisons should be considered tentative, whenever they are not supported by intrinsic evidence or by a correspondence of larger contexts. I believe, however, that the hypotheses of this kind may call attention to certain facts and stimulate further research.

Section 4 (in Part II of this paper) will represent an attempt to see the Venus-rain-maize complex in diachronic perspective. Showing the degree of continuity and discontinuity in the evolution of a particular cultural phenomenon, this Section may also have more general implications for the problems of cultural unity and plurality in Mesoamerica. Possible observational bases of the Venus-rain-maize complex will be explored in Section 5.

1. VENUS EXTREMES

The characteristics of the apparent motion of Venus have been described by various authors;[8] however, some phenomena have so far received little attention, or have been completely ignored.

	Date	Morning star N	Morning star S	Evening star N	Evening star S
132	Apr 9			22.83	
	Aug 15	22.07			
133	Jan 5		-24.09		
	May 30			25.18	
	Oct 31				**-27.22**
134	Feb 18		-20.57		
	Jul 16	23.86			
	Dec 6				-24.97
135	May 5			**26.70**	
136	Jan 21		-23.54		
	Jun 14			24.74	
	Nov 8				-26.29
137	Jul 31	23.24			
	Dec 21				-24.53*
138	May 15			25.79	
139	Feb 5		-22.70		
	Jun 30	24.32*			
	Nov 21				-25.51
500	Jul 21	23.41			
	Dec 11				-24.63
501	May 7			26.13	
502	Jan 26		-23.01		
	Jun 20			24.40*	
	Nov 12				-25.78
503	Aug 6	22.58			
	Dec 27		-24.19		
504	May 20			25.37	
	Oct 8				-22.73
505	Feb 9		-21.73		
	Jul 5	23.96			
	Nov 26				-25.13
506	Apr 30			**27.06**	
	Aug 19	20.67			
507	Jan 11		-23.70		
	Jun 4			24.85	
	Nov 2				**-26.94**
644	Feb 14		-20.47		
	Jul 11	23.69			
	Dec 1				-24.86
645	May 1			**26.83**	
646	Jan 16		-23.37		
	Jun 10			24.61	
	Nov 4				-26.33
647	Jul 27	23.06			
	Dec 17				-24.40*
648	May 11			25.74	
649	Jan 31		-22.53		
	Jun 25	24.17*			
	Nov 16				-25.45
650	Apr 5			22.07	
	Aug 10	21.94			
651	Jan 1		-23.94		
	May 25			25.10	
	Oct 27				**-27.31**
748	Feb 8		-21.55		
	Jul 4	23.86			
	Nov 24				-25.06
749	Apr 30			**27.21**	
	Aug 17	20.45			
750	Jan 10		-23.60		
	Jun 3			24.77	
	Nov 1				**-26.92**
751	Jul 20	23.31			
	Dec 10				-24.56
752	May 5			26.11	
753	Jan 24		-22.91		
	Jun 18			24.32*	
	Nov 10				-25.75
754	Aug 4	22.47			
	Dec 25		-24.11*		
755	May 19			25.32	
	Oct 6				-22.73
852	Feb 1		-22.20		
	Jun 26	24.01			
	Nov 17				-25.28
853	Apr 14			24.96	
	Aug 11	21.50			
854	Jan 2		-23.78		
	May 27			24.95	
	Oct 31				**-27.59**
855	Feb 14		-19.71		
	Jul 13	23.52			
	Dec 3				-24.73
856	May 1			**26.62**	
857	Jan 17		-23.19		
	Jun 11			24.47	
	Nov 4				-26.14
858	Jul 28	22.83			
	Dec 18				-24.27*
859	May 13			25.59	
996	Jan 23		-22.78		
	Jun 16			24.22*	
	Nov 9				-25.69
997	Aug 2	22.32			
	Dec 23		-24.02*		
998	May 17			25.25	
	Oct 5				-23.31
999	Feb 6		-21.45		
	Jul 3	23.77			
	Nov 23				-25.00
1000	Apr 27			**27.34**	
	Aug 15	20.33			
1001	Jan 7		-23.50		
	Jun 1			24.70	
	Oct 29				**-26.95**
1002	Jul 18	23.21			
	Dec 8				-24.49
1003	May 4			26.10	
1146	Feb 9		-20.27		
	Jul 8	23.50			
	Nov 28				-24.74
1147	Apr 29			**26.88**	
1148	Jan 13		-23.19		
	Jun 6			24.46	
	Nov 1				-26.33
1149	Jul 22	22.85			
	Dec 13				-24.26*
1150	May 8			25.68	
1151	Jan 27		-22.33		
	Jun 22	24.00*			
	Nov 14				-25.36
1152	Mar 30			22.41	
	Aug 5	21.72			
	Dec 28		-23.78		
1153	May 21			24.98	
	Oct 26				**-27.52**
1244	Jan 7		-23.39		
	May 30			24.61	
	Oct 28				**-26.94**
1245	Jul 16	23.10			
	Dec 6				-24.41
1246	May 2			26.04	
1247	Jan 21		-22.69		
	Jun 15			24.15*	
	Nov 7				-25.65
1248	Jul 30	22.22			
	Dec 21		-23.94*		
1249	May 15			25.20	
	Oct 2				-23.28
1250	Feb 3		-21.36		
	Jun 30	23.68			
	Nov 21				-24.94
1251	Apr 25			**27.46**	
	Aug 13	20.22			

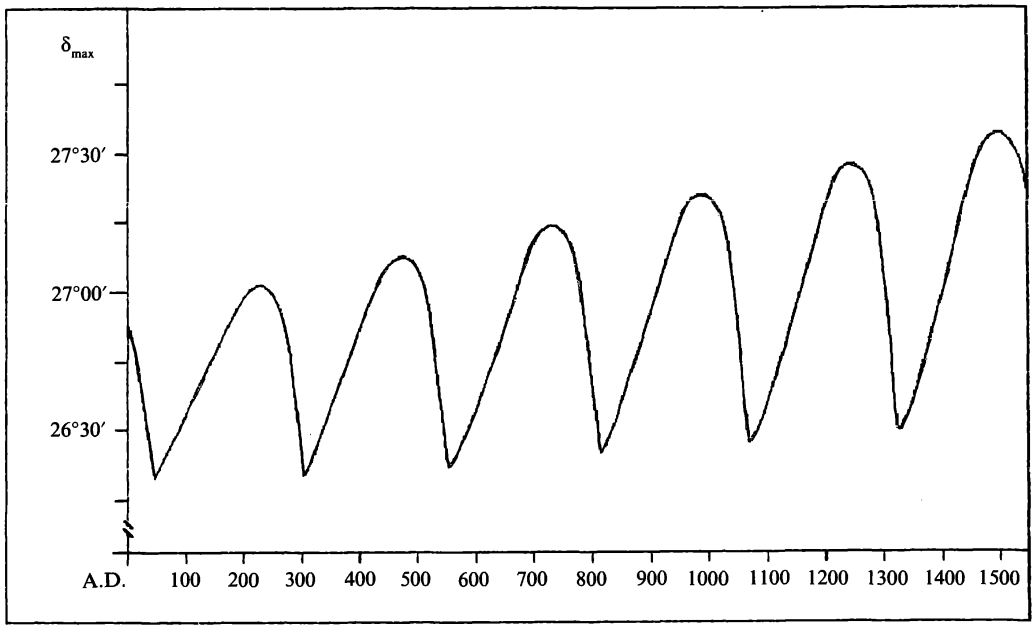


FIG. 1. Maximum northerly declinations of Venus as a function of time. The curve was obtained by connecting *only the maximum* declinations of successive 8-year cycles. The oscillations exhibit 251-year periods, marking intervals at which the patterns of Venus phenomena recur (see ref. 13). The overall growth of declination values is a consequence of the advance of the ascending node of Venus's orbit (*cf.* Šprajc, "Venus, lluvia y maiz" (ref. 3), 231–3).

Since Venus is a planet, its declination changes and, consequently, its rising and setting points move along the eastern and western horizon, respectively, reaching northerly and southerly extremes. Dates and magnitudes of the extremes vary considerably, exhibiting, however (like other Venus phenomena), 8-year patterns. Because the plane of Venus's orbit is slightly inclined to the plane of the ecliptic, some extremes of an 8-year cycle are greater than solstitial extremes.

The importance of Venus extremes in prehispanic Mesoamerica has already been discussed in the literature.[9] Closs *et al.* noticed that all great northerly extremes (when the planet attained a declination in excess of $25\frac{1}{2}°$) in the eighth and ninth centuries were visible in late April or early May, i.e. they were seasonally fixed, coinciding approximately with the onset of the rainy season in Mesoamerica.[10] Further research has shown that (i) *all Venus extremes are seasonal phenomena*; and (ii) the *maximum extremes of morning star and evening star are asymmetric*, i.e. maximum extremes *visible* on the eastern horizon *differ in magnitude* from those visible on the western horizon.[11]

During the Classic and Postclassic eras in Mesoamerica Venus attained declinations in excess of about |24°10′| (up to about $|27\frac{1}{2}°|$) exclusively when it was visible as *evening star*, and always some time *before* the solstices: between April and June (northerly extremes) and between October and December (southerly extremes). The *maximum extremes*, occurring at 8-year intervals, always fell between 1 and 6 May (north) and between 2 and 7 November (south), Gregorian.[12] On the other hand, the extreme declinations of Venus as

morning star were always attained *after* the solstices, between late December and February (south) and between late June and August (north), but they never exceeded the |24°10′| (Table 1, but note that the dates are Julian). This means that the greatest extremes visible in the east were about 3° smaller than the greatest extremes in the west; it means, furthermore, that the *morning star's* rising point, while moving southwards and northwards along the *eastern* horizon, never passed much beyond the points of solar solstitial extremes.

In one 8-year cycle, 5 northerly and 5 southerly extremes of the evening star can be observed. The pattern of magnitudes and dates of Venus extremes, as exhibited in a cycle of 8 years, changes through time gradually.[13] Figure 1 shows variations in magnitude of the maximum northerly declinations of Venus from A.D. 1 to 1500. It is particularly noteworthy that the relationship of the extremes with certain seasons of the year practically does not change for many centuries and even millennia (see Table 1); the astronomical explanation of these phenomena has been given elsewhere.[14]

Viewed in the light of rainfall data for various parts of Mexico,[15] the evening star extremes seem particularly interesting, since they approximately coincide with the start (northerly extremes) and with the end (southerly extremes) of the rainy season in Mesoamerica; in various regions they also delimit the agricultural cycle. As we shall see, Venus orientations in Mesoamerican architecture refer to the *maximum extremes*, which, as was noted above, are particularly accurate time-markers.[16]

2. THE VENUS-RAIN-MAIZE COMPLEX

Venus and Rain

The relations of the planet Venus with rain and maize in Mesoamerican world view are abundantly evidenced historically, ethnographically and archaeologically. In this Section only those data will be surveyed which document the Venus-rain-maize associations in a general way.

One of the best known facts is that the god Quetzalcoatl was related to Venus, on the one hand, and to rain, maize and fertility, on the other. The feathered serpent was a mythical creature which, from the remote past, represented celestial water, clouds, and also the rainy season.[17] According to Thompson, Quetzalcoatl was "primarily the deity of fresh vegetation, of growth when the rains come, as is brought out in the hymn to Xipe".[18] The transformation of the fire serpent into the feathered serpent in this hymn symbolizes the transition from the dry to the rainy season.[19]

The belief of the Quiché Maya, associating Venus with rain and birds, particularly with the quetzal,[20] must have its roots in the characteristics of K'ucumats, the Quiché deity corresponding to Quetzalcoatl. Having aquatic attributes, K'ucumats can also be identified with the planet Venus: a modern tradition describes K'ucumats as a great serpent that carries the sun every day from the east to the west, whereas in the *Título de Totonicapán* the course of the sun is said to be guided by Venus.[21]

A comparable deity of the Yucatec Maya was Itzamna. Chicchan, the principal deity of the modern Chorti, has the characteristics of both Itzamna and the feathered serpent.[22] Itzamna was a quadruple divinity,[23] and likewise there are four "sky Chicchans, who produce most of the sky phenomena".[24] A relationship between Chicchan and the planet Venus is very probable.[25] The Maya god Kukulcan of the Postclassic Yucatán was but a variant of Quetzalcoatl.[26] Most surely Itzamna, Chicchan and Quetzalcoatl/K'ucumats/Kukulcan were essentially identical deities, having originated from the same conceptual roots.

Núñez de la Vega, in his *Constituciones diocesanas del Obispado de Chiapa*, mentions a calendric figure called *Cuchulchan* and describes it as a plumed serpent that goes on the water; he adds it corresponds to *Mexzichuaut*, which means Cloud Serpent (Mixcoatl?).[27] Interestingly, some Tzotzil groups still believe that Venus is a big feathered serpent called *Mukta Ch'on* (= "big serpent").[28]

Beliefs associating rain or water in general with serpents, which often have wings or feathers, are preserved all over Mesoamerica.[29] Another pan-Mesoamerican belief associates water with mountains. Mythical ophidians are thus not only lords of the lakes, rivers and waterholes but also of the mountains.[30] In some cases the mountain lords are evidently connected with Venus.

For the Cakchiquel of Panajachel, Guatemala, the strongest star is Santiago (or San Pedro), which "cares for wheat, beans, and the Hill".[31] Blom and La Farge report that the name of the Tzeltal lord of the mountains is *hun ahau*.[32] It may be recalled that the base date of the Venus table in the Dresden Codex is 1 (*hun*) Ahau, attributed to the heliacal rise of the morning star, and that this was probably a collective title of the Venus gods.[33] On the other hand, Landa mentions that *Hunhau* was the lord of the hell, which explains the panic that mention of *hun ahau* provoked among the Tzeltal.[34] It is interesting that Tax's informants said that Santiago (or, in another version, San Pedro) cares for crops and the hill, "but the Devil won't let him be friendly"; moreover, there is a linguistic confusion: *pajuyu'* means "with devil" or "with owner of hills or *montes*".[35] The association Venus-devil-mountains can perhaps be accounted for by the periodical disappearances of Venus conceived as descents to the underworld. When Hun Hunahpu and Vucub Hunahpu of the *Popol Vuh* were reconstituted by Hunahpu and Xbalanque, Hun Hunahpu was transformed into the morning star, but at the same time he became the Lord of the Underworld.[36] The Tzotzil of Zinacantan explicitly identified Venus (*muk'ta k'anal* = "big star") with the devil.[37]

The association between Venus and the devil was firmly established by Closs.[38] Also evident, on the other hand, are the devil's connections with rain. A Zoque informant replied to Wonderly, not without hesitation: "The rain god is King Satanas." He also identified him with *lusbel* or Lucifer.[39] In Codex Ramírez, Tlaloc is depicted as a devil.[40] Pickands observed that the attires used in the Kekchi "Devil Dance" — particularly those worn by the chief devil — resemble the characteristics of the Maya God L; he also compared the mythological background of the dance with the scene represented on the Vase of

the Seven Gods.[41] The figures on this Maya vase were identified by Closs[42] as Venus deities, particularly God L, who presides over the group and whose Venus affiliation is manifested by the presence of his image and nominal glyphs in the Venus table of the Dresden Codex. The other attribute of God L is shown on p. 74 of the same codex, where he "appears as a protagonist in the celestial downpour scene.... In the same vein, a black god closely affiliated to and possibly identical with God L is the protagonist in scenes showing heavy rainfalls on Madrid 32a-b."[43]

Since the devil in contemporary Mesoamerican folklore generally has not much in common with the Christian concept of the devil, it seems safe to conclude that the Christian Devil merged with some prehispanic deities. The most probable evolution of these transformations, as well as of the associations between Venus and the devil, can be summarized as follows:

1. In prehispanic belief
(a) water was stored under the surface of the earth, particularly in the mountains, from where it ascended in the form of clouds;[44] Tlalocan, the abode of rain deities — a paradise and a place of abundance[45] — is occasionally placed in the first heaven,[46] but the evidence that it was in fact located in the underworld is overwhelming;[47]
(b) Venus was associated with water/rain and with the underworld.

2. Under post-Conquest Christian influence
(a) the indigenous concepts about the underworld began to be equated with the Christian idea of the hell, and the underworld deities became devils;[48]
(b) as a consequence of the relations and transformations described, Venus also became associated with the devil.[49]

Put in a schematic way, the prehispanic association

water + underworld + gods of the underworld + Venus

was contaminated, after the Conquest, by the transformations

underworld → hell
gods of the underworld → devils

and resulted, new terms (though not necessarily new concepts) having been substituted, in the association

water + hell + devil + Venus.[50]

The *cenote* cave of Tancah in Quintana Roo may have a relationship with the "diabolical" aspect of Venus. Some of the glyph-like motifs carved on the east ledge of the cave, which has an east–west orientation, were interpreted by Miller as the Lamat and Ahau glyphs referring to the planet Venus.[51] According to a local legend, the cave is haunted by an *alux* and is still feared by the Maya living in the vicinity; when they hunt near Tancah, they make special offerings to placate the sprite.

> This fear of the Tancah Cenote Cave suggests that the ancient Maya associated Hell with a cold damp place and that caves with water were thought to be passages into that realm of death.[52]

If Miller is correct, this is another example illustrating the nature of Venus's relationship with waters and with the underworld.

Venus and Maize

As Closs has argued, the Vase of the Seven Gods represents Venus deities; the presiding one is God L, who occasionally wears the maize plant in his headdress (Figure 2).[53]

Since Atamalcualiztli, the Aztec feast of the rejuvenation of maize, was celebrated at 8-year intervals, Seler concluded that the ceremony had to do with Venus.[54] Eight years is the time-span after which Venus phenomena recur on approximately the same dates of the year. On the other hand, the canonical period of the planet's invisibility around inferior conjunction was 8 days. In this context it should be recalled that the Maya maize god was patron of the number 8.[55] Pasztory argues, using the evidence contained in the hymn of Atamalcualiztli and in the *Popol Vuh*, that connections between Venus and the maize god are reflected in the ball game symbolism, and Cohodas concludes that "for certain purposes venus and the Maize God were meant to be seen as equivalent".[56]

The Venus-maize relationship is also revealed in various myths about the origin of maize. Characteristically, an important role in the discovery of corn is attributed to a particular species of ants (*zompopos*), for example in the Tzeltal, Mam, Mopan, Zoque, western Nahua and Chinantec myths.[57] The reason might lie in the fact that this insect, indeed, causes damage to the fields by carrying away the maize.[58] Closs offered convincing arguments that ants have some relationship with Venus in Mesoamerican world view. It is significant, for instance, that in various Maya languages Xulab is the name for the Venus god or Venus, and also for a certain ant species.[59] In the *Leyenda de los Soles* Quetzalcoatl, whose Venus affiliation is indisputable, transforms himself into an ant in order to obtain the maize.[60] A Yucatec Maya belief has it that Kukican, a many-headed snake living in the sky, comes at intervals to the earth to a place below the home of the red ants.[61] Considering the Venus-devil identification discussed above, it is interesting that the Maya of Quintana Roo believe the devil normally dwells in subterranean anthills.[62]

In some Chinantla stories it is the gopher who brings maize to mankind. Curiously, in one tale we read that the gopher wanted to ascend and transform itself into a star, but, having no success, remained on the earth. Such an intention of the gopher is also mentioned in the tale about Sun and Moon.[63] In another Chinantec narrative the gopher brings a corncob to Antonio Güero, a figure described as "father and mother of the maize". The continuation of the story reveals, again, the peculiar relationship between maize, devil and, probably, Venus; furthermore, it reminds us of Quetzalcoatl's myth, specifically of the passages concerned with his role in the discovery of maize and with his disappearance:[64]

> Then the father of maize planted what the gopher had brought; thus there would be maize all over the world. And when there was maize, the

FIG. 2. Relief on a tablet in the Temple of the Cross at Palenque, Chiapas, Mexico, representing the Maya God L (photograph by the author).

> body of Antonio Güero peeled, in the morning, around eight o'clock, when he had just finished washing the maize. Antonio turned fair, he turned white. As he was dying, he said: "Remember me, for I am leaving. My hour of death has come. I am going to be seen there, below the belly of the Siete Cabrillas, until the end of this world."
>
> Then said Jesus to Antonio Güero: "So that you may know, all the seeds are incarnated there, inside the palace of the devil."
>
> Thus spoke the son of God.[65]

If indeed the protagonist can be associated with Venus, an assumption based on comparative evidence, it may be noted that the planet can be seen near the Pleiades (*Siete Cabrillas*) only in June, as morning star, or in March-April, as

evening star, i.e. at the time of the year when the rains come and when the planting season starts. The possible importance of these coincidences was pointed out by Milbrath.[66]

3. DISTINCT ASPECTS OF VENUS AND THEIR RELATIONSHIP WITH RAIN AND MAIZE

The symbolism associated with Venus can be differentiated with regard to different parts of the planet's synodic period. Most obvious is the dichotomy between morning and evening star, but some evidence indicates the existence of certain concepts linked to a few more specific segments of the synodic period. The archaeological, historical, ethnographic and other data presented below are arranged in thematic units labelled alphabetically, in order to facilitate further references.

A. Evening star and rains: the Nahua of Guerrero

In Citlala, a Nahua-speaking village in the Mexican state of Guerrero, the Holy Cross festival (3 May) is still an extremely important annual rain-making ceremony. One of the deities invoked to assure rains and abundant crops is Venus as evening star:

> They make petitions to St Nicholas, who "appeared" in the village bearing a star (*citlali* in Nahuatl) on his breast as a symbol of his love for the village that accepted him, from that time on, as its patron saint in place of Venus, the evening star, which had its sanctuary in that place.[67]

B. Venus and North: the Cora, the Maya, and others

In the Cora mythology Venus has great importance. The morning star and evening star are distinguished as two deities, although their characteristics are sometimes confused.[68] The maize god Sautari is identified with the evening star, whereas the more important morning star, called Hatsikan and occasionally identified with San Miguel, is the lord of clouds and rains, and figures as a cultural hero.[69] One of the chants mentioning Venus is of particular interest because it seems to associate the movement of the planet in the western sky with climatic changes:

> Come dancing from the north and (bring as a crown) your younger brothers.
> Come dancing from the north, with feathers of the blue magpie.
> ...
> (Come dancing) from the north, with the flowers of *Turàs*.
> Bring the flowers of *Cempasuchil*.
> Bring the flowers of *Zacalosuchil*.
> Bring the flowers of *Tsakwas*.
> You bring the clouds as a crown.

You bring the whiteness as a crown.
You bring life as a crown.[70]

According to Preuss it is the morning star that is invoked in this chant, because the kinds of flowers mentioned here appear as younger brothers of Sautari in another song.[71] This interpretation, however, disagrees with the fact that *Sautari* ("he who gathers flowers") is the name of the *evening star*.[72] In the song cited above the evening star comes from the north bringing clouds, feathers of the blue magpie and some flower species, which the Cora associate with the rainy season.[73] The poetic narrative agrees with astronomical and climatic facts. When Venus is visible in the western sky, its northerly extremes approximately coincide with the onset of the rainy season. This does not mean that the Cora had to know the exact dates and magnitudes of the extremes. The easily observable phenomenon is that Venus at this time of the year, if visible as evening star, is always seen relatively far to the north of the astronomical west, and its 'return' from the extreme northerly setting point is accompanied by progressively heavier rainfall.[74]

In this context attention may be drawn to Sahagún's informants who described North as "the land of cloud serpents".[75] For the Tzotzil of Larraínzar the god of North is the maize god, and the same association is found in the Dresden Venus table.[76] The Chorti place the chief of the sky Chicchans at the north.[77] In their rain-bringing ritual "Noh Chih Chan, the great water serpent of the north, ... must be awakened to begin the rainy season".[78] These beliefs, and the fact that North is described as "from here the water" in some Mayan tongues,[79] may also reflect the observed coincidence of Venus northerly extremes with the onset of the rainy season, as already suggested by Closs *et al.*[80] It is illustrative that an entry in Moran's Cholti vocabulary reads: "lucero — nohec; norte tambien" ("Venus — *nohec*; similarly, north").[81] Thompson thought this was "a reference to the pole star or perhaps the great bear",[82] but "great star" ("noh ek'") is normally a name for Venus, both in Mayan and in other Mesoamerican languages.

Tiripeme-xungapeti, one of the brothers of the sun god Curicaueri in Tarascan mythology, was associated with north and fertility. Another brother of Curicaueri was Tiripeme-thupuren; dwelling in the west he presided over the evening star and had some connection with winds and rains.[83] Bearing in mind these associations, the following observation may be particularly interesting:

> The *Relación* [*de Michoacán*] places Tiripeme-xungápeti at Pichátaro, which nowadays is situated roughly west of the Lake of Pátzcuaro. We do not know the reason for this location, for the colour yellow seems to belong to the north.[84]

Could it be that the direction associated with this god was actually the northwest, where the evening star announces the coming of rains? According to Corona's interpretation, the *Relación de Michoacán*, indeed, alludes to the course of Venus as having the form of the *ollin* sign.[85]

C. Venus and Water Serpent: the Lacandon, the Cora, and others

In the Lacandon mythology there is a connection, although not very clear, between Venus and the rain god Mensäbäk.[86] Possibly the evening aspect of Venus is (or originally was) more important in this relationship: Äh Säh K'in, the evening star, is addressed in a chant to the new incense burners during a ceremony, which includes, or included in the past, the first-fruit offerings.[87] On the other hand, the morning star appears in another poem as the antagonist of the rain: its arrival is destructive and brings about Mensäbäk's death.[88]

The story resembles a Cora myth, in which the morning star kills the water serpent of the West with an arrow. It thus prevents the flood, but out of the serpent's body flows the water of life.[89] In a tale found by Preuss[90] among the Nahua of Durango, the water serpent is defeated and controlled by San Miguel. This is a variant name of the morning star among the Cora.[91] In similar stories from Oaxaca the Lightning kills the serpent that caused the flood.[92]

D. Venus among the Kekchi and Mopan

Among the Kekchi and Mopan of Belize Venus is named Xulab, Noh Ich or Nohoch Ich, and is almost as important as the Christian God. In one story the sun declares the cloud to be his elder brother, which is significant since the elder brother of Lord Kin, the sun, is Lord Xulab, the planet Venus.[93]

Xulab is associated with Venus as morning star, whereas the evening aspect of the planet has no significance. Xulab is the owner of all the animals and patron of agriculture, hunting and fishing, particularly the last two. His servants are the Mams, who are equivalent to the Chacs, the lowland Maya rain gods.[94] "Thus, the ultimate power over the rains is implicitly held by Venus."[95] Conceived as one single individual or four or as innumerable, the Mams are gods of the mountains, plains, of the underground, of thunder and lightning, and, by extension, of the rain. The chief Mam is Yaluk, associated with the west, or (in another version) Xucaneb, presiding over the north.[96] The myth about the origin of maize says that it was Yaluk who, by hurling his thunderbolt, smashed a big rock in which the maize was hidden.[97]

Among some Kekchi groups the equivalents of the Mams are the Tzultacaj, associated with serpents, bees and wasps.[98] Interestingly, one of the names for Venus in Yucatec Maya is *xux ek* (= "wasp star"); there is also some evidence indicating a connection between Venus and the bees.[99]

E. Quetzalcoatl and Tlahuizcalpantecuhtli

It is commonly held that Quetzalcoatl was associated with Venus as morning star, but in fact not all the sources are unanimous. The *Histoyre du Mechique* says that the burnt body of Quetzalcoatl was transformed into a big star called Héspero.[100] According to the *Diccionario* of the Real Academia Española, "Héspero" is "el planeta Venus cuando a la tarde aparece en el Occidente" ("the planet Venus when it appears in the west in the evening").[101]

In the *Anales de Cuauhtitlan* it is said:

> Decían los viejos que se convirtió en la estrella que al alba sale; así como dicen que apareció, cuando murió Quetzalcoatl, a quien por eso nombraban el Señor del alba (*tlahuizcalpanteuctli*). Decían que, cuando él murió, sólo cuatro días no apareció, porque entonces fué a morar entre los muertos (*mictlan*); y que también en cuatro días se proveyó de flechas;[102] por lo cual a los ocho días apareció la gran estrella (el lucero), que llamaban Quetzalcoatl.[103]
>
> *The old men said he had transformed himself into the star that rises at dawn. They likewise said that it appeared when Quetzalcoatl died, and for this reason they named him Lord of the Dawn* (tlahuizcalpanteuctli). *They said that when he died, for four days only he did not appear, for then he went to dwell among the dead* (mictlan)*; and that similarly in four days he supplied himself with arrows; and so it was that after eight days the big star appeared which they call Quetzalcoatl.*

The period of eight days, after which the big star appeared, calls to mind the canonical interval of Venus's disappearance around inferior conjunction, and suggests that Quetzalcoatl upon his death transformed himself into the morning star. It is therefore possible that the personage from Tula, while alive, symbolized the evening aspect of Venus.[104]

One commentator of the Codex Telleriano-Remensis identifies Tlahuizcalpantecuhtli with Venus and Quetzalcoatl, and adds: "Este Tlauizcalpantecutli quiere dezir señor de la mañana cuando amaneçe y lo mesmo es señor de aquella claridad quando quiere anocheçer" ("This Tlauizcalpantecutli means 'lord of the morning when dawn comes', and likewise he is lord of that brightness when it begins to grow dark").[105] It thus seems that Quetzalcoatl was linked with both aspects of Venus.[106]

Carlson noted that the god Tlahuizcalpantecuhtli depicted in Telleriano-Remensis has a skull with the same headdress as himself attached to the back of his head. Relying on the evidence from the Maya area, Carlson argues that the skull represents the evening star and that, at least in central Mexico at the time of the Conquest, Tlahuizcalpantecuhtli was god of both aspects of Venus, which also agrees with the comment in the codex.[107]

Tlahuizcalpantecuhtli, with his militaristic and malevolent nature,[108] seems to have been a somewhat aberrant manifestation of Quetzalcoatl (*cf.* Part II, Section 4), whose fertility associations figure so prominently among his all-encompassing attributes.

F. Xolotl and related deities

Quetzalcoatl was closely related to the god Xolotl. The latter is often represented with Quetzalcoatl's attires. The role of the two gods in myths is occasionally interchangeable.[109] The feathered serpent carved on the monolith of Maltrata has a star symbol attached to the body, and is accompanied by the

glyph 4 Ollin (Figure 3); according to Vaticanus A, 4 Ollin was the day of Quetzalcoatl's disappearance in the Red Sea, but in Vaticanus B it is a name for Xolotl.[110] On Magliabecchi 33v it is said that Xolotl was Quetzalcoatl's brother. Xolotl carried the sun and the dead to the underworld, but various authors have argued that he was also associated with Venus as evening star,[111] and the following evidence supports this conclusion.

The Cuicatec say that the evening star is like a hairy beast, a fierce dog flying downward,[112] and we may recall that Xolotl is often represented as a dog. In the Chilam Balam of Kaua the augury for the day Lamat, associated with Venus, reads: "Drunkard, deformed dog is his prognostic. The head of a jaguar; the rear of a dog."[113] Thompson[114] connected this description with the god Lahun Chan, who is depicted on Dresden 47 as the patron of a Venus period, and Closs[115] assigned him the evening aspect of the planet. Kelley, on the other hand, noted that the Kaua augury agrees well with descriptions and representations of Xolotl, god of monsters, and with Macuilxochitl, who was one of the gods of drunkenness and appears, according to Seler, as a Venus god in the Nuttall Codex.[116]

Unpleasant traits were, however, not the only characteristics of Xolotl. In Codex Borgia he appears associated with lightning and water. If Seler's interpretation is correct, the scene on plate 42 of the codex represents Xolotl's birth in water containing corn cobs.[117] The *Histoyre du Mechique* mentions that the first men were nourished with bread by Xolotl.[118] Moreover, on Magliabecchi 60v it is said that "Xulutl ... means a kind of bread which they make of amaranth and maize".

Nanahuatl, a god who can actually be considered a variant of Xolotl,[119] was also linked with water and maize. Recalling the most illustrious exploit of this god, it may be noted that in a Huichol myth the son of the maize goddess was thrown into the fire in order to be converted into the sun.[120] In the *Leyenda de los Soles* Nanahuatl opened the mountain in which maize was stored.[121] In a comparable Kekchi-Mopan tale the big rock covering the maize was smashed by Yaluk, the chief of the Mams who are equivalent to the Yucatec Chacs.[122] Nanahuatl was characterized as "el buboso" ("afflicted with pustules or buboes"). Recall that the "leprous, postulous and itchy, gouty and dropsical" went upon death into Tlalocan.[123]

Finally, in a modern tale from Hueyapan, Puebla, Nanahuatzin is explicitly the rain deity.[124]

It is probable that Nanahuatl, as well as Xolotl, was associated with Venus as evening star: Yaluk, his Kekchi equivalent, is the chief of the Mams, servants of Xulab. Although the latter is identified with the morning star, Yaluk is placed at the west.[125]

G. Itztlacoliuhqui

Itztlacoliuhqui was an avatar of the maize god Cinteotl.[126] He is shown on Codex Borbonicus 12 associated with a symbol that Beyer interpreted as a Venus sign, because it is sometimes depicted as Tlahuizcalpantecuhtli's pec-

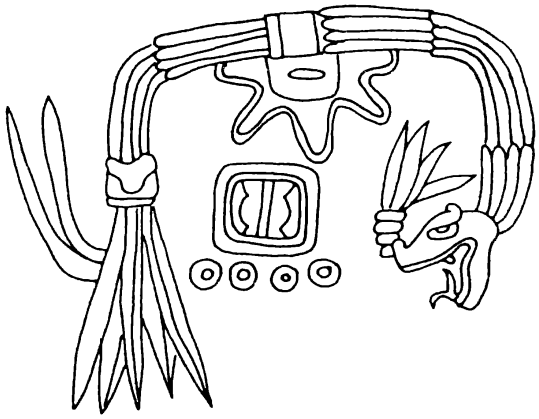


FIG. 3. Late Classic carving of a feathered serpent on a boulder from Maltrata, Veracruz, Mexico (from Baird, *op. cit.* (ref. 153), Fig. 39).

toral.[127] The commentators of Telleriano-Remensis and Vaticanus A (3738-Ríos) mention that Itztlacoliuhqui is a star that goes backward.[128] As Thompson[129] observed, this might be a reference to the retrograde motion of a planet, most probably Venus, because Itztlacoliuhqui appears on Dresden 50, presiding over one of the five synodic periods of the Venus table; moreover, his attires in codices are similar to those of Tlahuizcalpantecuhtli.[130] Considering that Itztlacoliuhqui is blindfolded, it is noteworthy that in the Maya codices there are several representations of a blind deity which is related to or even identical with God L,[131] whose Venus association was established by Closs.[132]

More specifically, there are grounds for thinking that Itztlacoliuhqui personified Venus in its evening manifestation. Consider the following comment found on Telleriano-Remensis 18:

> In front of this effigy they killed those who had been caught in adultery.... Yztlacoliuhqui was the lord of sin or blindness, who sinned in paradise, and so they picture him with covered eyes.... Those who were born on this day, they said, would be sinners and adulterers.[133]

Sullivan[134] remarks that "blindness was regarded as one of the terrible consequences of licentiousness and thus, in all of the representations of Itztlacoliuhqui as ruler of Ce Cuetzpalin, there are also depicted either adulterers being stoned, or people drinking, or else drunk from pulque". In view of the proposed relationship of Itztlacoliuhqui with Venus as evening star, it is indicative that some myths of the Cora and Nahua of Durango narrate that the evening star in ancient times occupied the distinguished place of the morning star, but was relegated, due to a sexual transgression, to the western sky.[135] The Cora identify the evening star with their maize god (*supra*: B), which may also be significant since Itztlacoliuhqui is a variant of the maize god Cinteotl.[136]

In Telleriano-Remensis and Vaticanus A (Ríos) it is further said that Itztlacoliuhqui is a star that goes backward.[137] Venus has periods of retrograde motion when it is visible both as morning and evening star. But in fact we do not

know if the motion defined in modern astronomy as retrograde was also considered by prehispanic peoples as a backward movement. Interestingly, a Tzotzil informant from Yabteclum, in the municipality of San Pedro Chenalho, Chiapas, told me that only the moon moves in the reverse direction in the sky, because it goes from west to east.[138] The opinion that "the moon goes backward" was also found among the Lacandon.[139] The moon, however, never undergoes what in modern astronomy is termed retrograde motion, precisely because it always moves eastward with respect to the stars. But the fact that it "rises" in the west, i.e. appears after the conjunction with the sun on the western sky after sunset, and in the following days moves away from the sun toward the east, gives the impression of a reverse motion.[140] Venus moves not unlike the moon during several months of its visibility as evening star: after its first appearance, following superior conjunction, Venus is visible after sunset on each subsequent day higher in the western sky. Although the details of its apparent motion differ from one synodic period to the next, it is characteristic that the evening star begins ostensibly to lose altitude only some 30 or 40 days before disappearance, plunging during the last two weeks literally like a falling stone.[141] Consequently, the fact that the evening star, like the moon, "rises" in the west and moves eastward during the greater part of its visibility, may have originated the notion of backward movement.

Because Itztlacoliuhqui is mentioned as god of frost or ice,[142] and depicted in codices with an arrow thrust in his hood, Seler and Thompson called attention to the myth of Tlahuizcalpantecuhtli, who shot an arrow at the sun to make him move:[143]

> Le disparó y no le acertó. ¡Ah! ¡Ah! le dispara y flecha el Sol a Tlahuizcalpanteuctli con sus saetas de cañones de plumas rojas, y en seguida le tapó la cara con los nueve cielos juntos. Porque Tlahuizcalpanteuctli es el hielo.[144]
>
> *He shot at him and missed. Oh! Oh! shoots the Sun at Tlahuizcalpanteuctli with his arrows of red quills, and immediately he covered his face with nine skies together. Because Tlahuizcalpanteuctli is the ice.*

Thompson contended that Itztlacoliuhqui was a variant of Tlahuizcalpantecuhtli, god of Venus as morning star, and that the concept of lord of frost derived from a natural association of the morning star with the coldness of dawn.[145] Indeed, the association of the cold with the morning star was also found among the Cora.[146] Notwithstanding the plausibility of Thompson's interpretation regarding Tlahuizcalpantecuhtli, Itztlacoliuhqui's connection with frost may have a different explanation. Sullivan[147] comments:

> The figure representing Cetl, the Frost, in the section of the *Primeros Memoriales* dealing with the natural phenomena wears the same curved, conical headpiece with the serrated edge ... and is accompanied by the following statement: "We call the frost Itztlacoliuhqui. During the year it comes, there are frosts (beginning) in the twenty days of Ochpaniztli ...."

It seems, then, that Itztlacoliuhqui personified the coldness of a season. The source cited above has it that frosts begin in Ochpaniztli, i.e. precisely in the month of the feast of Cinteotl-Itztlacoliuhqui. Now what could have been the place of Venus in this context?

One commentator of the Codex Telleriano-Remensis identifies Itztlacoliuhqui with a star and adds that "esta imagen de estrella está a la parte del sur" ("this figure of the star is situated in the southern part").[148] In the months of cold in central Mexico, Venus is visible in the southern part of the sky. Although in general this holds both for morning and evening star, it can be argued that Itztlacoliuhqui had a specific connection with the *evening star in autumn*.

At the time of the Conquest Ochpaniztli fell in September; at that time of the year Venus moves southwards and, whenever visible as evening star, sets south of astronomical west.[149] As discussed above (Section 1), the morning star attains its southerly extreme always after the winter solstice, while the evening star southerly extremes occur before the solstices, normally between October and December (see Table 1). In other words, the evening star is visible far to the south precisely in the harvest season in the central Mexican highlands. However, the month Ochpaniztli did not coincide with the harvest; as Broda argues, the purpose of the feast of this month was to conjure the ripening of maize, whereas the harvest took place about two months later.[150] During the ceremony, the man representing Cinteotl was given a mask made of the thigh skin of the sacrificial victim personifying his mother, the goddess Toci:

> The accoutrements he wore were a skin mask put over the head, and a hood of feathers placed on the head. This was stuck to a feather garment that had its sleeves and body; the prong of the hood which was long was curved backwards in a spiral, having a ridge like a cock's comb. They called this hood *itztlacoliuhqui*, which means god of the frost.[151]

It can be hypothesized that the transformation of Cinteotl into Itztlacoliuhqui symbolized the transition from the rainy to the dry and cold season. Assuming, furthermore, that this climatic change was considered as related to, or even conditioned by, the "journey" of the evening star to the south, i.e. by the appearance of Itztlacoliuhqui, the rite can be viewed as a magic enactment of a proper development of natural phenomena, on which a successful and abundant harvest depended.

Let us return once more to the Codex Telleriano-Remensis. Identifying Itztlacoliuhqui with a star to the south, the commentator adds that it was held to be a "great omen for wars and births".[152] Iconographic evidence reveals that Venus had a paramount importance in Mesoamerican war symbolism.[153] More specific information is found in Mayan inscriptions. Most of the dates accompanied by star/Venus glyphs or some related signs record military exploits, such as raids, battles and captures. A statistically meaningful number of these dates corresponds, in the GMT correlation, to certain significant points in the Venus cycle, among which the *evening star phenomena prevail*.[154] Most of these dates fall within the period between October and February, when Venus had a negative declination and was thus visible *to the south of due west!*[155] The

observed role of Venus in war scheduling is not without implications for our discussion on the Venus-rain-maize complex, since warfare and sacrifice were closely tied to the rain and fertility symbolism.[156]

Finally, it should be recalled that Itztlacoliuhqui appears in the Dresden Codex as one of the gods of the five synodic periods of Venus.[157] He is the regent of the last period terminating on the days Ahau. It may not be a coincidence that one of these days is 1 Ahau, the base date of the table, and that Itztlacoliuhqui was a transformation of Cinteotl, whose calendric name was 1 Xóchitl (= 1 Ahau). Lounsbury argued cogently that the real base date of the Dresden Venus table was 10.5.6.4.0 1 Ahau 18 Kayab, or 20 November 934, Julian (by the 584285 correlation constant),[158] coinciding with the heliacal rise of Venus as morning star and corresponding, in accordance with the structure of the table, to the end of the period governed by Itztlacoliuhqui. Venus had a negative declination on that day, as well as some time before inferior conjunction, i.e. when it was visible as evening star. It seems, therefore, that also in the Dresden Codex Itztlacoliuhqui was in charge of the periods that, recurring every 8 years, ended when Venus was in the southern part of the sky. In spite of the well-known Maya interest in period endings, it does not seem likely, however, that all of the five Venus gods were exclusively manifestations of heliacal risings of the morning star, as was suggested on the basis of comparative historical data from central Mexico.[159] The evening star association is probable not only with Itztlacoliuhqui but also Lahun Chan, the patron on Dresden 47.[160]

In view of the evidence presented it can be suggested that Itztlacoliuhqui was related to Venus as evening star, specifically to its autumnal appearances in the southwestern sky. Of course, there must have been some overlap in the attributions of particular deities to certain aspects of Venus, since the fact that only one celestial body was involved was not ignored by ancient Mesoamericans. It should also be pointed out that in one 8-year cycle Venus can be seen in the western sky only in 5 autumns; "Itztlacoliuhqui's appearances" were, therefore, not annual phenomena. Curiously enough, however, in Motolinia we find the following passage:

> ... contaban por una estrella que en el otoño comienza á aparecer á las tardes al occidente, y con luz muy clara y resplandeciente.... Llámase esta estrella *Lucifer*, y por otro nombre se dice *Esper*.... Como el sol va abajando y haciendo los días pequeños, parece que ella va subiendo: á esta causa cada día va apareciendo un poco más alta, hasta tanto que torna el sol á la alcanzar y pasar en el verano y estio, y se viene á poner con el sol, en cuya claridad se deja de ver....[161]
>
> *... they counted by means of a star that begins to appear in the autumn, in afternoons to the west, with a very bright and resplendent light.... This star is called* Lucifer, *and the other name is* Esper.... *As the Sun descends and makes the days short, this star seems to ascend; hence it appears each day a little higher, until the Sun returns and catches it up, this continuing to the*

> *summer, when it eventually sets with the Sun, in whose brightness it disappears....*

Could it be that this peculiar description of Venus's movement reflects precisely the importance attributed to the autumnal appearances of evening star and to its southerly extremes coinciding with the harvest season?

H. Venus and the Maya maize god

In the Chilam Balam of Chumayel the following dialogue takes place:

> Bal ti zihi coe? Bal ua? yume. Tech a uohel. Zihil u cah ah mun ti caan.

Roys translated it:

> How was the grain of maize born?
> How indeed, father?
> Thou knowest. The tender green <shoot> was born in heaven.[162]

Thompson[163] felt sure that *Ah Mun* ("the tender one") was a name for the young maize god. Indeed, the repetition of the word *gracia* in this part of the text suggests it has to do with maize.[164] Concerning the maize god's birth in heaven, the following passage, taken from the same part of Chumayel, might be significant:

> Esperas was the name of the sixth heaven; Isperas was the name of the seventh heaven.[165]

It is possible that the obscure context refers not only to maize but also to the planet Venus. In the preceding text creation of the planets is mentioned. Furthermore, in the books of Chilam Balam of Ixil and Kaua various spheres around the earth are labelled with names of the planets;[166] consequently, *Esperas* and *Isperas* may be derivatives from *Héspero*, "el planeta Venus cuando a la tarde aparece en el Occidente" ("the planet Venus when it appears in the afternoon in the west").[167] The term must have been rather common in the sixteenth century; it is used in the *Histoyre du Mechique* and, in a variant form (*Esper*), by Motolinia.[168]

The relationship of the Maya maize god with Venus is perhaps implicated in the bicephalic monster represented on Altar D at Copán: a youthful human head, possibly of the maize god, emerges from the open jaws of the monster's front head.[169] It will be argued (*infra*: K) that the front heads of bicephalic dragons are associated with the west and with Venus as evening star.

I. Distinction of Morning Star *v.* Evening Star: the Mixe-Popoluca

The Mixe-Popoluca of Oluta and Sayula, in the Veracruz Isthmus region, view the morning star as an old man, *El Viejo* or *Viejito*, and the east is described as the "place of the Old Wind's House".[170] In addition to the myths about Viejito, Lehmann obtained the following information on this personage:

Entra à dormir el Viejito, (cuando) sale el sol.
...
En el oriente va à dormir el Viejito tapado con cielo.
...
El Viejito anda janto [*sic*] con el sol.
...
El viejito es solito, no casado
...
El viejito tiene su camisa rompida [*sic*]
blanco su cabello ... largo su cabello.
es flaquito anda con su bordón.
pequeño calzoncito sucio.
larga su barba blanca
todo tiene grano su cuerpo ....[171]

Viejito enters to sleep, (when) the Sun rises.
...
Viejito goes to sleep in the east, covered with the sky.
...
Viejito walks together with the Sun.
...
Viejito is alone, not married.
...
Viejito has a ragged shirt,
white is his hair ... long is his hair.
He is frail, he walks with his staff,
dirty little breeches,
long is his white beard,
his body has pimples all over....

The idea that Viejito goes to sleep in the east, "covered with the sky", calls to mind the *Leyenda de los Soles*, in which the sun shot an arrow at Tlahuizcalpantecuhtli, "and immediately covered his face with nine skies together".[172] Other comments bear some resemblance to the descriptions of Quetzalcoatl. Although poverty and disease are rather Nanahuatl's features, let us recall the portrayal of Quetzalcoatl before his departure from Tula:

> Because of the many warts on his eye-lids, the sunken sockets of his eyes, and the whole of his face being swollen, he was deformed.[173]

Like Quetzalcoatl, Viejito is believed to be the creator.[174]

While the East belongs to Viejito, the owner of the House of the West is *muchacho limpio*, a clean young man, most probably associated with the evening star:

> Since he [his informant from Oluta] told me that the Moon was the Sun's wife, the "clean young man" cannot correspond to the crescent Moon of the west. As the dirty, ill, old, poor and ragged *Viejito* embodies the

> Morning Star, it is quite probable that the *muchacho limpio* is the Evening Star.[175]

On another occasion, however, the same informant attributed the House of the West to *Satanás*. It has already been shown (Section 2) that the devil and Venus are conceptually related in contemporary Mesoamerican folklore. In this case, too, the association is confirmed by the following evidence.

Cardinal directions belong to different owners:

> North — Satanas;
> South — Sun;
> East — El Viejo (= Morning Star, "big star") and Sun;
> West — Moon.[176]

In another context the "Lord of the Old Wind" rules both in the East and the South, whereas Satanas has his house in the North and also in the West.[177] The apparent inconsistencies seem to have a logical explanation, considering the climatic changes associated with the owners of cardinal directions:

> Tata Dios rules in the east and in the dry season (summer), and Satanas in the west and in winter.[178]

In another place we read that Tata Dios is equivalent to Viejito, who is in charge of the East and, in the dry season, of the South. He is active in summer (i.e. the dry season), and summer rains are said to come from his house. Satanas, on the other hand, controls winter; coming from the South, he reaches his Northern House with southern whirlwinds of the dry season.[179] Now winds are said to blow from the south between 15 February and the end of May; from June to August they come from the west, and between 8 November and 15 February from the north.[180] Since Satanas attains his North House with southern winds, this must occur between February and May, precisely in the period when Venus, if visible as evening star, moves northwards. These circumstances, as well as the fact that Satanas is the owner of West and North and, moreover, presides over the rainy season (winter), suggest he has a connection with the evening star, whose northerly extremes (Satanas's North House?) herald the onset of the rainy season.[181]

The Satanas cannot be identified with the moon, because they both appear, in one and the same version, among the patrons of the cardinal directions.[182] They are not unrelated, however, because they both figure as owners of the West, just as both the sun and the morning star are owners of the East (see above). As Lehmann puts it, the relationship exists between the evening star and the waxing moon, and between the morning star and the waning moon.[183]

The fact that the *muchacho limpio*, recognized by Lehmann as evening star, is mentioned as owner of the West House only once,[184] but does not appear where the patrons of all the four cardinal directions are cited, makes it possible to identify him with Satanas. Lehmann linked the latter with the night sun, which is, in fact, a concept related to the evening star, as Lehmann's data themselves

reveal. According to one of his informants, the principal god is *Naxaikat* or *Móstramo* (= *Nuestro Amo*, Our Master), representing the invisible sun:

> The Sun, the day, and the Moon, all the three in *naxaikat*, "Our Master".... Naxaikat is a very beautiful star; they say it is pure gold. It is the spirit of God and of everything, the spirit of Móstramo. Where the Sun is every day, but one cannot see. A saint of the Sun and of the night. The sun underneath.... He cannot be seen overhead, only below. He is like a mirror. We are his servants.[185]

The attributes and appellations like "Our Master", "we are his servants" and the "sun below ... like a mirror" correspond, as Lehmann observes, to Tezcatlipoca, whose other name *Titlacahuan* means "we are his slaves".[186] Even if the concept of the night sun is highlighted, the "very beautiful star" possibly refers to Venus as evening star: just as Viejito has manifold aspects, being identified with the sun, Jesus Christ, the daytime (= waning) moon and the morning star,[187] Naxaikat seems to personify the night sun, the waxing moon and the evening star.

Similar conceptual fusions are found in central Mexico: Cecelia Klein showed that the evening star merged with the moon and the night sun. Considering that Satanas of the Mixe-Popoluca is the lord of rain, it is significant that the rain god Tlaloc, in Klein's opinion, was related to both the night sun and Venus as evening star.[188]

J. Venus among the Cakchiquel

In his field notes taken among the Cakchiquel of Panajachel, Guatemala, Tax mentions that the strongest star is Santiago, who "cares for wheat, beans, and the Hill".[189] He also says that Santiago is the "*mero santo* or God", and that "it sometimes *pone joven* [gets young] & sometimes *viejito* [old]".[190] Unfortunately more precise data are lacking, but it is evident that Santiago is a name for Venus, particularly for its morning manifestation.[191]

K. Itzamna

The most important Maya god Itzamna, or God D of the codices, is frequently represented as a bicephalic celestial dragon or monster, usually having a star glyph on his front head and a sun glyph on his rear head.[192] Although Closs[193] recently agreed that the star sign may refer to any planet or star, his previous argument[194] is still valid in that the star glyph, even without prefixes, *can* refer — and in fact in many cases it demonstrably does — to *the* star *par excellence*, i.e. Venus.[195]

> It is interesting to note that the *ek* glyph without prefixes is found in celestial bands together with symbols of the sun and moon. This provides further reason to accept it as a Venus symbol, for the sun, moon and

> Venus all have a prominent role in the Maya universe, while the other planets and stars occupy relatively minor positions.[196]

The celestial monsters adorn the doorways of Temple 22 at Copán and House E at Palenque:

> Both doorways are surmounted by a celestial monster with infixed Venus signs on the front head and *kin* signs on the rear head. Both doors form a passage way that can be used by living people. To my knowledge only these two doors and a second Palencano door in House E are physical objects which exist in the physical world and can be used by people. All other representations of the celestial monster as a doorway are pictorial abstractions. ... While the spatial pattern reverses in the two doors, both are on the southern side of the door jamb with the front head in the west and the rear head in the east.[197]

That is, the star glyphs are placed on the head looking west, and the sun glyphs on the head to the east. The star signs are also found on the western part of various celestial bands at Palenque:[198] on the Tablet of the Cross, on the sarcophagus lid and on piers *d* and *e* in the Temple of the Inscriptions.[199] It is therefore not unreasonable to suppose that these star glyphs, assuming that they represent Venus, refer to the evening star. The hypothesis is supported by the fact that one of the structures decorated with a celestial monster, Temple 22 at Copán, has a window on the west side, most probably designed for observations of Venus as evening star (see below: O). It should also be noted that Itzamna was, according to Thompson, associated with the west.[200]

Schele and Miller think that the celestial monster represents the dawn, with the sun following the morning star.[201] Such reasoning, however, cannot explain why the moon glyphs are also frequently placed on the west side of the celestial bands.[202] It seems much more likely that the iconography and spatial orientation of the monsters and celestial bands reflect certain concepts about the universe and aspects of directional symbolism, and that the Maya associated the moon primarily with the west and the sun with the east, like the present-day Mixe-Popoluca (see above: I). Following this line of argument, the location of star-Venus signs on celestial bands and monsters would indicate the importance of Venus in its evening aspect, which does not come as a surprise, considering that the preference for the evening star is also evident in the inscriptions.[203]

It is interesting that Lehmann[204] had already associated the god Itzamna with Venus as evening star. If the evidence examined confirms this relationship, the kind of symbolism that must have surrounded the evening star in the Maya world view becomes obvious: Itzamna was essentially the deity of celestial water;[205] he was said to be "el rozio, o sustancia del Cielo, y nubes" ("the dew, or substance of Heaven, and clouds").[206] Aquatic attributes of the evening star are further attested in its connection with the god Tlaloc, recognized by Schele and Miller[207] who also observed a specific relation between the first appearances of evening star and fertility; their hypothesis is supported, again, by the iconography and alignments of Temple 22 at Copán (*infra*: O).

The following report may also reflect the Maya beliefs concerning Venus (evening star?) and rain:

> Divídense los términos once leguas de su asiento en una venta que llaman Yocajeque [Yocah-Ek']; llamóse Yocajeque [Yocah-Ek'] porque habiendo en él un gran lago de agua muy hondable, dicen los naturales que cayó en éi una estrella con grandes piuvias, y así se deja entender, pues a la estrella del alba llaman Noch Eque [Nohoch Ek']; ésta cae al oeste, dejando cuarenta leguas de allí al puerto de Conil al este ....[208]
>
> *The boundaries are divided eleven leagues from its seat, at an inn called Yocajeque [Yocah-Ek']; it was so called because, as there is there a big lake with very deep waters, the natives say a star fell into it with big rains, and so it is understood, for they call the Morning Star Noch Eque [Nohoch Ek']. It lies to the west, forty leagues from the port of Conil to the east....*

L. Venus in the *Popol Vuh*

Various authors observed that Hun Hunahpu and Vucub Hunahpu of the *Popol Vuh* probably personify Venus because their names correspond to the days 1 Ahau and 7 Ahau, which appear in the Dresden Venus table among the canonical days of the morning star's heliacal risings. Thompson even suggested that 1 Ahau was a collective title of the Venus gods.[209]

Concerning other associations of the two brothers, it is noteworthy that Foster, commenting upon a Popoluca folk tale, noticed that the adventures of Homshuk, the Popoluca maize god, resemble those of Hun Hunahpu and Vucub Hunahpu in the *Popol Vuh*.[210] Furthermore, the calendric name of Cinteotl, the Aztec maize god, was 1 Xóchitl,[211] equivalent to the Yucatec 1 Ahau and to the Quiche 1 Hunahpu. Codex Magliabecchi 46v–48r mentions festivals on the days 1 Xóchitl and 7 Xóchitl involving the same ritual performances. According to another manuscript, the feast on 7 Xóchitl was dedicated to Xochipilli;[212] indeed, the Mixtec god Seven Flower seems to have been a variant of Xochipilli.[213] Since Cinteotl and Xochipilli are related deities,[214] the parallelism with the twins 1 Hunahpu and 7 Hunahpu of the *Popol Vuh* is patent, as already noted by Taube.[215]

A more specific conclusion about the Venus nature of Hun Hunahpu and Vucub Hunahpu was drawn by Coe:

> ... it has been long recognized that 1 Hunahpu is equivalent to the lowland Maya tzolkin day 1 Ahau, the starting point of the Venus calendar, when the Morning Star has a heliacal rising. 7 Hunahpu or Ahau is just 240 days later; 1 Hunahpu or Ahau is just 20 days later in the tzolkin than 7 Ahau. Thus, it is highly likely that we are dealing with an astral myth concerning the Morning and Evening Stars.[216]

In fact the attribution of the evening aspect of Venus to Vucub Hunahpu does not seem convincing for the following reasons:

A. The identification of Hun Hunahpu with the morning star is based on the equivalence: 1 Ahau = day of heliacal rise of the morning star in the

Dresden Codex. By analogy the identification of Vucub Hunahpu with the evening star should be derived from the equation: 7 Ahau = day of first appearance of the evening star. But in fact the periods of evening star visibility in the Dresden Venus table never start with a day Ahau.

B. The distance between 1 Ahau and 7 Ahau is 240 days, whereas the distance between the morning star's heliacal rise and the subsequent first appearance of the evening star is approximately 313 days or, in the Dresden "canon", 326 days.[217] Consequently, if a period of morning visibility starts with the day 1 Ahau, the first day 7 Ahau that follows can in no way fall within the following period of evening visibility, but rather near the last day of the morning visibility period.

C. If the distance from 1 Ahau to 7 Ahau is considered as a specific reason for relating Hun Hunahpu and Vucub Hunahpu with two Venus aspects, the question remains: what is the significance of their adversaries Hun Came and Vucub Came, whose names correspond to the days which are *also* 240 days apart?

A more likely astronomical identity of the personages of the *Popol Vuh* was proposed by Dennis Tedlock and will be summarized here.[218]

Among the modern Quiche the combination of a calendric sign with numerals 1 and 7 is a conventional form to express the whole series of all possible combinations of the sign with 13 numerals, for in a cycle of 260 days the sequence starting with number 1 ends with number 7.[219] Since, in the Dresden Venus table, one of the series of the canonical days for heliacal risings of the morning star consists of the days Ahau, Hun Hunahpu and Vucub Hunahpu probably *both* personify the morning aspect of Venus.[220] Their descent into the underworld corresponds to the invisibility around superior conjunction, while their fatal confrontation with the lords Hun Came and Vucub Came (1 Cimi and 7 Cimi in Yucatec) represents the reappearance of Venus in the western sky, because in the Dresden Codex the days Cimi begin the first period of evening star visibility after the morning star period started with the Ahau days; the evening star itself is symbolized by Hun Hunahpu's severed head.[221] In a similar way Tedlock interprets other adventures of Hun Hunahpu and Vucub Hunahpu, and of his successors Hunahpu and Xbalanque who, after the death of their forefathers, figure as aspects of Venus, maize deities and year-bearers; ultimately they ascend into the sky as sun and moon.[222]

Tedlock contends that there is a general commensurability between the mythical episodes in the *Popol Vuh* and Venus periods as presented in the Dresden Codex. Five periods of the evening star visibility in the *Popol Vuh* are all metaphorically represented with severed heads of Hun Hunahpu and Hunahpu, and with balls in the shape of a skull or gourd. Tedlock[223] notes that "in Mesoamerican iconography the evening-star Venus is a death's head": Lounsbury[224] recognized an alternative Venus symbol, "a skull with distinctive markings and teeth", and Carlson[225] connected this sign specifically with the evening star.

It may be added that skeletal features *in general* must have been a characteris-

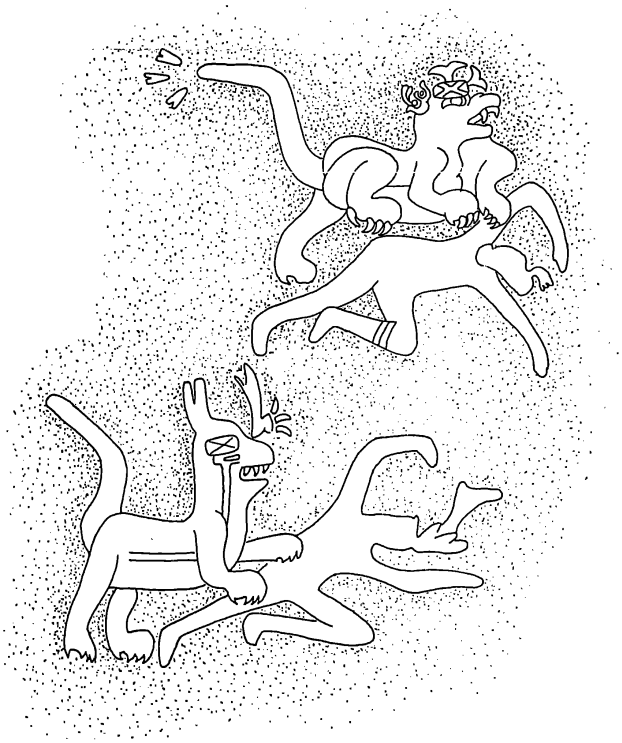


FIG. 4. Relief 4, Chalcatzingo, Morelos, Mexico (from Grove, "Olmec felines" (ref. 237), Fig. 2).

tic of Venus as evening star. Lahun Chan, linked to the evening manifestation of Venus, is depicted on Dresden 47 with fleshless ribs and apparently also with fleshless jaws.[226] The Stuttgart statuette represents a skeletal aspect of the god Xolotl,[227] and so does the relief of Tepetzintla[228] and the back side of a Huaxtec statue from the Brooklyn Museum.[229] But what could have been the symbolic significance of this bony appearance of evening star deities?

The skull of Hun Hunahpu had a fertilizing power: a barren tree in which it was put immediately bore fruit, and the maiden Xquic became pregnant when the skull's spittle fell on her hand.[230] Taube,[231] accordingly, thinks that a head with maize foliage in Maya iconography represents the severed head of Hun Hunahpu. Lahun Chan appears on Dresden 47 with the nose of the rain god Chac.[232] Analysing the Codex Vindobonensis, Furst[233] affirms that the deities unequivocally associated with earth, maize and fertility are invariably depicted with skulls or fleshless jaws. In fact "a skeletal aspect is attributed *only* to figures creating or generating living offspring or to vegetation deities".[234]

> If the skeletal jaw and skeletal features are fertility images, perhaps the symbolism of the entire post-Classic needs to be re-evaluated. Figures and motifs previously interpreted as death imagery may in fact be related to fertility.[235]

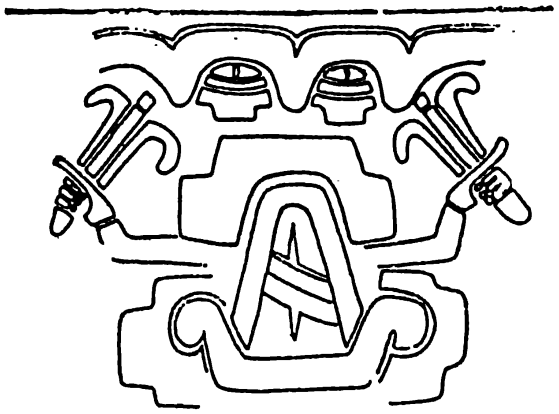


FIG. 5. Detail of an Early Classic decorated urn from Monte Albán, Oaxaca, Mexico. Note the so-called stellar eye motif (above), similar to the half-variant of the Maya Lamat glyph. (From Caso and Bernal, *Urnas de Oaxaca* (ref. 245), Fig. 94; drawing by A. Mendoza.)

The foregoing evidence leads to the conclusion that the evening aspect of Venus had a distinguished place in fertility symbolism.

M. Venus-rain-maize complex in the Preclassic?

Most of the reliefs found at Chalcatzingo, Morelos, and dated around 800 B.C. are related to rain and fertility.[236] One of them is Relief 4, which represents two felines, probably jaguars, "crouching over or leaping upon prone human figures".[237] As various authors already observed, the upper jaguar has in the area where the ear should be represented a symbol which is very similar to a variant of the Maya star glyph (Figure 4).[238] The head ornamentation of this animal includes the motif which, according to Joralemon's interpretation, represents the sprouting maize and characterizes Gods I and II of his classification:[239] God I is a jaguar-dragon, whose "primary associations are with earth, water, and agricultural fertility";[240] God II was designated as the Olmec maize god.[241] In view of such iconographic context, and if the "ear symbol" refers to Venus, the planet was already incorporated in the beliefs concerning maize and fertility by the Middle Preclassic. The identification of the star glyph must remain tentative, since it is far removed, both in time and space, from its Maya counterparts; nonetheless, there is some evidence suggesting an early origin of this symbol and the continuity of its form and meaning.

The two forms of the star sign used in Maya writing (the Lamat glyph (T510) and its so-called half-variant which resembles the sign on Chalcatzingo Relief 4) seem to have been interchangeable. In spite of their general meaning, which may have been just "star", they often refer specifically to Venus (see above: K). It is interesting that among the few Olmec symbols transmitted to the Maya script, Coe mentions "the Lamat sign, a symbol for Venus".[242] A possible prototype of

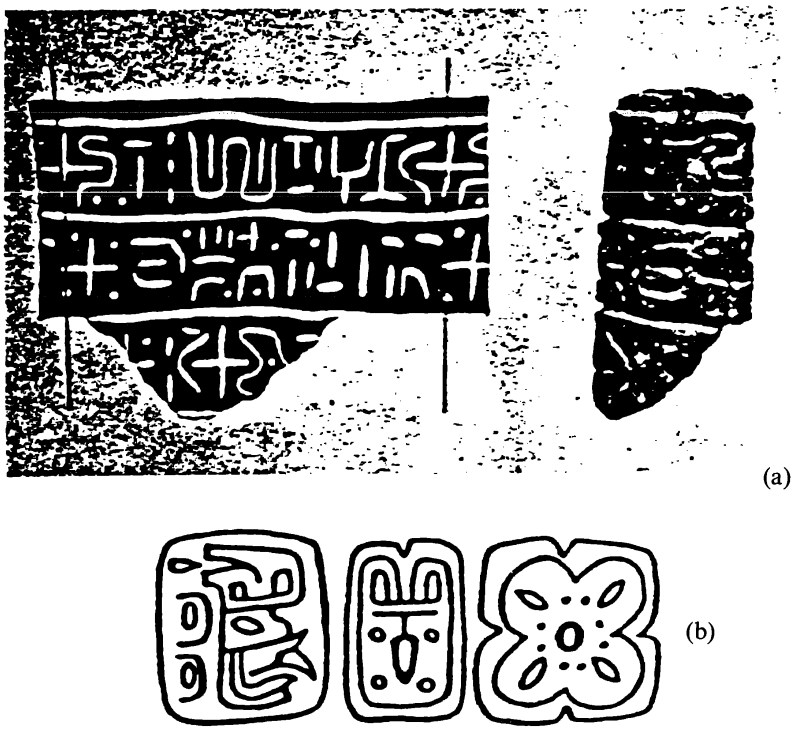


FIG. 6. Motifs on two Preclassic seals from Tlatilco, Edo. de México, Mexico (from Kelley, "A cylinder seal" (ref. 246), Figs 1 and 2).

T510 is depicted on a ceramic fragment from Tlapacoya, on the face of a variant of God I.[243] Justeson *et al.* observed:

> The cruciform Lamat on Cerro de las Mesas Stela 8 parallels the cruciform Lamat signs of Mayan texts ... as well as the Zapotecan examples, suggesting that a cruciform Lamat was a general feature of early southern Mesoamerican scripts. The sign could well have been inherited separately by both Zapotec and Mayan writing from an Olmec "mother script" ....[244]

Since the half-variant of the Lamat glyph can be found on some Zapotec urns (Figure 5),[245] it is possible that this sign, too, was already used in early scripts. Indeed, a motif resembling this symbol appears, together with Lamat-like crosses, on a Preclassic cylinder seal from Tlatilco (Figure 6(a)).[246]

Nicholson[247] convincingly argued that the validity of the direct historical approach, if properly applied, can hardly be questioned. Accordingly, in the attempt to elucidate the iconographic content of Chalcatzingo Relief 4, one may resort to comparative evidence from later periods:

> A rather unusual relationship between dogs with torn ears and Venus can be seen on Princeton 8. This vase includes a canine god whom Coe identifies as "the dog associated in the Mesoamerican mind with the

> journey across their version of the River Styx, in which a dog must accompany his master".... The legend to which Coe refers can be derived from the role of the canine god of the evening star in leading the sun to the underworld. In this instance the canine god is represented with a torn ear in the shape of a Venus symbol. The usage of the Venus glyph as an ear is not unique to Princeton 8. It is also to be found on Stela 16 at Tikal and again on Lintel 3 of Temple IV at Tikal. In all three cases the orientation of the Venus ear is the same.[248]

The same symbol adorns the headdress of the personage on Stela 8 of Naranjo.[249] In addition, the star glyph substitutes the ear of the so-called Venus monster in head variants of the Lamat glyph.[250] In House E of the Palace at Palenque it is placed in the ear of the bicephalic monster's front head. In all these cases, including Monument 4 of Chalcatzingo, the head is represented in profile, and the glyph variant not only is the same ($\frac{1}{2}$T510) but also has the same orientation with regard to the head. In both examples from Tikal the star glyph appears on a headdress in the shape of a skull (Figure 7).[251] The skull of this type is an alternative Venus sign, the evening star being its most probable referent (see above: L). The celestial monster in House E at Palenque has the "Venus ear" on the western head, which also indicates an evening star association. As Closs's argument quoted above suggests, Venus as evening star is likely to be implicated on Princeton 8, where the star glyph replaces the ear of a dog.[252]

Another example of a "Venus ear" may be depicted on a human head in profile represented on a seal from Tlatilco (Figure 6(b)) and resembling the head variant of the Maya Lamat glyph.[253] The personage has jaguar features and was identified with God I by Joralemon.[254] Justeson *et al.*[255] observe that the same seal contains a probable ancestor of the Maya sun glyph (T544), and suggest that Preclassic band designs of this kind may have been precursors of the Maya "astronomical bands". A Venus glyph in such a context obviously would not be out of place.

N. Orientations to Venus extremes in prehispanic architecture

Chichén Itzá. Exploring the astronomical properties of the Caracol of Chichén Itzá, Aveni, Gibbs and Hartung discovered that some of the lines with a possible astronomical significance point to the maximum northerly and southerly Venus extremes on the western horizon. The shape of the building can account for the presence of Venus alignments, since Diego de Landa associates the Caracol of Mayapán, a very similar round structure, with Kukulcan, the Maya counterpart of Quetzalcoatl.[256]

Uxmal. Aveni[257] observed that the straight line taken from the western doorway of the House of the Magician and passed through the centre of the ballcourt, the centre of the northern plaza of the south group and the principal doorway of the west group, closely agrees with the direction toward the maximum southerly setting point of Venus. There is no clear evidence indicating that this alignment

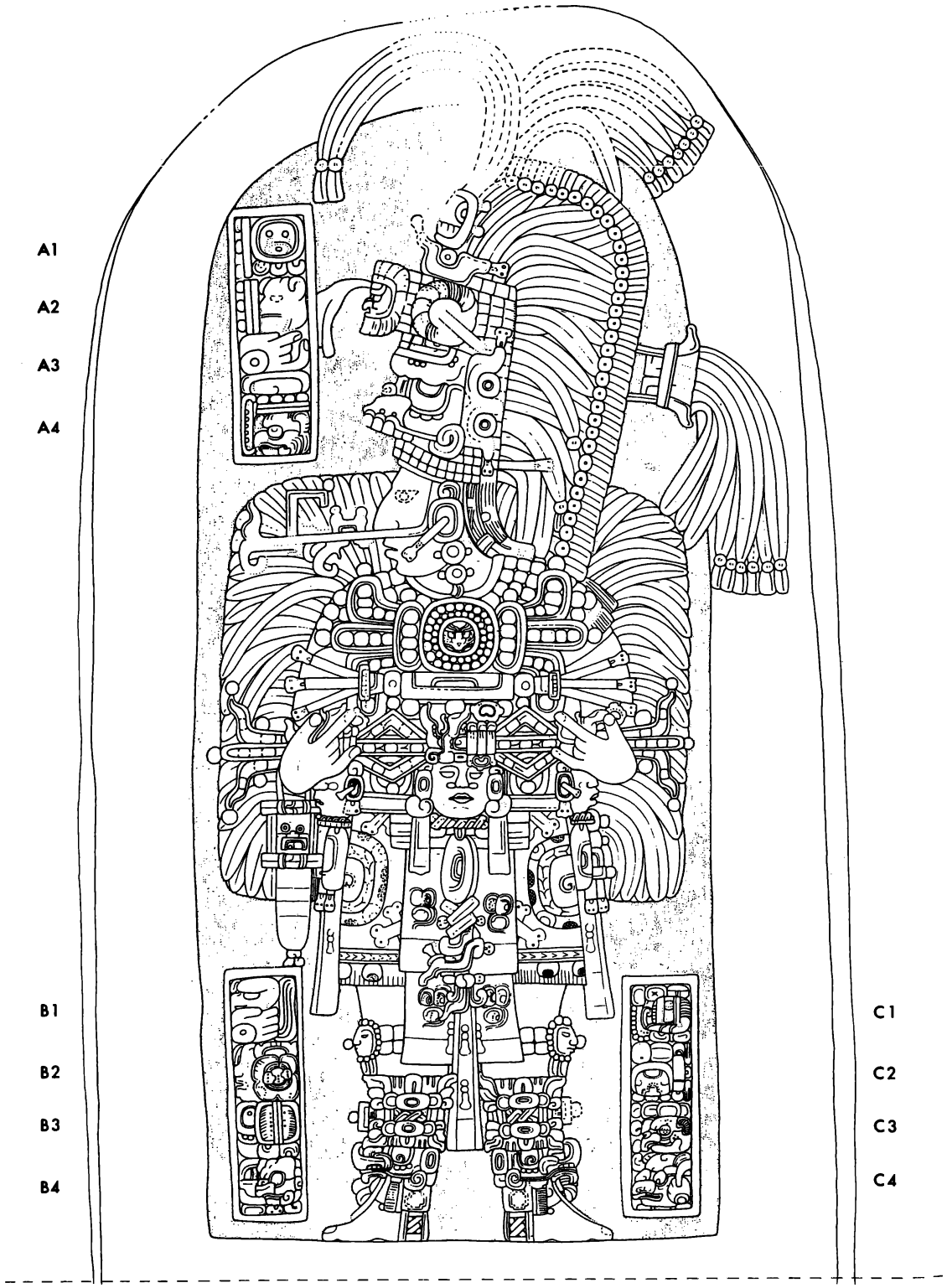


FIG. 7. Stela 16, front, Tikal, Guatemala (from Jones, *op. cit.* (ref. 251), Fig. 7; drawing by W. R. Coe).

was intentional, but the presence of star glyphs and numerals 8 on the western façade of the Chenes temple of the House of the Magician is probably worth mentioning.

Venus orientation was also suggested for the House of the Governor, skewed about 15° relative to the common orientations at Uxmal. The line from the principal doorway toward the southeast, perpendicular to the front face of the Palace, passes almost exactly over a distant mound believed to be the Great Pyramid of Nohpat.[258] Field research in 1989 revealed that this identification was erroneous and that the bump visible on the southeastern horizon is the main pyramid of Cehtzuc, a relatively small site situated about 4.5km from Uxmal.[259] According to Aveni,[260] "the alignment from the Governor's Palace to Nohpat points almost exactly to the azimuth of Venus rise when the planet attained its maximum southerly declination around A.D. 750". The azimuth of the line from the principal doorway to Nohpat (= Cehtzuc) is given to be 118°13′.[261] However, considering the asymmetry of maximum/minimum morning star *v.* evening star declinations (Table 1), Venus visible as morning star on the eastern horizon of Uxmal could never have reached an azimuth greater than 115°40′. It seems improbable that the Maya would have made such a great error, if indeed they had wanted to incorporate this Venus alignment in their architecture.

The alignment was more likely intended to work in the opposite direction: an observer standing at Cehtzuc would have been able to see Venus *set* behind the House of the Governor, when the planet attained its great *northerly* extremes.[262] This hypothesis has iconographic support in the decoration of the Palace. The Chac masks on the façade are arranged in groups of five, which is the number of synodic periods in one 8-year cycle; in addition, the cheeks of the rain god masks are adorned with more than 350 star glyphs,[263] and it should be recalled that Venus great northerly extremes coincided with the beginning of the rainy season (see Table 1)! Furthermore, eight stylized double-headed serpents are set in the decoration above the central doorway, and numerals 8 in dot-bar notation are sculptured over the eyes of the Chac masks at both northern corners of the Palace. This may be a reference to the canonical 8-day disappearance interval of the planet about inferior conjunction.[264] But it is also possible, or even more likely, that the 8-year Venus cycle is implied.[265]

It can be mentioned that the axis of West Building on the southern court of Group 17 at Uxmal[266] points to 120°15′ ± 15′ (my measurements, 1989). The orientation approximately agrees with maximum northerly extremes of Venus on the western horizon, but I could not detect any additional evidence indicating that Venus is responsible for it.[267]

Nocuchich. Structure 2 of this Chenes site near Hopelchen in the state of Campeche faces southwest.[268] Transit measurements in 1989 showed it may have been oriented to the maximum southerly extreme of Venus as evening star, since it is skewed approximately $28\frac{1}{2}°$ south of west.[269] Other kinds of evidence would be needed, however, to prove that this was an intentional Venus orientation. It can only be pointed out that Venus may be hinted at in the name

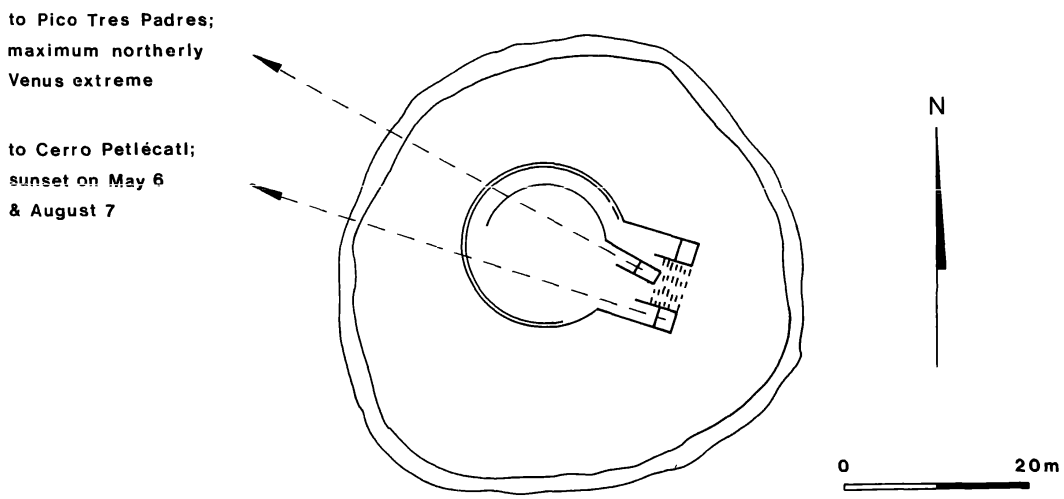


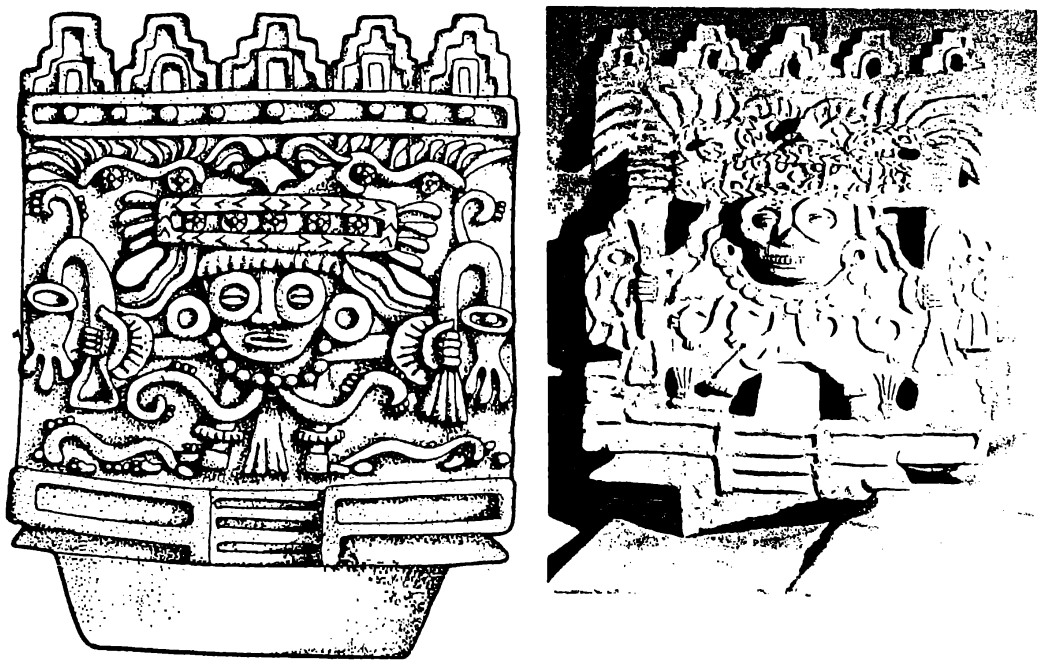
FIG. 8. Orientation of the two phases of El Circular at Huexotla, Edo. de México, Mexico (plan after García G., *op. cit.* (ref. 271), 19; drawing by Snežana Hvala-Tecco).

of the site: *Nocuchich*, meaning "great eye", reminds us of *Nohoch Ich*, which is one of the names for Venus among the Maya of Belize.[270]

Huexotla. One of the structures at Huexotla, a postclassic site south of Texcoco in the state of Mexico, is the so-called *El Circular*. The building faces east and has a substructure of which the northern balustrade crops out.[271] The two phases of construction, disclosed already by Batres,[272] do not have the same orientation (Figure 8). Results of transit measurements carried out in November 1988, by A. Ponce de León and myself, suggest that the substructure was oriented to the maximum northerly extreme of Venus as evening star. The hypothesis is supported by the following evidence.

The only visible balustrade of the substructure aligns 118°16′. Viewing east, the azimuth does not seem to be astronomically significant.[273] The declination of 26°52′, corresponding to the azimuth in the opposite direction (taking into account 1°13′ of the horizon altitude), agrees, however, with the value of the maximum northerly declination of Venus in mid-twelfth century (Table 1): archaeological dating places the construction of El Circular-sub within the first phase of prehispanic settlement at Huexotla, between A.D. 1150 and 1350.[274]

In Pollock's classification of round structures, El Circular of Huexotla belongs to Type 5, which appears among the types associated with the cult of Quetzalcoatl.[275] The wind jewels, prevalent motives on the pottery found in the vicinity by Batres,[276] confirm this association, which in view of Venus-Quetzalcoatl relationship has obvious implications for the orientational hypothesis. Excavating El Circular, Batres found "fragments of an enormous clay idol wearing a headdress of five flowers placed horizontally on his front".[277] The fact that the ornaments were five might have a Venus connotation. Moreover, Batres's description of the idol calls to mind two *almenas* or roof ornaments of



(a) (b)

FIG. 9. Two roof ornaments from Cinteopa, Morelos, Mexico (from Cook de Leonard, *op. cit.* (ref. 278), Figs 1a and 2b).

Teotihuacan type found at Cinteopa, Morelos: on each of the two a figure of what is apparently the same deity is represented, but whereas one has five rosettes placed horizontally in his headdress (Figure 9(a)), the other one wears five symbols resembling the Maya Lamat glyph T510 (Figure 9(b)).[278]

The proposition that the orientation referred to the phenomena on the western horizon is reinforced by the way the structure relates to the surrounding topography. The axis of the balustrade prolonged eastwards does not point to any significant natural feature; it passes over the southern slope of the Tlapanco hill, relatively close to the site. In the opposite direction, however, the same axis leads to Pico Tres Padres, the highest mountain visible on the NW horizon, lying north of Mexico City and about 30km from Huexotla (Figure 8).

Some recent studies have demonstrated that a number of prehispanic temples are oriented to prominent mountains in their neighbourhood; in many cases these orientations may also have been astronomically significant.[279] Thus the localities for the erection of ceremonial buildings could have been premeditated, in accordance with certain principles of "sacred geography" or geomancy, in which astronomical and calendrical considerations, beliefs concerning local topographic features, and probably many other factors were involved.[280] Though we are far from understanding how the whole combination of these rules really functioned, mountains did have an important role in prehispanic

Mesoamerican world view, particularly in the concepts about rain, water and fertility.[281]

Considering the evidence presented, it is probable that the substructure of El Circular was erected on a carefully selected place, from which the line to the prominent mountain on the NW horizon marked the maximum northerly setting point of Venus. It is even possible that a deliberate correlation exists between the orientations of the two construction phases of El Circular. Solar dates corresponding to the orientation of the second phase, which aligns 107°26′, are 10 February and 1 November (sunrise), and 6 May and 7 August (sunset).[282] 6 May is a particularly interesting date, because it lies within the span of the dates of Venus maximum northerly extremes (1–6 May; *cf.* Table 1, but note that those dates are Julian). Considering that on this date the sun *sets* in the axis of the building, it is significant that this axis prolonged *westward* points to Cerro Petlécatl in the northern part of Mexico City (Figure 8).[283] It seems as if the second phase of El Circular was deliberately oriented to the mountain behind which the sun set on or near the dates when Venus, at 8-year intervals, attained maximum northerly extremes.

Summary. Regarding the Caracol of Mayapán, comparable to the Caracol of Chichén Itzá, it has been pointed out that the only doorway on the west, the stairway, and the probable "window" of the upper chamber all emphasize the importance of the western side of the building.[284] Another similar structure is the Castillo of Paalmul, which has the access from the northwestern side. Exact measurements could not be accomplished, because of the poor preservation of the building, but it was quite possibly also oriented relative to Venus.[285]

Many years ago Seler observed that the temples consecrated to the planet Venus face west.[286] This statement should nowadays be corrected: the façades of the round temples of Quetzalcoatl/Kukulcan are oriented to the west on the Yucatán peninsula, whereas in central Mexico they look east.[287] The Governor's Palace at Uxmal, evidently associated with Venus, also has the access from the east. In spite of these dissimilarities it can be said that all the alignments to Venus extremes known so far refer to the extremes of the *evening star*, visible on the *western horizon*. It appears that the placement of entrance or stairway does not indicate the direction of astronomical record.

O. Temple 22 at Copán

A possible astronomical function of Temple 22 at Copán, particularly of the narrow window in the western wall, was discussed by Closs, Aveni and Crowley.[288]

The sun sets behind the local horizon along the axis of the window on the same dates as it sets behind Stela 10, viewed from Stela 12, i.e. on 12 April and 1 September.[289] Closs *et al.*[290] suggested that the window may also have served for observations of Venus above the western horizon, and that the apparitions of the planet through the window were seasonally fixed, coinciding approximately

with the onset of the rainy season. Further research disclosed, however, that they did not take into consideration the periods when Venus was not visible as evening star, and that the pattern of Venus appearances would have actually been such as presented on Figure 10. A detailed argument has been set out elsewhere.[291]

Figure 10 shows that Venus was visible through the window some time from February to April and from June to September, exhibiting eight-year patterns of apparitions. Even if this scheme differs from the one proposed by Closs *et al.*, it agrees with their basic argument concerning the presence of the Venus-rain-maize complex in the iconography of Temple 22. There may be, indeed, a relationship between the periods of Venus visibility through the window and the maize cultivation, assuming that the schedule of agricultural works and festivities in the Classic period Copán was comparable to the one of the present-day Chorti, who are quite probably descendants of the ancient inhabitants of Copán.[292] The February-March-April visibility coincided with the first annual agricultural works before planting, and the July-August appearances with the time when the first young maize ears were gathered.

It is particularly interesting that first appearances of Venus after superior conjunctions, visible through the window of Temple 22, occurred on dates fairly close to 12 April and 1 September, when the sun sets along the axis of the window.[293] Perhaps the April phenomena had a connection with the burning of the *milpas* before planting, whereas the September appearances announced, every 8 years, the first harvest and second planting in the lowlands. Both the first and the second planting are nowadays preceded by rain-making ceremonies, which originally may have had some relationship with Venus, considering the available ethnographic evidence. Furthermore, some iconographic elements support the assumption that first appearances of the evening star were observed through the window.

When I wrote my paper on Venus and Temple 22 at Copán,[294] the time-span shown on Figure 10 (second half of the eighth century A.D.) seemed to correspond to the most probable period of the temple's construction and use. D. Stuart's recent decipherment of the bench inscription of Temple 22 revealed, however, that it was commemorated by the ruler 18 Jog, in A.D. 703, and stratigraphic evidence supports this early dating.[295] In the first half of the eighth century, the April and September first appearances of Venus after superior conjunction, which seem to have been the most significant phenomena, would not have been visible through the window, unless it had a viewing angle wider than permitted by the reconstructions of Trik and of Hohmann and Vogrin.[296] At present a part of the window and of the wall on the outer side seem to be missing, and therefore the viewing angle of the window is almost $2\frac{1}{2}°$ wider than it used to be, according to the reconstructions on which the calculations and results shown on Figure 10 are based. Aveni and Hartung (pers. com.) informed me, however, that the outer part of the window might have been a later addition and that the diagonal lines used by the Maya in their observations were perhaps the very ones that exist today. If they are correct, the visibility spans shown on Figure 10 ought to be expanded by a few days, which means that the first

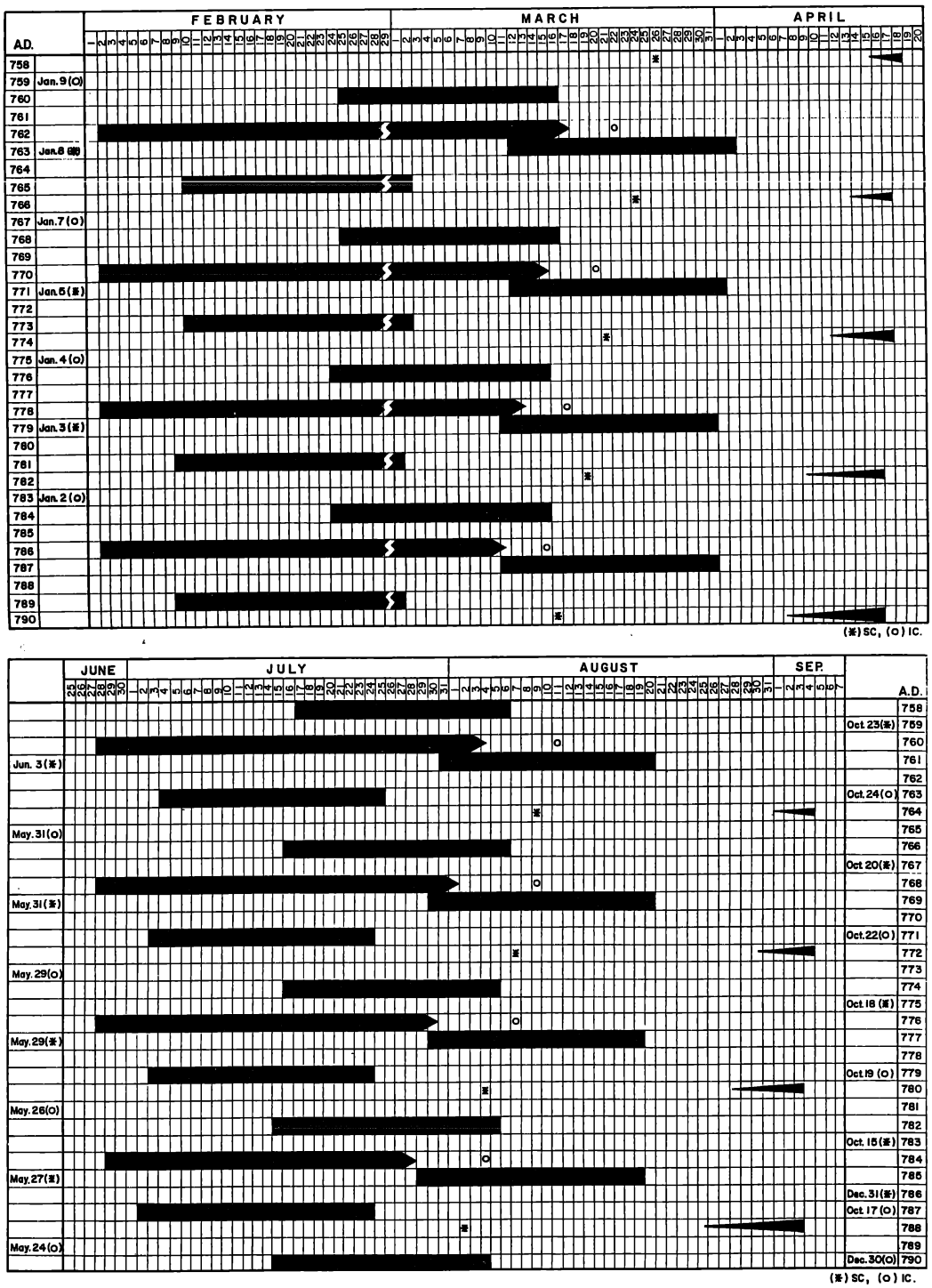


FIG. 10. Venus visibility through the window of Temple 22 at Copán, Honduras, during a sequence of years in the second half of the eighth century. Conjunctions (o = inferior conjunction, * = superior conjunction) are marked on dates which were current, at the moment of conjunction, on 90° of W geographical longitude. The narrowing sections of the black stripes denote a decreased probability of Venus's visibility; breaks indicate there was no 29 February. (Drawing by Arturo Ponce de León.)

evening star appearances in April and September would have been visible through the window already in the first half of the eighth century.

There is yet another possibility. As Hohmann and Vogrin maintain,[297] the window in the western wall of Temple 22 was a later addition, a result of remodelling works that may have been related to the construction of the adjacent Temples 21A and 22A. Since the latter two structures were erected by Yax Pac,[298] enthroned in A.D. 763, it is noteworthy that the life of this ruler was evidently under the auspices of Venus. The date of his designation as successor or acting regent, 9.15.15.12.16 5 Cib 9 Pop (9 February 747, Julian, by the 584283 correlation constant), coincided with the first appearance of the evening star; the inscription on Temple 11 recording this date includes the *chac ek* glyphic compound and thus definitely refers to Venus.[299] Furthermore, the same structure records the date 9.17.0.0.16 3 Cib 9 Pop (3 February 771, Julian), again a very likely day for the first sighting of Venus after superior conjunction. This was the first time after Yax Pac's accession to the throne that this phenomenon could have been observed on the same *haab* date as on the occasion of his heir designation, 24 years or three 8-year Venus cycles ago.[300] Finally, "the Venus symbols and skulls that appear as iconographic elements in some of the monuments for which he was responsible may be indicative of the image that he acquired or had confirmed on this day" (i.e. of his heir designation).[301] In view of this evidence it is, indeed, tempting to suggest that it was Yax Pac who designed the window of Temple 22 for the observations of Venus, specifically of the first appearances of the evening star.[302]

SUMMARY

Various kinds of evidence reveal that the beliefs about rain and maize in Mesoamerica were, or still are, associated with different aspects of the planet Venus. Most obvious is the distinction between the morning and the evening star. The associations of the Venus-rain-maize complex with morning or evening manifestation of the planet, as indicated by the units of data presented, can be summarized as follows:

Venus as morning star: B, D?, E, J;
Venus as evening star: A, B, C, E, F, G, H, I, K, L?, M?, N, O.

In a few cases the association with one or another aspect is not explicitly manifested, and the placement of such units in the scheme depends on the interpretation of data based on comparative evidence. Question marks indicate special uncertainties:

D: Xulab is the morning star, but the chief of his servants, the Mams, is Yaluk, who is linked with the West. The latter is definitely related to rain and maize, whereas Xulab is the patron of agriculture, hunting and fishing, but "particularly the last two".[303]

L: The severed head of Hun Hunahpu, having fertilizing power, has been identified with the evening star, but the protagonists Hun Hunahpu and Vucub Hunahpu represent rather the morning star.

M: The interpretation largely depends on comparative evidence from considerably later periods.

Some data in units B, G and I are more specific in that they reflect observations of the planet's motion with regard to the horizon and of the coincidence of these phenomena with climatic changes. Units B and E suggest the association of the Venus-rain-maize complex with both morning and evening manifestations of the planet; the Cora maize god is linked to the evening star, and so is the reference to the planet's movement bringing rain, but the supreme authority and rain controller seems to be the morning star. Although in most cases rain and/or maize is connected with Venus as evening star, units B, C, D, E, I, J and L attribute a dominant position to the morning star. A possible explanation will be offered in Part II of the paper, in which an attempt will be made to trace the development of the concepts associating Venus, rain and maize in Mesoamerica, and to examine the observational facts that may have been responsible for them. Many peculiarities and apparent inconsistencies which have been left unaccounted for will, hopefully, become clearer by viewing the Venus-rain-maize complex in a broader context of Mesoamerican (pre)history and cultural evolution.

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3. Michael P. Closs, Anthony F. Aveni and Bruce Crowley, "The planet Venus and Temple 22 at Copán", *Indiana*, ix (1984) (*Gedenkschrift Gerd Kutscher*, Teil 1), 221–47; Ivan Šprajc, "Venus, lluvia y maíz: El simbolismo como posible reflejo de fenómenos astronómicos" in *Memorias del Segundo Coloquio Internacional de Mayistas: Campeche, 17–22 de agosto de 1987* (Mexico City, 1990), 221–48.
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7. *Ibid.*, 171.
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10. Closs *et al.*, *op. cit.* (ref. 3), 234f.
11. Šprajc, *op. cit.* (ref. 3).
12. The maximum extremes *can* occur a few days before or after these time-spans, but this happens only every two centuries and a half (see ref. 13), around the time when maximum extremes exchange (the lowest points of the curve in Figure 1), i.e. when a maximum extreme, recurring at 8-year intervals and pertaining to a specific synodic period of a 5-period (= 8-year) cycle, decreases and is replaced by a growing extreme of another synodic period in the cycle.
13. These changes also exhibit a long-term periodicity: a given pattern of Venus phenomena is almost exactly repeated after 251 years. See: Herbert J. Spinden, "Maya inscriptions dealing with Venus and the Moon", *Bulletin of the Buffalo Society of Natural Sciences*, xiv, no. 1 (1928), 5–63, p. 20; Stephen C. McCluskey, "Maya observations of very long periods of Venus", *Journal for the history of astronomy*, xiv (1983), 92–101; J. Daniel Flores Gutiérrez, "Venus y su relación con fechas antiguas", in *Arqueoastronomía y etnoastronomía en Mesoamérica*, ed. by J. Broda, S. Iwaniszewski and L. Maupomé (Mexico City, 1991), 343–88.
14. Šprajc, *op. cit.* (ref. 3), 231–3.
15. Enriqueta García, *Modificaciones al sistema de clasificación climática de Köppen*, 4th edn (Mexico City, 1987), 22–30, 62–70.
16. It should be pointed out, however, that it is difficult to determine the *exact* date of a Venus extreme by naked-eye observations, because around that date (as is the case with the sun at the solstices) the planet's declination changes very little.

17. Román Piña Chan, *Quetzalcóatl: Serpiente emplumada* (Mexico City, 1977).
18. J. Eric S. Thompson, *Maya hieroglyphic writing: An introduction*, 3rd edn (Norman, 1971), 134.
19. R. H. Barlow, "Remarks on a Nahuatl hymn", *Tlalocan*, iv (1963), 185–92, p. 189; Closs *et al.*, *op. cit.* (ref. 3), 229f.
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22. Mercedes de la Garza, *El universo sagrado de la serpiente entre los mayas* (Mexico City, 1984), 163ff; Charles Wisdom, *The Chorti Indians of Guatemala* (Chicago, 1940), 395f, 445.
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24. Wisdom, *op. cit.* (ref. 22), 393.
25. Closs *et al.*, *op. cit.* (ref. 3), 226.
26. Kelley believes that Kukulcan, as a feathered serpent associated with Venus, was already present in the Maya Classic. According to Houston, Kukulcan's name appears on a Late Classic vase from Uaxactún. David H. Kelley, "The birth of the gods at Palenque", *Estudios de cultura maya*, v (1965), 93–134; *idem*, *Deciphering the Maya script* (Austin and London, 1976), 96; Stephen D. Houston, "An example of homophony in Maya script", *American antiquity*, xlix (1984), 790–805, pp. 799f.
27. Francisco Núñez de la Vega, "Calendar and nagualism of the Tzeltals" [parts of *Constituciones diocesanas del Obispado de Chiapa*, Rome, 1702; transl. by A. Watters Payne], *The Maya Society quarterly*, i (1932), 56–64, p. 61.
28. William R. Holland, "Conceptos cosmológicos tzotziles como una base para interpretar la civilización maya prehispánica", *América indígena*, xxiv (1964), 11–28, p. 14.
29. Pedro Armillas, "La serpiente emplumada, Quetzalcoatl y Tlaloc", *Cuadernos americanos*, year 6, xxxi, no. 1 (1947), 161–78, pp. 170ff. Rain clouds are conceived as plumed serpents among the Huicholes, and similar beliefs were found in the Mixteca; see Nigel Davies, *The Toltecs: Until the fall of Tula* (Norman, 1977), 56; John Monaghan, "The feathered serpent in Oaxaca: An approach to the study of the Mixtec codices", *Expedition*, xxxi (1989), 12–18. In the northern part of the state of Puebla a rain shower is called *quetzalcóatl* (Armillas, *op. cit.*, 175). The Zinacanteco Earth Lord (*yahval balamil*), who owns all the waterholes and controls lightning and clouds, is described as a Ladino, but he has serpents as attributes. Likewise, among the natives of the Isthmus of Veracruz the serpents, symbolizing water, are owned by the Earth King Chaneque; Evon Z. Vogt, "Some aspects of the sacred geography of highland Chiapas", in *Mesoamerican sites and world-views*, ed. by E. P. Benson (Washington, 1981), 119–38, p. 126; Guido Münch Galindo, *Etnología del Istmo Veracruzano* (Mexico City, 1983), 179.
30. *Cf.* Ralph L. Beals, "Two mountain Zapotec tales from Oaxaca, Mexico", *The journal of American folk-lore*, xlviii (1935), 189–90; *idem*, "Ethnology of the western Mixe", *University of California publications in American archaeology and ethnology*, xlii (1945), 1–175, pp. 84, 94; Julio de la Fuente, "Las ceremonias de la lluvia entre los zapotecos de hoy", in *Vigesimoséptimo Congreso Internacional de Americanistas: Actas de la primera sesión, celebrada en la Ciudad de México en 1939*, ii (Mexico City, 1939), 479–84, pp. 480f; *idem*, *Yalálag: Una villa zapoteca serrana* (Mexico City, 1949), 266f; George M. Foster, "Sierra Popoluca folklore and beliefs", *University of California publications in American archaeology and ethnology*, xlii (1945), 177–249, p. 216; John G. Fought, *Chorti (Mayan) texts 1*, ed. by S. S. Fought (Philadelphia, 1972), 421f; Elsie Clews Parsons, *Mitla: Town of the souls* (Chicago and London, 1936), 223f; Wisdom, *op. cit.* (ref. 22), 388, 394.
31. Sol Tax, *Panajachel: Field notes* (Microfilm Collection of Manuscripts on Middle American Cultural Anthropology, no. 29; Chicago, 1950), 2451.
32. Frans Blom and Oliver La Farge, *Tribes and temples*, ii (New Orleans, 1927), 368.
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42. Closs, "Venus in the Maya world" (ref. 8), 150f.
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48. It is not too difficult to understand this process of transformation if we try to imagine the efforts of the first missionaries, such as described by Muñoz Camargo: "As they did not know the language, they only said that in the hell (with their hands indicating beneath the ground) there was fire [and] there were toads and snakes. And, having said that, they lifted their eyes skywards, saying that the one god was above in heaven, likewise pointing with their hands." (*Relaciones geográficas del siglo XVI, 4: Tlaxcala*, i, ed. by René Acuña (Mexico City, 1984), 208; my translation.)
49. The association might have been reinforced by the fact that in medieval Christendom the devil was equated with *Lucifer* (= "light bearer"), who originally was a Greek deity (Phosphoros) of *Venus* as morning star. *Cf.* Stanislaw Iwaniszewski, "Venus in the East and West", paper presented at the First International Conference on Ethnoastronomy: Indigenous astronomical and cosmological traditions of the world (Washington, D.C., 1983).
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51. Arthur G. Miller, *On the edge of the sea: Mural painting at Tancah-Tulum, Quintana Roo, Mexico* (Washington, D.C., 1982), 87f, Figs 118, 119.
52. *Ibid.*, 87.
53. Closs, "Venus in the Maya world" (ref. 8), 149–52; Kelley, *Deciphering* (ref. 26), 71.
54. Eduard Seler, *Gesammelte Abhandlungen zur amerikanischen Sprach- und Altertumskunde* (5 vols, Graz, 1960–61; orig.: Berlin, 1902–23), ii, 1063; Angel Ma. Garibay K., *Veinte himnos sacros de los nahuas* (Mexico City, 1958), 154.
55. Thompson, *Maya hieroglyphic writing* (ref. 18), 134f, 137, 272.
56. Esther Pasztory, "The historical and religious significance of the Middle Classic ball game", in *Religión en Mesoamérica*, ed. by Litvak K. and Castillo T. (ref. 5), 441–55, p. 445; Marvin Cohodas, "The iconography of the Panels of the Sun, Cross and Foliated Cross at Palenque: Part III", in *The art, iconography & dynastic history of Palenque, Part III: Proceedings of the Segunda Mesa Redonda de Palenque*, ed. by M. Greene Robertson (Pebble Beach, Calif., 1976), 155–76, p. 160.
57. Marianna C. Slocum, "The origin of corn and other Tzeltal myths", *Tlalocan*, v (1965), 1–45, pp. 1–7; June Nash, *In the eyes of the ancestors: Belief and behavior in a Maya community* (New Haven and London, 1970), 43f; León A. Valladares, *El hombre y el maíz: Etnografía y etnopsicología de Colotenango*, 2nd edn (Mexico City, 1957), 239f; Otto Schumann, "El origen del maíz en maya-mopan", *Tlalocan*, vi (1971), 305–11; *Dos mitos zoques en zoque de Copainalá* (Instituto Lingüístico de Verano, Mexico City, 1980), 5–7; Preuss, *op. cit.* (ref. 50), 243ff; Roberto J. Weitlaner, *Relatos, mitos y leyendas de la Chinantla*, ed. by M. S. Molinari, M. L. Acevedo, M. Aguayo Alfaro (Mexico City, 1977), 69. Summaries of various tales are given in Thompson, *Historia y religión* (ref. 33), 417ff.
58. Preuss, *op. cit.* (ref. 50), 39; Juan de Dios Rosales, *Notes on Aguacatan* (Microfilm Collection of Manuscripts on Middle American Cultural Anthropology, no. 24; Chicago, 1949), 98; Robert Redfield, *Notes on San Antonio Palopo* (Microfilm Collection of Manuscripts on Middle American Cultural Anthropology, no. 4; Chicago, 1945), 46. An alternative explanation of the maize-ants association is offered by Roberto D. Bruce S., Carlos Robles U. and Enriqueta Ramos Chao, *Los lacandones*, 2: *Cosmovisión maya* (Mexico City, 1971), 149f.
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61. Alfred M. Tozzer, *A comparative study of the Mayas and the Lacandones* (New York, 1907), 157.
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63. Weitlaner, *Chinantla* (ref. 57), 88f, 62.
64. *Cf. Códice Chimalpopoca* (ref. 60), 11, 121.
65. Weitlaner, *Chinantla* (ref. 57), 90, my translation.
66. Susan Milbrath, "Astronomical images and orientations in the architecture of Chichen Itza", in *New directions in American archaeoastronomy* (*Proceedings of the 46th International Congress of Americanists*), ed. by A. F. Aveni (BAR International Series 454; Oxford, 1988), 57–79, pp. 67–70, Tables 1 and 2. Aveni, Gibbs and Hartung, *op. cit.* (ref. 9), 984, observed that settings of the Pleiades could have been watched, around A.D. 1000, through window 1 of the Caracol at Chichén Itzá; one diagonal line of this window points to the maximum northerly setting extreme of Venus (see below, Section 3: N). The significance of the Pleiades in Mesoamerican world view, accounted for by the concomitance of their heliacal phenomena with the onset of the rainy season, was amply documented by Johanna Broda, "La fiesta azteca del Fuego Nuevo y el culto de las Pléyades", in *Space and time in the cosmovision of Mesoamerica*, ed. by F. Tichy (*Lateinamerika Studien*, 10; Munich, 1982), 129–57, pp. 139ff.
67. Mercedes Olivera, "Huémitl de mayo en Citlala: ¿Ofrenda para Chicomecóatl o para la Santa Cruz?", in *Mesoamérica: Homenaje al dr. Paul Kirchhoff*, ed. by B. Dahlgren (Mexico City, 1979), 143–58, p. 144, my translation.
68. Gildardo González Ramos, *Los coras* (Mexico City, 1972), 147; Konrad Theodor Preuss, *Die Nayarit-Expedition*, i: *Die Religion der Cora-Indianer* (Leipzig, 1912), pp. XXVIIIf.
69. Preuss, *ibid.*, pp. XXXII, XLIV, 111f; Thomas B. Hinton, *Coras, huicholes y tepehuanes* (Mexico City, 1972), 37f; González R., *op. cit.* (ref. 68), 147, 161.

70. Preuss, *ibid.*, 230, my translation.
71. *Ibid.*, 94, 230.
72. *Ibid.*, pp. LXIff. In his notes to the chant Preuss (*ibid.*, 230) says it is not very clear why the morning star embellished with flowers and clouds comes from the north; elsewhere (*ibid.*, p. LXIV) he attributes the associations of the morning star with North and South to the observation of the annual motion of the sun. It is more logical, however, to relate these associations to the movements of the planet itself.
73. *Ibid.*, p. LXXXI.
74. "The period in which, as a general rule, the rainy season begins, is between 15 and 24 June, and it ends in the second fortnight of October" (González R., *op. cit.* (ref. 68), 19). The planting of the maize starts with the first rains, whereas the harvest takes place between the end of October and the end of December (*ibid.*, 47).
    In another Cora chant it is the morning star (Hatsikan) that asks the (god of) North for clouds (Preuss, *Die Nayarit-Expedition* (ref. 68), 247). Venus is associated in various chants with different sky directions, but what seems significant is that exclusively its *associations with north bring about rains*. Recall that both evening and morning star northerly extremes could have been associated with rain: while those of the evening star coincide with the *start* of the rainy season, the morning star reaches its northerly extremes after the summer solstice, i.e. *during* the rainy season.
75. Angel Ma. Garibay K., *Vida económica de Tenochtitlan, 1: Pochtecayotl* (Mexico City, 1961), 49, 103.
76. William R. Holland, *Medicina maya en los altos de Chiapas: Un estudio del cambio socio-cultural*, transl. by D. Cazés (Mexico City, 1963), 92; J. E. S. Thompson, *A commentary on the Dresden Codex* (*Memoirs of the American Philosophical Society*, xciii; Philadelphia, 1972), 67.
77. Wisdom, *op. cit.* (ref. 22), 393.
78. Cohodas, *op. cit.* (ref. 56), 163.
79. Thompson, *Maya hieroglyphic writing* (ref. 18), 249.
80. Closs *et al.*, *op. cit.* (ref. 3), 235. On the geographical latitude of the Maya Lowlands the maximum northerly extremes of Venus coincide almost exactly with the first annual solar zenith passage (beginning of May), when the sun is moving *northwards*. Both astronomical phenomena may have been responsible for the mythological importance of the north, since they both announce the coming of rains. Possibly the sun was the primary and most important factor, since its diurnal course lies in the northern part of the sky during the greater part of the rainy season.
81. Francisco Morán, "Arte en lengua cholti que quiere decir lengua de milperos", *Linguistic Society*, cxx (1935), no. 25.
82. Thompson, *Maya hieroglyphic writing* (ref. 18), 249.
83. José Corona Núñez, *Mitología tarasca* (Mexico City, 1957), 36–38; *idem*, "La religión de los tarascos", *Anales del Museo Michoacano*, 2a. epoca, iv (1946), 13–38, p. 23.
84. Corona N., *Mitología tarasca* (ref. 83), 35, my translation.
85. Corona N., *ibid.*, 46; *idem*, "Estudio preliminar", in *Relación de las ceremonias y ritos y población y gobierno de los indios de la provincia de Michoacán (1541)* (Morelia, 1977), pp. V–XX, p. XV.
86. Robert D. Bruce, *El libro de Chan K'in* (Mexico City, 1974), 358.
87. *Ibid.*, 311; Tozzer, *A comparative study* (ref. 61), 106.
88. Bruce, *El libro de Chan K'in* (ref. 86), 83ff.
89. Preuss, *Die Nayarit-Expedition* (ref. 68), pp. XXVIII, LXXIV.
90. *Mitos y cuentos* (ref. 50), 191–7.
91. Hinton, *op. cit.* (ref. 69), 37.
92. Beals, "Two Zapotec tales" (ref. 30), 190; Paul Radin and Aurelio M. Espinosa, *El folklore de Oaxaca* (Anales de la Escuela Internacional de Arqueología y Etnología Americanas; New York, 1917), 205–7.
93. J. Eric S. Thompson, *Ethnology of the Mayas of southern and central British Honduras* (Field Museum of Natural History, Publ. 274, Anthropological Series XVII, no. 2; Chicago, 1930), 159–61; Closs *et al.*, *op. cit.* (ref. 3), 230f. The Venus-Cloud equation is further supported by the tale in which Sun suspects that Moon is having an affair with Venus; another version of the story has Cloud as the suspected adulterer: Closs *et al.*, *ibid.*, 231; Thompson, "The moon goddess" (ref. 23), 169f. In a tale from Oaxaca Venus also seems to be identified with a cloud: "... and she is the cloud, one of the best educated girls, and they

loved her very much, for she was the most beautiful of the stars" (Radin and Espinosa, *op. cit.* (ref. 92), 44, my translation).

94. Thompson, *Ethnology of the Mayas* (ref. 93), 62–64, 124.
95. Closs *et al.*, *op. cit.* (ref. 3), 230.
96. Thompson, *Ethnology of the Mayas* (ref. 93), 57–59.
97. *Ibid.*, 134.
98. *Ibid.*, 57; Luis Pacheco V., "Religiosidad kekchí alrededor del maíz", *Guatemala indígena*, xvi, nos. 3–4 (1981), 1–167, p. 66.
99. Closs, "Venus in the Maya world" (ref. 8), 152. It may not be a coincidence that Lord of Bees or Lord of Honey, a figure in the mythology of the Nahua of Durango, is also related to Venus. Ziehm, *op. cit.* (ref. 40), 43ff.
100. Angel Ma. Garibay K., *Teogonía e historia de los mexicanos: Tres opúsculos del siglo VI*, 3rd edn (Mexico City, 1979), 116.
101. *Diccionario de la lengua española*, 19th edn (Madrid, 1970), 704.
102. Lehmann translated this phrase as: "and for the next four days he was bone." Walter Lehmann, *Die Geschichte der Königreiche von Colhuacan und Mexico* (Quellenwerke zur alten Geschichte Amerikas, aufgezeichnet in den Sprachen der Eingeborenen, 1: Zweite, um ein register vermehrte und berichtigte Auflage herausgegeben von Gerdt Kutscher (Berlin and Stuttgart, 1974)), 92.
103. *Códice Chimalpopoca* (ref. 60), 11.
104. Seler, *Gesammelte Abhandlungen* (ref. 54), i, 633; Lehmann, *op. cit.* (ref. 102), 91, n. 3; Stanisław Iwaniszewski, "Mitología y arqueoastronomía", in *Historia de la astronomía en México*, ed. by M. A. Moreno Corral (Mexico City, 1986), 102–23, p. 109.
105. Edward King Lord Kingsborough, *Antigüedades de México* (3 vols, Mexico City, 1964; orig.: *Antiquities of Mexico* (London, 1831)), i, 204.
    A similar comment is found in Vaticanus 3738 (Ríos): "Porque creían que de cierto que él [Quetzalcoatl] fue subido al cielo y es aquella estrella que se ve al tramontar el sol, y la primera del día o sea el planeta Venus, y asi lo representan ..." ("Because they believed that he [Quetzalcoatl] was lifted to the sky and is that star which is seen at sunset, and the first of the day, that is, the planet Venus, and they thus represent him ...") (Kingsborough, *op. cit.* (ref. 105), iii, 36).
106. *Cf.* Seler, *Gesammelte Abhandlungen* (ref. 54), i, 633; Walter Lehmann, "Ergebnisse einer mit Unterstützung der Notgemeinschaft der Deutschen Wissenschaft in den Jahren 1925/1926 ausgeführten Forschungsreise nach Mexiko und Guatemala: 1. Mixe-Mythen", *Anthropos*, xxiii (1928), 749–91, p. 773; César A. Sáenz, *Quetzalcóatl* (Mexico City, 1962), 15, 23; Iwaniszewski, *op. cit.* (ref. 104), 106ff.
107. "The Grolier Codex" (ref. 2), 50. It is only fair to recognize that Seler and Beyer interpreted Tlahuizcalpantecuhtli's figure in a similar way (although without the supporting Maya evidence) many years ago: Seler, *Gesammelte Abhandlungen* (ref. 54), i, 627; Hermann Beyer, "La astronomía de los antiguos mexicanos", *El México antiguo*, x (1965), 266–84 (orig. publ. in *Anales del Museo Nacional de Arqueología, Historia y Etnología*, ii (1910)), 277.
108. Nicholson, "Religion" (ref. 46), 427.
109. In the *Leyenda de los Soles* Quetzalcoatl (and in the *Histoyre du Mechique* Ehecatl) descended into the underworld to obtain bones, from which man was to be created: *Códice Chimalpopoca* (ref. 60), 120f; Garibay, *Teogonía e historia* (ref. 100), 106. Mendieta, however, attributes this task to Xolotl. When the sun did not want to move, Xolotl killed the gods and finally himself; Fray Gerónimo de Mendieta, *Historia eclesiástica indiana* (Mexico City, 1971), pp. 78f, B. 2, ch. 1. In another version this sacrifice was accomplished by the Air; Sahagún, *Historia general* (ref. 45), p. 434, B. 7, ch. 2.
110. Alfonso Caso, *Los calendarios prehispánicos* (Mexico City, 1967), 197.
111. Seler, *Gesammelte Abhandlungen* (ref. 54), iii, 392–409; Yólotl González Torres, *El culto a los astros entre los mexicas* (Mexico City, 1979), 112; Burr Cartwright Brundage, *The fifth sun: Aztec gods, Aztec world* (Austin, 1979), 120; *idem*, *The phoenix of the western world: Quetzalcoatl and the sky religion* (Norman, 1982), 208ff.
112. Eva Hunt, *The transformation of the hummingbird: Cultural roots of a Zinacantecan mythical poem* (Ithaca and London, 1977), 141.
113. Alfredo Barrera Vásquez and Sylvia Rendón, *El libro de los libros de Chilam Balam* (Mexico City, 1963), 121.
114. Thompson, *Maya hieroglyphic writing* (ref. 18), 218.
115. Closs, "Venus in the Maya world" (ref. 8), 161f; *idem*, "Cognitive aspects" (ref. 2), 411.

116. David H. Kelley, "Astronomical identities of Mesoamerican gods", *Archaeoastronomy* (supplement to *Journal for the history of astronomy*), no. 2 (1980), S1–54, pp. S26f; Seler, *Gesammelte Abhandlungen* (ref. 54), iii, 218–20.
117. Eduard Seler, *Comentarios al Códice Borgia* (2 vols, Mexico City, 1963; 1st edn in German: 1904), ii, 34, 45f.
118. Garibay, *Teogonía e historia* (ref. 100), 106.
119. Seler, *Códice Borgia* (ref. 117), i, 148f, and ii, 77; Thompson, *Maya hieroglyphic writing* (ref. 18), 79.
120. Ziehm, *op. cit.* (ref. 40), 32.
121. *Códice Chimalpopoca* (ref. 60), 121.
122. Thompson, *Ethnology of the Mayas* (ref. 93), 134.
123. Sahagún, *Historia general* (ref. 45), p. 207, B. 3, ch. 2. Considering that in the codices Nanahuatl is normally depicted as a deformed being, it is relevant to quote what Sahagún (*ibid.*, p. 49, B. 1, ch. 21) has to say about the Tlaloque, whom he identifies with prominent mountains: "They also imagined that certain diseases, which seemed to be diseases of coldness, originated in the mountains, or that those mountains had the power to cure them.... The diseases for which they made these vows were gout of the hands or feet, or whatever other part of the body; and also lameness of a limb or of the whole body..." (my translation).
    The relationship between Nanahuatl and the Tlaloque was already noted by Johanna Broda, "Las fiestas aztecas" (ref. 44), 257, n. 10.
124. Vicente Díaz Hernández, "Nanahuatzin", *Tlalocan*, ii (1945), 64. Nicholson, "Religion" (ref. 46), 418f, Table 3, placed Xolotl and Nanahuatl in his Centeotl-Xochipilli complex, but he observed: "The cult which revolved around the cultivation of the staple food plant, maize, greatly overlapped, as would be expected, with the Tlaloc cult" (*ibid.*, 416).
125. Thompson, *Ethnology of the Mayas* (ref. 93), 58f.
126. Thelma D. Sullivan, "The mask of Itztlacoliuhqui", in *Actas del XLI Congreso Internacional de Americanistas (México, 2–7 sept. 1974)*, ii (Mexico City, 1976), 252–62, pp. 252f; Sahagún, *Historia general* (ref. 45), p. 134, B. 2, ch. 30.
127. Hermann Beyer, "El llamado 'Calendario Azteca': Descripción e interpretación del cuauhxicalli de la 'Casa de las Aguilas' ", *El México Antiguo*, x (1965), 134–256 (orig. publ. in *Verband deutscher Reichsangehöriger*, 1921), pp. 249f. Seler, *Gesammelte Abhandlungen* (ref. 54), i, 662f, called this symbol "stellar eye" or "eye with rays".
128. Kingsborough, *op. cit.* (ref. 105), i, 212, and iii, 90.
129. Thompson, *Maya hieroglyphic writing* (ref. 18), 220.
130. Sullivan, *op. cit.* (ref. 126), 255.
131. Pickands, *op. cit.* (ref. 41), 133f.
132. Closs, "Venus in the Maya world" (ref. 8), 150f.
133. Kingsborough, *op. cit.* (ref. 105), i, 212, my translation.
134. Sullivan, *op. cit.* (ref. 126), 259.
135. Preuss, *Die Nayarit-Expedition* (ref. 68), pp. LXIIf, 151–61; *idem*, "El concepto de la estrella matutina según textos recogidos entre los mexicanos del estado de Durango, México", *El México Antiguo*, viii (1955), 375–95; *idem*, *Mitos y cuentos* (ref. 50), 22, 75–81; Hinton, *op. cit.* (ref. 69), 37f.
136. In the light of this comparative evidence it would seem that Cinteotl, too, was linked to the evening manifestation of Venus, as suggested by Dieter Dütting, "Aspects of Classic Maya religion and world view", *Tribus*, xxix (1980), 107–67, p. 149. It might also be added that Thompson placed Cinteotl to the west, remarking that "all the western deities, except the sky bearers, are associated with maize"; J. E. S. Thompson, "Sky bearers, colors and directions in Maya and Mexican religion", *Contributions to American archaeology*, no. 10 (Carnegie Institution of Washington, Publ. 436, 1934), 225. But on the other hand, Cinteotl's calendric name, 1 Xochitl, befits rather the morning star (*cf. infra*: L). A verse in the chant of Xochipilli reads: "By night did the god of corn shine"; but the context seems to refer to the dawn: Arthur J. O. Anderson and Charles E. Dibble, *Florentine Codex: Fray Bernardino de Sahagún, General history of the things of New Spain*, Book 2, 2nd edn, revised (Santa Fé, 1981), 231; Garibay, *Veinte himnos* (ref. 54), 104. As already mentioned (Section 2), the 8-year intervals, at which the Atamalcualiztli festival of the rejuvenation of maize was celebrated, suggest it was somehow tied to the 8-year Venus cycle; according to Long's calculation, based on the data in Sahagún and Telleriano-Remensis, the feasts of Atamalcualiztli may well have coincided with heliacal risings of the morning star; R. C. E.

Long, "The Venus calendar of the Aztec", *Notes on Middle American archaeology and ethnology*, ii (1944–45), 139–41. Graulich argues that Cinteotl personified the morning star and the sprouting maize, while the seeds and the evening star corresponded to Xochipilli: Michel Graulich, "Mythes et rites des vingtaines du Méxique central préhispanique", unpubl. doctoral dissertation, Brussels, 1979–80, 47, 410, 703f; *idem*, "Myths of paradise lost in pre-Hispanic Central Mexico", *Current anthropology*, xxiv (1983), 575–88, pp. 577f. In sum, the data are contradictory and probably reflect the overlapping characteristics of the manifold central Mexican maize deities.

137. Kingsborough, *op. cit.* (ref. 105), i, 212, and iii, 90.
138. The information was obtained during field work in 1986. I thank Ulrich Köhler, from the University of Freiburg, Germany, for kindly inviting me to join his research group. *Cf.* Ulrich Köhler, "Le cycle lunaire et sa signification chez les Indiens mexicains", *Publication de l'Observatoire Astronomique de Strasbourg: Série "Astronomie et Sciences Humaines"*, no. 6 (n.d.), 1–13, pp. 6f.
139. Román Piña Chan and Raul Pavón Abreu, "Entrevista con el caribe Bor", *Información* (Centro de Estudios Históricos y Sociales, Campeche), i (1981), 3–31, p. 11.
140. Lehmann, "Ergebnisse" (ref. 106), 764, 767, was told by the Mixe-Popoluca: "the moon rises in the west"; "the moon comes to the end in the east and ascends in the west".
141. Aveni, "The real Venus-Kukulcan" (ref. 8), 312.
142. Sahagún, *Historia general* (ref. 45), p. 133, B. 2, ch. 30; Kingsborough, *op. cit.* (ref. 105), i, 212; Sullivan, *op. cit.* (ref. 126).
143. Seler, *Códice Borgia* (ref. 117), ii, 120; Thompson, *Maya hieroglyphic writing* (ref. 18), 220.
144. *Códice Chimalpopoca* (ref. 60), 122. In Lehmann's translation (*Die Geschichte* (ref. 102), 346) the sun threw Tlahuizcalpantecuhtli face down to the nine levels of the underworld.
    Mendieta's version (*Historia eclesiástica* (ref. 109), 79) is similar: "Citli, tomó un arco y tres flechas, y tiró al sol para le clavar la frente: el sol se abajó y así no le dió: tiróle otra flecha le segunda vez y hurtóle el cuerpo, y lo mismo hizo á la tercera: y enojado el sol tomó una de aquellas flechas y tiróla a Citli, y enclavóle la frente, de que luego murió" ("Citli took a bow and three arrows and shot at the Sun to pierce his forehead; the Sun stooped and so he missed him; he shot an arrow for the second time and scraped his body, and the same he did the third time; and the Sun, irritated, took one of those arrows and shot it at Citli and pierced his forehead, with the result that he died immediately").
    A comparison of this version with that in Codex Chimalpopoca suggests that Seler, *Códice Borgia* (ref. 117), ii, 119, must have been right in interpreting the name *Citli* as a corrupt form of *cetl* (= "ice"). Graulich, *Mythes et rites* (ref. 136), 122, argues that *citli* (= "rabbit", "grandmother") refers rather to the moon, though he recognizes a relation with Venus.
145. Thompson, *Maya hieroglyphic writing* (ref. 18), 220.
146. Preuss, *Die Nayarit-Expedition* (ref. 68), pp. LXIVf.
147. Sullivan, *op. cit.* (ref. 126), 253.
148. Kingsborough, *op. cit.* (ref. 105), i, 212. *Cf.* the same statement in Vaticanus A (*ibid.*, iii, 90).
149. Venus as evening star sets at an azimuth of less than 270° (i.e. it is visible south of due west) at the latest around the autumnal equinox, but normally before that date; as morning star, however, it cannot be seen rising south of the astronomical east until after the autumnal equinox: normally it attains a negative declination (i.e. the rising azimuth greater than 90°) some days or weeks after the equinox.
150. Johanna Broda, "Ciclos agrícolas en el culto: Un problema de la correlación del calendario mexica", in *Calendars in Mesoamerica and Peru*, ed. by Aveni and Brotherston (ref. 2), 145–65, p. 154.
151. Sahagún, *Historia general* (ref. 45), p. 133, B. 2, ch. 30, my translation. The typical Itztlacoliuhqui's headdress in pictorial representations agrees well with this description; Sulivan, *op. cit.* (ref. 126).
152. Kingsborough, *op. cit.* (ref. 105), i, 212.
153. Ellen T. Baird, "Stars and war at Cacaxtla", in *Mesoamerica after the decline of Teotihuacan A.D. 700–900*, ed. by R. A. Diehl and J. C. Berlo (Washington, 1989), 105–22; John B. Carlson, "Venus and astrologically-timed ritual warfare in Mesoamerica", paper presented at the Third International Conference on Archaeoastronomy "Oxford 3", St Andrews, Scotland (September 1990).
154. Floyd G. Lounsbury, "Astronomical knowledge and its uses at Bonampak, Mexico", in *Archaeoastronomy in the New World*, ed. by A. F. Aveni (Cambridge, 1982), 143–68, p. 153; Justeson, *op. cit.* (ref. 2), 105–9; Aveni, "Monumental inscriptions" (ref. 2).

155. Obviously this time of the year was particularly appropriate for warfare, because it was not within the agricultural cycle; *cf.* Broda, "Ciclos agrícolas" (ref. 150), 156; Justeson, *op. cit.* (ref. 2), 107f. During these months not only Venus but also the sun moves over the southern half of the celestial vault. Both phenomena may have motivated the association of the south with war, observed also in the Bonampak murals by Mauricio Rosas (pers. com., 1989).
156. Carlson, "Venus and ritual warfare" (ref. 153); Baird, *op. cit.* (ref. 153).
157. Thompson, *Maya hieroglyphic writing* (ref. 18), 220.
158. Floyd G. Lounsbury, "The base of the Venus table of the Dresden Codex, and its significance for the calendar-correlation problem", in *Calendars in Mesoamerica and Peru*, ed. by Aveni and Brotherston (ref. 2), 1–26.
159. Floyd G. Lounsbury, "Maya numeration, computation, and calendrical astronomy", in *Dictionary of scientific biography*, ed. by C. C. Gillispie, xv (New York, 1978), 759–818, p. 778; Thompson, *Maya hieroglyphic writing* (ref. 18), 219.
160. Closs, "Venus in the Maya world" (ref. 8), 161f; *idem*, "Cognitive aspects" (ref. 2), 409ff.
161. Fray Toribio de Motolinia, *Memoriales*, Manuscritos de la colección del Sr. Don J. García Icazbalceta (Mexico, Paris and Madrid, 1903), 53f. *Cf.* similar passages, possibly taken from Motolinia or from some common source, in Fray Bartolomé de Las Casas, *Apologética historia sumaria* ..., ed. by E. O'Gorman (2 vols, Mexico City, 1967), ii, pp. 40f, B. 3, ch. 142, and J. de la Serna, quoted in Aveni, "The real Venus-Kukulcan" (ref. 8), 310.
162. Ralph L. Roys, *The book of Chilam Balam of Chumayel* (Norman, 1967), 36, 112.
163. Thompson, *Historia y religión* (ref. 33), 345.
164. Roys, *op. cit.* (ref. 162), 111, n. 6.
165. *Ibid.*, 111.
166. *Ibid.*, 110, n. 7.
167. *Diccionario de la lengua española* (ref. 101), 704.
168. Motolinea, *Memoriales* (ref. 161), 53ff; Garibay, *Teogonía e historia* (ref. 100), 116.
169. Dütting, "Aspects of Classic Maya religion" (ref. 136), 146, Fig. 16.
170. Lehmann, "Ergebnisse" (ref. 106), 750, 768, 780.
171. *Ibid.*, 764.
172. *Códice Chimalpopoca* (ref. 60), 122.
173. *Ibid.*, 9, my translation.
174. Lehmann, "Ergebnisse" (ref. 106), 764.
175. *Ibid.*, 772, my translation. This age distinction between morning and evening star has an analogy among the Cora, who designate the two aspects of Venus as elder and younger brother: Preuss, *Die Nayarit-Expedition* (ref. 68), p. LXII; Hinton, *op. cit.* (ref. 69), 37f. The morning star as an old man is also found in Nicaragua; Lehmann, "Ergebnisse", 777, 781f.
    Lehmann (*ibid.*, 777) believed that the Classic Maya had similar concepts concerning the age of the two Venus manifestations. Recently Dütting, referring to Lehmann's ethnological research and analysing some epigraphic evidence, suggested that God GI of the Palenque triad incorporated a young and creative aspect of the evening star, on the one hand, and a destructive aspect of the morning star, on the other; Dieter Dütting, "Venus, the Moon and the gods of the Palenque triad", *Zeitschrift für Ethnologie*, cix (1984), 7–74, pp. 16f.
    In this context attention may be called to the Maya maize god, probably linked to the evening star (see above: H); he was normally depicted as a youthful personage and regarded as kindly and well disposed toward man; Thompson, *Maya hieroglyphic writing* (ref. 18), 11, 66, 134f. For the Achi in Guatemala the evening star is a benevolent young servant girl; they refer to the morning star as "big star" and speak of it as if it were a man; Helen Neuenswander, "Reflections of the concept of dualism in Maya hieroglyphic pairing, halving, and inversion", in *Memorias del Primer Coloquio Internacional de Mayistas: 5–10 de agosto de 1985* (Mexico City, 1987), 715–34, p. 724. The image of a young girl who serves calls to mind the Nahuatl word *xolotl*, which can be translated as "page" or "servant"; it has been shown (*supra*: F) that the deity with that name was also associated with the evening star.
176. Lehmann, "Ergebnisse" (ref. 106), 768, 772.
177. *Ibid.*, 766.
178. *Ibid.*, 767, my translation.
179. The Chontal of Oaxaca also attribute the responsibility for whirlwinds to the devil. His helpers

are evil spirits, but it is interesting that the whirlwind and the devil are given offerings during certain sowing rituals; notably, the prescribed offerings never include the figure seven, normally associated with the evil supernaturals; Pedro Carrasco, "Pagan rituals and beliefs among the Chontal Indians of Oaxaca, Mexico", *Anthropological records*, xx (1960), 87–117, p. 112.

180. Lehmann, "Ergebnisse" (ref. 106), 766–8, 772.

181. Münch G., *op. cit.* (ref. 29), 154, reports that West is the place of the god of darkness, patron of evil sorcerers and malefactors. Surely this god and Lehmann's Satanas can be considered identical deities, particularly if the following observation is taken into account: "In the folk tradition Chaneque has been replaced by the devil. The ancient god of earth and water, lord of the underworld and of the animals, is losing his attributes, converting himself into the western demon, symbol of destruction and wickedness. Christianity has satanized him" (Münch G., *ibid.*, 174, my translation).

Also in agreement with Lehmann's data, Münch (*ibid.*, 154, 190) says that North is the home of the lightning god, who brings water for planting and introduces the winter, while the dry season is symbolized by the south wind.

182. Lehmann, "Ergebnisse" (ref. 106), 768.

183. *Ibid.*, 772. Among the Pawnees of North America, too, the deities of the West were both Evening Star and Moon, while Morning Star and Sun were gods of the East; Waldo R. Wedel, "Native astronomy and the Plains Caddoans", in *Native American astronomy*, ed. by A. F. Aveni (Austin, 1977), 131–45, p. 133.

184. Lehmann, "Ergebnisse" (ref. 106), 772.

185. *Ibid.*, 765, my translation.

186. *Ibid.*, 778f.

187. *Ibid.*, 764–6; Münch G., *op. cit.* (ref. 29), 160f. Viejito as *la luna del dia* ("the daylight moon") is clearly the waning moon: "The colour of the waning Moon that descends in the east is the colour of *viejito*, it is dirty..." (Lehmann, *loc. cit.*).

188. Klein, *The face of the earth* (ref. 1), 96f; *eadem*, "Who was Tlaloc?", *Journal of Latin American lore*, vi (1980), 155–204.

189. Tax, *Panajachel* (ref. 31), 2451. A variant version has it that Santiago cares for the *milpa*, while San Pedro, another star that appears at 1 or 2 a.m. above Santiago, cares for wheat, beans and the hill (*ibid.*, 2451, 2456). The data available do not permit a clear identification of the star named San Pedro. It is possible that the information was misinterpreted, and that Santiago and San Pedro both refer to Venus, in its two manifestations, since their attributes interchange.

190. *Ibid.*, 2432.

191. *Ibid.*, 2517; Juan de Dios Rosales, *Notes on San Pedro La Laguna* (Microfilm Collection of Manuscripts on Middle American Cultural Anthropology, no. 25; Chicago, 1949), 510f. In San Pedro La Laguna the biggest star is also called Santiago:

> La estrella Santiago es la que regresa tres veces para atrás cuando sale, pues es por su caballo quien no quiere andar, pero a la cuarta vez le castiga y entonces corre a su dirección. Dicen que cuando sale Santiago, todas las bestias se acuestan cuando ven salir a ella, de lo contrario se mueren.
>
> ... sale siempre a las cuatro de la mañana y ... se regresa tres veces cuando sale, lo que no tienen que ver las personas, de lo contrario se mueren (Rosales, *loc. cit.*).
>
> *The star Santiago is the one that thrice turns back when it rises, which is because of his horse who does not want to move along, but on the fourth occasion he punishes him and then he takes his proper course. They say that when Santiago rises, all the beasts lie down when they see him rise, and by contrast they die.*
>
> *... he always rises at four in the morning and ... returns three times when he rises, which must not be seen by the people, lest they die.*

There is a striking similarity between this ethnographic information from Guatemala and the following passage from Sahagún (*Historia general*, pp. 434f, B. 7, ch. 3):

> A la estrella de Venus la llamaban esta gente *citlápol*, *uei citlalin*, estrella grande; y decían que cuando sale por el oriente hace cuatro arremetidas, y las tres luce poco, y vuélvese a esconder, y a la cuarta sale con toda su claridad, y procede por su curso....
>
> En la primera arremetida teníanla de mal agüero, diciendo que traía enfermedad consigo, y por esto cerraban las puertas y ventanas para que no entrase su luz....
>
> *The star Venus was called by these people* citlápol, uei citlalin, *big star; and they said that when it rises in the east it makes four assaults, and during three it shines little, hiding itself again, while on the fourth it rises with all of its brightness and continues along its course....*

At the first assault they considered it bad augury, saying that it carried illness with it, and therefore they closed the doors and windows, so as not to allow its light to enter....

There can be no doubt that both descriptions refer to heliacal risings of the morning star: in the first days after the invisibility around inferior conjunction, Venus is visible at dawn only a few moments before disappearing in the sun glow.

192. Thompson, "The moon goddess" (ref. 23), 152–61; *idem*, *Historia y religión* (ref. 33), 263ff; De la Garza, *op. cit.* (ref. 22), 163ff; Kelley, *Deciphering* (ref. 26), 96; Linda Schele, "Accession iconography of Chan-Bahlum in the Group of the Cross at Palenque", in Greene Robertson (ed.), *op. cit.* (ref. 56), 9–34, p. 17.
193. Closs, "A glyph for Venus as evening star" (ref. 2).
194. Closs, "Venus in the Maya world" (ref. 8), 147f.
195. According to Kelley, *Deciphering* (ref. 26), 38, the star glyph (*ek*) refers to Venus only when it has the prefix *chac* ("red", "big"), since this compound appears in the Dresden Venus table, and because "big star" (*chac ek* in Yucatec Maya) is a common designation for Venus in various Maya languages. Closs, "Venus in the Maya world" (ref. 8), 147f, argued, however, that the vocabulary of J. Pío Perez renders the entry *ek* as both "estrella" and "lucero", and called attention to the fact that a star glyph without prefixes appears on Dresden 47, evidently referring to Venus. Having examined the astronomical phenomena occurring on the dates of the explicitly marked star events in Mayan inscriptions, Justeson, "Ancient Maya ethnoastronomy" (ref. 2), 110, concluded that "the prime referent of the star sign is in fact either planet or star, as Kelley has long argued, and not specifically Venus as is generally supposed".
196. Closs, "Venus in the Maya world" (ref. 8), 148. The circumstances described by Closs may well be those in which, as Justeson, "Ancient Maya ethnoastronomy" (ref. 2), 110, observes, the star glyph alone, rather than the compound *chac ek*, refers specifically to Venus, because it is used as "a generic term in a context in which its specific referent has already been established". In the cases of the occurrence of star sign discussed in the present paper, such context may have been, indeed, provided, and I believe that Venus is very likely to be implied.
197. Schele, "Accession iconography" (ref. 192), 20.
198. A close iconographic and conceptual relationship between celestial bands and bicephalic monsters is manifested, for example, in House E at Palenque.
199. A. P. Maudslay, *Biologia Centrali-Americana: Archaeology* (5 vols, London, 1889–1902), iv, Plates 52–56, 76; Schele, "Accession iconography" (ref. 192), 16, Fig. 7.
200. Thompson, "Sky bearers" (ref. 136), 226.
201. Linda Schele and Mary Ellen Miller, *The blood of kings: Dynasty and ritual in Maya art* (New York and Fort Worth, 1986), 45.
202. Maudslay, *op. cit.* (ref. 199), iv, Plates 43, 53, 55, 74; Schele, "Accession iconography" (ref. 192), 16, Fig. 7. The interpretation of Schele and Miller might apply to Temple 22 at Copán, where also the eastern head of the monster has a star-Venus glyph.
203. Closs, "Venus in the Maya world" (ref. 8); *idem*, "Venus dates revisited", *Archaeoastronomy: The bulletin of the Center for Archaeoastronomy*, iv, no. 4 (1981), 38–41; *idem*, "Cognitive aspects" (ref. 2); *idem*, "A glyph for Venus" (ref. 2); Lounsbury, "Astronomical knowledge" (ref. 154); Aveni, "Monumental inscriptions" (ref. 2).
204. Lehmann, "Ergebnisse" (ref. 106), 775, 785.
205. Thompson, *Historia y religión* (ref. 33), 261ff.
206. Fr. Bernardo de Lizana, *Historia de Yucatán: Devocionario de Ntra. Sra. de Izmal y conquista espiritual* (Mexico City, 1893; orig.: Valladolid, 1633), 4.
207. Schele and Miller, *op. cit.* (ref. 201), 177, 311f.
208. "Relación de la Villa de Valladolid", in *Relaciones histórico-geográficas de la Gobernación de Yucatán* (Mexico City, 1983), ii, 27–45, p. 33. Köhler believes the passage refers to the fall of a meteorite; Ulrich Köhler, "Comets and falling stars in the perception of Mesoamerican Indians", in *World archaeoastronomy*, ed. by Aveni (ref. 2), 289–99, p. 297.
209. Thompson, *Historia y religión* (ref. 33), 305; see also: Kelley, "The birth of the gods" (ref. 26), 108ff; *idem*, "Astronomical identities" (ref. 116), S24ff.
210. George M. Foster, "Sierra Popoluca folklore and beliefs", *University of California publications in American archaeology and ethnology*, xlii (1945), 177–249, pp. 194f.
211. Caso, *Los calendarios* (ref. 110), 198.
212. Federico Gómez de Orozco, "Costumbres, fiestas, enterramientos y diversas formas de proceder de los indios de Nueva España", *Tlalocan*, ii (1945), 37–63, p. 53.

213. Jill Leslie Furst, *Codex Vindobonensis Mexicanus I: A commentary* (Institute for Mesoamerican Studies, State University of New York at Albany, Publ. no. 4, 1978), 164.
214. Nicholson, "Religion" (ref. 46), 416ff.
215. Karl Taube, "The Classic Maya maize god: A reappraisal", in *Fifth Palenque Round Table, 1983*, ed. by M. Greene Robertson and V. M. Fields (San Francisco, 1985), 171–81, p. 175.
216. Michael D. Coe, "Death and the ancient Maya", in *Death and the afterlife in pre-Columbian America*, ed. by E. P. Benson (Washington, 1975), 87–104, p. 90.
217. Sharon L. Gibbs, "Mesoamerican calendrics as evidence of astronomical activity", in *Native American astronomy*, ed. by Aveni (ref. 183), 21–35, p. 33.
218. Dennis Tedlock, *Popol Vuh: The Mayan book of the dawn of life* (New York, 1985); *idem*, "La siembra y el amanecer de todo el cielo-tierra: Astronomía en el Popol Vuh", in *Arqueoastronomía y etnoastronomía en Mesoamérica*, ed. by Broda *et al.* (ref. 13), 163–77.
219. Due to this property of the calendar, 1 and 7 are numbers whose significance is comparable to the significance of alpha and omega; Munro S. Edmonson, "Historia de las tierras altas mayas, según los documentos indígenas", in *Desarrollo cultural de los mayas*, ed. by E. Z. Vogt and A. Ruz L. (Mexico City, 1964), 255–78, p. 273.
220. Tedlock, *Popol Vuh* (ref. 218), 234.
221. *Ibid.*, 273f, 353.
222. Tedlock, "La siembra y el amanecer" (ref. 218); *idem*, *Popol Vuh* (ref. 218), 294. There is no agreement on the astronomical identity of Hunahpu and Xbalanque. The text of the *Popol Vuh* relates them to the sun and the moon, but Thompson and Lounsbury preferred to identify the latter with the sun and the former with Venus. Tedlock (*Popol Vuh*, 296f) shows that Xbalanque may represent the night sun and probably also the full moon, and Hunahpu the daytime sun, but he argues that they cannot be given unique and unambiguous astronomical assignments. On the problem see also: Marvin Cohodas, "The iconography of the Panels of the Sun, Cross, and Foliated Cross at Palenque: Part II", in *Primera Mesa Redonda de Palenque: Part I*, ed. by M. Greene Robertson (Pebble Beach, Calif., 1974), 95–107, pp. 105f (discussion); Pasztory, *op. cit.* (ref. 56), 452, n. 12.
223. Tedlock, *Popol Vuh* (ref. 218), 236.
224. Lounsbury, "Astronomical knowledge" (ref. 154), 153.
225. Carlson, "The Grolier Codex" (ref. 2), 45ff.
226. Closs, "Venus in the Maya world" (ref. 8), 161f; *idem*, "Cognitive aspects" (ref. 2), 409–11; *idem*, "A glyph for Venus" (ref. 2).
227. Seler, *Gesammelte Abhandlungen* (ref. 54), iii, 392–409.
228. Cecelia F. Klein, "Post-Classic Mexican death imagery as a sign of cyclic completion", in *Death and the afterlife in pre-Columbian America*, ed. by E. P. Benson (Washington, 1975), 69–85, pp. 74f; Lorenzo Ochoa, *Historia prehispánica de la Huaxteca*, 2nd edn (Mexico City, 1984), Plate XLVI:a.
229. Brundage, *The phoenix* (ref. 111), 230, Fig. 31.
230. Michael P. Closs, "The penis-headed manikin glyph", *American antiquity*, liii (1988), 804–11, pp. 809f.
231. Taube, "The Classic Maya maize god" (ref. 215), 176.
232. Closs *et al.*, "The planet Venus" (ref. 3), 231.
233. Furst, *Codex Vindobonensis* (ref. 213), 22f, 318.
234. Jill Leslie Furst, "The year 1 Reed, day 1 Alligator: A Mixtec metaphor", *Journal of Latin American lore*, iv (1978), 93–128, p. 106.
235. Furst, *Codex Vindobonensis* (ref. 213), 23. Such meaning of the death imagery is actually not surprising, since concepts associating the dead and the deities of the underworld with fertility have been found in many parts of the world: Mircea Eliade, *Tratado de historia de las religiones* (Mexico City, 1972; transl. by T. Segovia; orig.: *Traité d'histoire des religions* (Paris, 1964)), 315–20; James George Frazer, *The golden bough: A study in magic and religion* (London, 1922), chs 32, 39–40, 44.
236. David C. Grove, "Chalcatzingo, Morelos, Mexico: A reappraisal of the Olmec rock carvings", *American antiquity*, xxxiii (1968), 486–91.
237. David C. Grove, "Olmec felines in highland central Mexico", in *The cult of the feline*, ed. by E. P. Benson (Washington, 1972), 153–64, p. 157.
238. Jorge Angulo Villaseñor, "The Chalcatzingo reliefs: An iconographic analysis", in *Ancient Chalcatzingo*, ed. by D. C. Grove (Austin, 1987), 132–58, p. 145; Grove, "Olmec felines"

(ref. 237), 157; David C. Grove and Jorge Angulo V., "A catalog and description of Chalcatzingo's monuments", in *Ancient Chalcatzingo*, ed. by Grove, 114–31, p. 121.

239. Peter David Joralemon, *A study of Olmec iconography* (Studies in Pre-Columbian Art and Archaeology, no. 7; Dumbarton Oaks, Washington, 1971), 13.
240. Peter David Joralemon, "The Olmec dragon: A study in pre-Columbian iconography", in *Origins of religious art & iconography in Preclassic Mesoamerica*, ed. by Nicholson (ref. 6), 27–71, p. 37.
241. Joralemon, *Olmec iconography* (ref. 239), 90.
242. Michael D. Coe, "Early steps in the evolution of Maya writing", in *Origins of religious art & iconography in Preclassic Mesoamerica*, ed. by Nicholson (ref. 6), 107–22, p. 111.
243. Joralemon, *Olmec iconography* (ref. 239), 48, Fig. 140.
244. John S. Justeson, William M. Norman, Lyle Campbell and Terrence Kaufman, *The foreign impact on Lowland Mayan language and script* (Middle American Research Institute, Publ. 53; New Orleans, 1985), 50.
245. Alfonso Caso and Ignacio Bernal, *Urnas de Oaxaca* (Mexico City, 1952), pp. 59, 161, Figs 93, 94, 284.
246. David H. Kelley, "A cylinder seal from Tlatilco", *American antiquity*, xxxi (1966), 744–6, p. 744.
247. Nicholson, "Preclassic Mesoamerican iconography" (ref. 6).
248. Closs, "Venus in the Maya world" (ref. 8), 163.
249. Ian Graham and Eric von Euw, *Corpus of Maya hieroglyphic inscriptions*, ii, Part 1 (Cambridge, Mass., 1975), 27.
250. Thompson, *Maya hieroglyphic writing* (ref. 18), Fig. 7: 59, 60.
251. Christopher Jones, "Inauguration dates of three Late Classic rulers of Tikal, Guatemala", *American antiquity*, xlii (1977), 28–60, Figs 7, 11.
252. Jaguar, however, would not be a less appropriate animal in this context, considering that Lahun Chan, an evening star deity, had the head of a jaguar and the rear of a dog, according to the Chilam Balam of Kaua; Closs, "Venus in the Maya world" (ref. 8), 162; for the abundant evidence on Venus-jaguar association see Closs, "Cognitive aspects" (ref. 2), 411–13. In the light of this evidence we can also imagine the Chalcatzingo jaguar in the role of psychopompus, associated, like the much later Xolotl, both with the evening manifestation of Venus and with fertility (*cf. supra*: F). The intrinsic iconographic context on Relief 4, including human figures and vegetation symbols, seems to suport such a hypothesis.
253. Thompson, *Maya hieroglyphic writing* (ref. 18), Fig. 7: 59, 60.
254. Joralemon, *Olmec iconography* (ref. 239), 45.
255. Justeson *et al.*, *op. cit.* (ref. 244), 35.
256. Aveni *et al.*, "The Caracol tower" (ref. 9), 980, Table 1, Figs 2, 4–6; Aveni, "Possible astronomical orientations" (ref. 9), 178–82, Table 4.
257. Aveni, "Possible astronomical orientations" (ref. 9), 184f, Fig. 6, Table 5.
258. *Ibid.*, 183.
259. Ivan Šprajc, "Cehtzuc: A new Maya site in the Puuc region", *Mexicon*, xii (1990), 62–63.
260. Aveni, "Possible astronomical orientations" (ref. 9), 184.
261. *Ibid.*, Table 5.
262. Aveni's value (*ibid.*, 188, Table 5) for the azimuth of the line from the central doorway of the Governor's Palace to the mound on the southeastern horizon is 118°13′. According to my own transit readings, taken both from Uxmal and from Cehtzuc, the azimuth of this line is 117°35′, whereas the value 118°13′ corresponds rather to the line from the northeastern corner of the Palace to the main pyramid of Cehtzuc.

    In his extensive discussion of the Puuc chronology, Kowalski dates the Governor's Palace to around A.D. 900; Jeff Karl Kowalski, *The House of the Governor: A Maya palace of Uxmal, Yucatan, Mexico* (Norman and London, 1987), 51. At that time the maximum northerly declination attained by Venus was 26°54′, corresponding on the latitude of Uxmal to the azimuth of 299°04′ (in all azimuth-declination conversions in this paper, horizon altitudes and refraction were taken into consideration). It means that Venus at its maximum northerly extreme, observed from the main pyramid of Cehtzuc, would have set a trifle north of the northern edge of the Palace (the error would have been smaller a few decades before A.D. 900). But since the angular width of the Governor's Palace, viewed from Cehtzuc, is 1°15′, Venus could have been seen setting behind the Palace whenever it had a declination of at least 24°56′; the phenomenon could have been observed,

occasionally during a span of a few days, at two or three of the five northerly extremes of the evening star visible in one 8-year cycle (*cf.* Table 1).

The importance of the alignment from the main pyramid of Cehtzuc to the northern edge of the Governor's Palace is perhaps intimated by the fact that this direction (298°13′) is exactly perpendicular to the façade of the Palace which, according to both Aveni & Hartung and my own measurements, aligns 28°11′; A. F. Aveni and H. Hartung, *Maya city planning and the calendar* (*Transactions of the American Philosophical Society*, lxxvi, part 7; Philadelphia, 1986), 31, Fig. 6c.

On the other hand, the significance of the line from the central doorway of the Palace to Cehtzuc (117°35′) cannot be denied, since it is highlighted by the two central altars in front of the building: both are skewed counterclockwise with regard to the Palace, and situated along the line toward the Cehtzuc pyramid. The same direction is also embodied in the orientation of the two earlier Chenes structures behind the Governor's Palace, i.e. on the west edge of the great platform, and, furthermore, in the orientation of the Great Palace (also facing southeast) at Santa Rosa Xtampak, a Chenes site in Campeche; Anthony F. Aveni, "Archaeoastronomy in the Maya region: 1970–1980" in *Archaeoastronomy in the New World*, ed. by Aveni (ref. 154), 1–30, p. 14.

263. Aveni and Hartung, *Maya city planning* (ref. 262), 31.

264. *Ibid.*

265. Observed from Cehtzuc, Venus as evening star would have reached the northern edge of the Palace only at the maximum extremes, recurring every 8 years (see above, ref. 262).

The only other Maya buildings possessing the Chac masks with the star glyphs seem to be the Nunnery at Chichén Itzá, and the eastern structure of the Nunnery and the Chenes temple of the House of the Magician at Uxmal; the huge mask on the latter is unique in that it also bears the numerals 8 below the eyes.

266. H. E. D. Pollock, *The Puuc: An architectural survey of the hill country of Yucatan and northern Campeche, Mexico* (*Memoirs of the Peabody Museum*, xix; Cambridge, Mass., 1980), 263, Figs 458, 460–3.

267. The alignment agrees equally well, i.e. with the same margin of error ($\pm 1°$), with southern/northern major lunar standstills on the eastern/western horizon.

268. H. E. D. Pollock, "Architectural notes on some Chenes ruins", in *Monographs and papers in Maya archaeology*, ed. by W. R. Bullard (Papers of the Peabody Museum of Archaeology and Ethnology, 61; Cambridge, Mass., 1970), 1–87, pp. 45f, Fig. 54.

269. I was not able to determine the accurate orientation, since the measurable walls of this tower-like structure are relatively short. If Venus orientation is involved, it could only function in relation with some other building, placed in the required direction to make up for an alignment appropriate for observations.

270. Thompson, *Ethnology of the Mayas* (ref. 93), 63. A local informant said, however, that the site owes its name to the bulbous eyes of the face that was modelled in stucco on Structure 1 (Pollock, "Architectural notes" (ref. 268), 44, Fig. 53), now ruined.

271. María Teresa García García, *Huexotla: Un sitio del Acolhuacan* (Mexico City, 1987), 79, Foto 4.

272. Leopoldo Batres, *Mis exploraciones en Huexotla, Texcoco y montículo de "El Gavilán"* (Mexico City, 1904), 6.

273. This corresponds to the declination $-24°22'$, taking 19°28′10″ for the latitude of the site, considering the horizon altitude of 5°37′ and allowing for refraction.

274. García G., *op. cit.* (ref. 271), 82, 100.

275. H. E. D. Pollock, *Round structures of aboriginal Middle America* (Carnegie Institution of Washington, Publ. 471, 1936), 159ff, and 147, Table 5.

276. Batres, *op. cit.* (ref. 272), 6.

277. *Ibid.*, 15.

278. Carmen Cook de Leonard, "Las almenas de Cinteopa", *Cuadernos de arquitectura mesoamericana*, iv (1985), July issue, 51–56, Figs 1 and 2.

279. Arturo Ponce de León H., "Fechamiento arqueoastronómico en el altiplano de México", in *Calendars in Mesoamerica and Peru*, ed. by Aveni and Brotherston (ref. 2), 73–99; Franz Tichy, "El patrón de asentamientos con sistema radial en la meseta central de México: ¿'sistemas ceque' en Mesoamérica?", *Jahrbuch für Geschichte von Staat, Wirtschaft und Gesellschaft Lateinamerikas*, xx (1983), 61–84; A. F. Aveni, E. E. Calnek and H. Hartung, "Myth, environment, and the orientation of the Templo Mayor of Tenochtitlan", *American antiquity*, liii (1988), 287–309.

280. John B. Carlson, "A geomantic model for the interpretation of Mesoamerican sites: An essay

in cross-cultural comparison", in *Mesoamerican sites and world-views*, ed. by E. P. Benson (Washington, 1981), 143–215.

281. Broda, "El culto mexica" (ref. 44); *eadem*, "Templo Mayor" (ref. 47); *eadem*, "Cosmovisión y observación de la naturaleza: El ejemplo del culto de los cerros en Mesoamérica", in *Arqueoastronomía y etnoastronomía en Mesoamérica*, ed. by Broda *et al.* (ref. 13), 461–500. Specifically, we know that Pico Tres Padres was of foremost importance for the Mexica. In the month Atlcahualo children were sacrificed on various hills in the Valley of Mexico; one of them was Quauhtépetl, which can be identified with Pico Tres Padres: Sahagún, *Historia general* (ref. 45), p. 98, B. 2, ch. 20; Broda, "Las fiestas aztecas" (ref. 44), 273; *eadem*, "The sacred landscape of Aztec calendar festivals: Myth, nature, and society", in *To change place: Aztec ceremonial landscapes*, ed. by D. Carrasco (Niwot, Col., 1991), 74–120, pp. 84ff. Both the mountain group dominated by Pico Tres Padres and the suburb south of it are still called Cuauhtepec by the locals. Fragments of prehispanic pottery found on top of the mountain, as well as piles of stones visible on a plain near its summit, corroborate the historical reports. The place was already recognized as an archaeological site by William T. Sanders, Jeffrey R. Parsons and Robert S. Santley, *The basin of Mexico: Ecological processes in the evolution of a civilization* (New York, San Francisco and London, 1979), Map 18. It is likely that the Aztecs inherited the ritual importance of the mountain from their predecessors. If the rain-making ceremonies on this spot were already common during the period of the early settlement at Huexotla, they may have had a connection with Venus maximum northerly extremes which, observed from El Circular in the direction of Pico Tres Padres, heralded the onset of the rainy season.
282. Horizon altitudes are 5°50′ (east) and 0°44′ (west).
283. To the east the axis goes over Mt Tláloc, but considerably north of the peak. Nevertheless, the dates marked by this direction (10 February and 1 November) may well have been important, too, as they are indicated by 'east-working' alignments on some other sites in central Mexico.
284. Anthony F. Aveni and Horst Hartung, "Los observatorios astronómicos en Chichén Itzá, Mayapán y Paalmul", *Boletín de la Escuela de Ciencias Antropológicas de la Universidad de Yucatán*, vi, no. 32 (1978), 2–13, p. 7.
285. *Ibid.*, 11, Fig. 5.
286. Seler, *Códice Borgia* (ref. 117), ii, 117.
287. Pollock, *Round structures* (ref. 275), 160.
288. Closs *et al.*, "The planet Venus" (ref. 3).
289. Anthony F. Aveni and Horst Hartung, "Investigación preliminar de las orientaciones astronómicas de Copán", *Yaxkin*, i, no. 3 (1976), 8–13, p. 11; Anthony F. Aveni, "Concepts of positional astronomy employed in ancient Mesoamerican architecture", in *Native American astronomy*, ed. by Aveni (ref. 183), 3–19, p. 13, Fig. 1.6.
290. Closs *et al.*, "The planet Venus" (ref. 3), 235f, and 239–41, Table 1.
291. Ivan Šprajc, "Venus and Temple 22 at Copán: Revisited", *Archaeoastronomy: The Journal of the Center for Archaeoastronomy*, x (in press).
292. Wisdom, *op. cit.* (ref. 22); Closs *et al.*, "The planet Venus", 226.
293. The correspondence is not so close, however, as it might appear at a first glance, since all the dates on Figure 10 are Julian and, accordingly, the setting sun in the eighth century faced the mid-line of the window on approximately 8 April and 28 August, Julian.

    It seems as if one of the window's functions, perhaps the most important one, was to provide a sighting aid for locating Venus at its first visibility after superior conjunction: the planet appeared very close to one of the limiting lines of the window's viewing angle, and moved out of it within two days or so (see Figure 10).
294. Šprajc, "Venus and Temple 22" (ref. 291).
295. William L. Fash, Jr, "A new look at Maya statecraft from Copan, Honduras", *Antiquity*, lxii (1988), 157–69, p. 160; Rudy Larios and William Fash, "Architectural history and political symbolism of Temple 22, Copán", paper presented at the Septima Mesa Redonda de Palenque, Mexico (June 1989).
296. Aubrey S. Trik, "Temple XXII at Copán", *Contributions to American anthropology and history*, no. 27 (Carnegie Institution of Washington, Publ. 509, 1939), 81–103, p. 92, Figs 1, 4, 5; Hasso Hohmann and Annegrete Vogrin, *Die Architektur von Copán (Honduras)* (Graz, 1982), 80, Plan X, Figs 314, 316.
297. Hohmann and Vogrin, *op. cit.* (ref. 296), 50.
298. Larios and Fash, *op. cit.* (ref. 295).
299. Lounsbury, "Astronomical knowledge" (ref. 154), 154f.

300. Schele and Miller, *The blood of kings* (ref. 201), 123f.
301. Lounsbury, "Astronomical knowledge" (ref. 154), 155.
302. Recently Baudez rejected the astronomical interpretation of the window, arguing that the view through it was blocked by Structure 22A; Claude F. Baudez, "Archaeoastronomy at Copan: An appraisal", *Indiana*, xi (1987), 63–71. It is now clear that Temple 22A post-dates Temple 22 by nearly 80 years, during which time, as Larios and Fash, "Architectural history" (ref. 295), pointed out, ample observations of the evening star could have been made. Even if the window was added later and used under Yax Pac's regency and/or reign, the observations were still possible during a few decades, roughly corresponding to the time-span employed in Figure 10.
303. Thompson, *Ethnology of the Mayas* (ref. 93), 63.
304. Bryant Tuckerman, *Planetary, lunar, and solar positions: A.D. 2 to A.D. 1649* (*Memoirs of the American Philosophical Society*, lix; Philadelphia, 1964); Aveni, *Skywatchers* (ref. 8), 104.