Michael P. Closs – Anthony F. Aveni – Bruce Crowley

The Planet Venus and Temple 22 at Copán

La importancia que tenía Venus para los antiguos mayas es bien conocida. Sin embargo, ¿Qué razones básicas pueden aducirse para el lugar destacado que ocupa en la mitología maya? Este estudio ofrece una respuesta parcial. Discute la orientación de Venus en la arquitectura maya, la iconografía del Templo 22 de Copán, las apariciones de Venus por la inusitada ventana en el muro occidental de este templo, la mitología asociada con Venus, y los datos ethnohistóricos concernientes al ciclo agrícola de los mayas. Usando el Templo 22 como nexo, el presente trabajo reune el material obtenido de estas diversas fuentes en un todo cohesivo. Al proceder de este modo, hemos revelado también uno de los papeles cosmológico-míticos más significativos de Venus en el mundo maya.

VENUS AND THE MAYA

Of all the objects in the heavens none was paid more attention by the Maya than the planet Venus. The Venus table in the Dresden Codex reveals that these people kept close watch on the planet, tracing its heliacal rise to an accuracy of one hour in 400 years (Thompson 1972, Closs 1977). When the planet made its first appearance in the pre-dawn sky, its dazzling rays penetrated the earth. Pictures in the Dresden reveal manifestations of the Venus god spearing his victims with arrows which symbolize the first rays of Venus. Speared victims and attendant ritual cere-

INDIANA 9 (1984): 221-248
ISBN 3-7861-1312-2
Ibero-Amerikanisches Institut, Stiftung Preußischer Kulturbesitz

monies are also depicted. The Venus symbol is prevalent in the Maya inscriptions, both in the codices and in stone.

It is perhaps the cyclical nature of the motion of Venus which attracted the Maya more than its sheer brilliance. By a coincidence of celestial mechanics the most easily observed cycle of the planet meshes with the tropical year in simple whole number ratio. We see Venus swing back and forth relative to the sun, as though the two were attached. For about nine months it stands in the morning sky above the place where the sun will rise moving slightly farther away from the sun on successive days. When it reaches its limit of 46° from the sun, it retreats toward the sun again. After being lost in the solar glare for several weeks the planet reappears for an additional 9-month period, behaving the same way as it did as "morning star" except that it executes its celestial manoeuvers in the west after sunset. As it slowly approaches the sun again, Venus becomes more difficult to see, remaining visible after sunset for ever shorter intervals. Finally, it comes too close to the sun to observe and disappears into the sun's light. After a week, the watchful observer can glimpse its first rays for a few fleeting moments in the moring sky – heliacal rise.

The entire cycle averages 584 days and 5 such oscillations are almost exactly equivalent to 8 seasonal earth years. This means that any aspect of Venus once viewed is bound to recur at about the same calendar date 8 years later. The Venus tables in the Dresden Codex, in fact, are arranged in rows, each consisting of 5 periods of 584 days. This format indicates that the 8-year cycle of Venus was a very important period for Maya astronomers.

While Maya calendrices were employed in a historical capacity, they were also used for astrological, numerological and agricultural purposes. The Maya were necessarily concerned with the incorporation of nature's fundamental periods into an ordered temporal whole. We can think of the great Maya time machine as being composed of many cycles, each containing a pre-ordained number of days that the astronomer-priest sought to fit together in perfect harmony. Only then could the music of the spheres be heard in the domain of human affairs.

Modern computations of the motion of Venus reveal that beyond the basic 584-day "Venus year" the movement of the planet, as viewed from the earth frame of reference, can be quite complicated. Watched closely, however, the apparent celestial meanderings can be broken down into a series of repeatable phenomena which could have been of considerable use to ancient calender-keepers. Since there is considerable evidence that ancient Mesoamerican astronomers observed events on the local horizon (Aven 1977), it would be logical to open any investigation of Venus astronomy by asking the question: What does Venus do on the horizon

of Yucatan? Since it always seems attached to the sun, never moving more than a few degrees out of the plane of the ecliptic, the planet can be expected to rise and set near the place where the sun rises and sets on a given day. Therefore, like the sun, its extreme rise and set points can be expected to undergo an annual oscillation of amplitude about 25° either side of the east-west line. But over longer periods of time minor oscillations of Venus north and south of the ecliptic stretch the extremes a little beyond those which the sun attains. The difference provides a logical oberservational test for Venus-watching as opposed to sun-watching. If the Maya were creating special alignments to mark the swing positions of Venus along the horizon, the arrangement ought to deviate by a significant amount from a solar alignment.

It happens that some of these extremes are greater than others. We shall call the "great extremes" those which deviate by the widest margin from the solar extremes. Actually, Venus surges through a number of 8-year oscillations of varying amplitude on the horizon. If an observer marks a Venus great extreme on the horizon, he finds that almost precisely the same event is attained 8 years later. After 16, 32, and 64 years, a given great extreme is still quite recognizable, though it may occur a few minutes of arc away from the original one. About 2 centuries later, that great extreme begins to fade, though it is continually replaced by others which might occur in different seasons of the tropical year. The absolute maximum extreme attainable in any given period also fluctuates with time thus making the situation quiet complicated. Yet from a purely observational point of view, extrema and their cycles are quite easily witnessed if one is conscious of the sky.

To illustrate both the complexity and the inherent simplicity of the situation, the last column of Table 1 lists the dates for two sets of Venus great extremes, here defined as the midpoint of a period of time during which Venus attains a declination in excess of |25 1/2°|. The data apply to the period A.D. 700 – 900, when Maya culture in the Central Peten was quite active. The calculations were made from Tuckerman's (1964) tables. Our precision is limited only by the accuracy with which the tables can be read, which is at least as precise as the Maya could have observed the planet.

Note how remarkably anchored within the seasonal year these phenomena remain. Cycle A, occuring around the 1st of May at the beginning of the 8th century shifts slightly backward into mid-April before it becomes indistinguishable by the middle of the ninth century. Cycle B, consisting of mid-May events at 8-year intervals becomes more pronounced in the ninth century. By the beginning of the 10th century, when we stopped following it, the Venus extreme was taking place at the

end of April. These events are readily noticeable and would be especially significant in a horizon-conscious astronomical system.

We find strong evidence that the Maya were actually watching Venus extremes in two instances (Aveni 1975; Aveni, Gibbs and Hartung 1975):

(1) At Uxmal the Palace of the Governors is situated on an artificial terrace skewed 20° out of line with the other buildings at the site. Its main axis points to the southerly extreme of Venus about AD 800 when the complex was built. The sight line also passes over the main pyramid at the ruins of Nohpat 6 km away, which we expect the Maya deliberately built there because they believed the celestial motions pre-ordained it.
(2) At Chichen Itza several significant alignments in the Caracol mark the northern and southern extremes of Venus during the period A.D. 800 – 1000 when the structure was erected. These alignments were doubly convincing because they occur in a round tower, the form of which is known to have been associated with Quetzalcoatl, and they were erected at about the same time and in about the same place as the Dresden Codex originated.

The existence of such alignments lends support to a further search for Venus extremes in Maya architecture.

TEMPLE 22 AT COPAN

Temple 22 at Copan which contains Venus symbols on the high reliefs sculptures which adorn its inner doorway (see Figs. 1 and 2), was thoroughly excavated in the 1930's by A. Trik (1939). It is among the few buildings in ancient Mesoamerica to possess a window (see Fig. 3). The aperture, of dimensions 70 × 15 cm., is located on the west side of the building. Viewed from the rear of the chamber which houses it, the window subtends an angle of 5° (see Fig. 4). A. Aveni and H. Hartung (1976) determined that this direction is virtually parallel to the astronomical baseline connecting Stelae 12 and 10 at Copan. Following Morley (1926; Morley and Brainerd 1956: 132 f.) they assumed that the primary purpose of the window was to sight the setting sun on April 12, at the same time priests on the eastern side of the Copan valley at Stela 12 viewed the sunset behind Stela 10 some 7 km away. Because the milpa agricultural practice of burning the old vegetation was and still is initiated about mid-April, prior to the coming of the rainy season, it seemed logical to associate the solar alignment in the window with the termination of the dry season.

After the publication of the preliminary report of Aveni and Hartung (1976) on astronomical orientations at Copan, Closs suggested that the

symbolism on Temple 22 pointed to additional associations of the agricultural cycle with Venus and the rainy season.

An inspection of photographs and drawings of the interior doorway of the temple (Fig. 1; Maudslay 1889 – 1902, I: pls. 12 – 15; Trik 1939: Fig. 5, pls. 12 f.) shows human figures crouched and seated on either side of a bench forming the floor of the doorway and its interior room. The bench contains a hieroglyphic text between large skulls at each end. The crouching figures support a bicephalic monster with infixed Venus sign on the west head (the window side) and *kin* (sun) sign on the east head. The body of the monster is serpentine on either side of the doorway but over its central span consists of a series of S-shaped and reverse-S-shaped symbols in which small human figures are intertwined. Venus glyphs are attached to each side of the serpent body.

J. Eric S. Thompson (1970: 278) has proposed that the crouching human figures at each side of the doorway are Bacabs. They are recognized by netted headdresses with a central knot or medallion. One of the roles of the Bacabs is to support the sky so that it does not fall, a role which the figures on Temple 22 seem to be fulfilling. The netted headdress is characteristic of an important underworld deity known as God N. Evidence that God N may be identified with Pauahtun, a god frequently mentioned in colonial Yucatec sources, has been provided by M. D. Coe (1973: 14 f.). The two interpretations are not necessarily mutually exclusive since some Maya gods have several names and titles as well as many functions. The possibility that the Bacabs and Pauahtuns are the same is suggested by Bishop Landa (Thompson 1970: 255) who does not distinguish between them. In fact, he regards them as equivalent to the Yucatecan rain gods, the Chacs. There is also other evidence, cited by Thompson (1970: 255), linking the Pauahtuns with the Chacs:

(1) In the writings, dated 1813, of Granado de Baeza, cura of Yaxcaba, The Pauahtuns are called Pahahtuns and are said to be rain deities.
(2) According to *hmen* informants of R. Redfield and A. Villa Rojas, c. 1934, Pahuatun (sic) is an alternative name for Chac.
(3) In Quintana Roo, Villa Rojas, c. 1945, noted that the forms Papatun and Babatun occur and are regarded as alternative names for the Chacs.

The bicephalic monster spanning the doorway belongs to a class of celestial monsters of which Thompson (1939: 154 – 156) writes "there can be little doubt of the intimate connection between these celestial monsters and water symbolism". The aquatic symbolism of the Copan monster is heightened by some additional factors.

First we may note a special connection the Copan doorway has with the doorway of Palace House E at Palenque. L. Schele (1976: 20) writes:

"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."

She adds that the body of the monster at Palenque is composed of a sky band, possibly representing planets and stars, in which case it is associated with phenomena of the night sky. The aquatic connection of the Palenque monster is particularly emphasized by the fact that water falls from each of its heads.

A second distinctive aspect of the Copan sky monster is the presence of a clearly delineated serpentine section to its body. This rare feature recalls the sky Chicchans of the Chorti Maya of eastern Guatemala. These are giant snakes set at the four world directions and are gods of rain, thunder and lightning. They are close relatives of the Chacs. In fact, the features of the Chacs are believed to be derived from those of snakes. In the Maya codices, Chac's head is sometimes attached to the body of a serpent and sometimes Chac is shown riding astride a serpent. Thompson (1970: 269) considers that the rain cult, with world color and directional features and with quadripartite deities deriving from or fused with snakes, had developed in all its essentials by the end of the Maya Formative period.

The Chicchan deities of the Chorti have a special significance here because, prior to their conquest by the Spaniards, the Chorti occupied a region which included the locale of which ancient Copan was the culture centre. Thompson (1938: 584 f.) has suggested that the present day Chorti may well be descendents of the inhabitants of Classic period Copan. C. Wisdom (1940: 392 – 394) describes the Chicchan(s) as the most important of the native Chorti deities. He notes that Chicchan "may have the giant form of an ordinary snake; or his upper body may be that of a man while his lower body is that of a feathered snake; or he may be a gigantic man appearing like a snake to people". The "feathered snake" attribute or guise of Chicchan suggests that he may be related to Quetzalcoatl (Kukulcan), the Feathered Serpent, a possible equivalence also posited by Wisdom. Since Quetzalcoatl has connections with both the rain and Venus (of which more will be said later), this hypothesis may account for the presence of Venus glyphs on the body of the Copan monster. It also enhances the possibility of a direct relationship between the Copan monster and the Chorti Chicchan deity.

Finally, it may be noted that the S-shaped symbols forming that part of the monster's body above the doorway are in all probability water symbols. The best evidence for this is seen on a polychrome vase, Dumbarton Oaks 11 (Coe 1975: 19 – 21), which has a representation of the same S-shaped symbol as is found at Copan. The symbol is depicted submerged in water and is found adjacent to an Imix Crocodile, an ophidian deity. Further support for the notion that it is a water symbol comes from Coe's indentification of it as a stylized shell.

We now turn to the sculptured elements on the exterior of Temple 22. Trik (1939: 100) observed that the "entrance doorway to the temple was treated in the form of a serpent's mouth". We have already commented on the connection of snakes with water. That such an association is applicable here is suggested by the large masks which face the doorway on each side (Trik 1939: pl. 116). The masks are almost certainly heads of frogs. Frogs have an intimate connection with the rain gods and are known as the musicians and guests of the Chacs (Thompson 1970: 258). On Madrid 31a frogs labeled with the four world directional glyphs are spewing forth water and surround an image of Chac from whose lower quarters pours a stream of water. The masks facing the doorway also contain Cauac markings, symbolic of rain and storm. It is interesting to note that among the modern Chorti, frogs are still vaguely associated with water and rain (Wisdom 1940: 389).

The four corners of Temple 22 have long-nosed masks set into the walls at a 45° angle. These masks are conventionally called Chac masks because their long noses closely resemble the pendulous snout of Chac as he is shown in the codices. This is especially true of the masks on this temple. That the masks, in this instance, are indeed Chac masks is further suggested by the presence of Cauac elements on them.

Among the most outstanding sculptural forms on the temple are life-sized figures consisting of head and torso which A. P. Maudslay regarded as "singing girls". Maudslay found evidence that three such figures standing out in full relief from the waist upwards had been ranged along the upper part of the west wall. Trik (1939: 102) writes: "The number of heads that have been found in the debris and near Temple 22 suggests that these figures were used as an upper zone decoration all around the building." It is now known that these figures represent the young maize god (Thompson 1970: pl. 13; Trik 1939: pls. 14 f.).

The above analysis of the ornamentation of Temple 22 leads to the conclusion that it was dedicated to the young maize god and the coming of the rains. As such, the temple has an agricultural focus and, moreover, can be related to specific seasonal events in the agricultural year. Indeed,

the coming of the rains and the planting of the new maize occurs in late April and early May throughout most of the Maya area.

Temple 22 stands in the middle of the terrace on the north side of the Eastern Court of Copan. S. G. Morley (1920; 10 f.) has characterized the Eastern Court as "the center of religious life of the city" and Temple 22, in particular, as "the most important religious structure in the city". His views were prompted by the concentration of buildings in this court and by the magnificence of Temple 22. It may now be added that these views are in accord with the grand agricultural theme of Temple 22.

It is of interest to note that east of Temple 22 and arranged around the northeast corner of the court are Temples 21a, 21, and 20. The walls of Temple 21a abut against those of the substructures of Temples 21 and 22, the nature of the contact indicating that it is the most recent of these three. At the threshold of the inner doorway of Temple 21a there is a sculptured step with a single band of glyphs interrupted by three large Venus symbols. Morley (1920: 319) has used a period ending date to fix its chronological position at 9.17.0.0.0 in the Long Count.

As pointed out above, the inner doorway of Temple 22 is dominated by a two headed monster whose west head is marked with a Venus glyph and whose east head is marked with a sun glyph. These labels indicate that the celestial monster embodies some form of Venus-sun duality. Nevertheless, the Venus element is emphasized in this case by additional Venus glyphs on the monster's serpentine body. If, as posited earlier, the Copan monster is related to the great Chicchan deity of the Chorti with its possible Venus affiliations, there is further reason to attribute some Venus connection to the former. Finally, the three prominent Venus glyphs in the inscription of the abutting Temple 21a argue that the structure clustered in this part of the Eastern Court may have a special relationship to Venus.

The presence of overt Venus symbolism in the iconography of Temple 22 and the fact that additional Venus associations are plausible in that context, suggest that Venus may be a part of a complex including the new maize and the coming of the rains.

VENUS, THE NEW MAIZE AND THE COMING OF THE RAINS

The most ancient and widespread Venus cult in Mesoamerica is that of the Feathered Serpent.

The cult of the Feathered Serpent can be traced back to Olmec times (Joralemon 1971: 82 – 84) but there is no evidence that it was at that time linked to the worship of Venus. The Feathered Serpent also appears

in the art of Teotihuacan as an adjunct of Tlaloc, the god of rain and lightning, and is closely connected with rain and vegetation. N. Davies (1977: 57 – 62) reviews previous studies relating to the presence of a Quetzalcoatl cult at Teotihuacan. He does not believe there is sufficient evidence to link the Feathered Serpent there with Quetzalcoatl in his identiy as Tlahuizcalpantecuhtli, god of Venus as the Morning Star. Instead, Davies (1977: 63 – 69) places the origins of the Quetzalcoatl Venus cult in the great periods of El Tajin and Xochicalco, almost contemporaneous with the decline and fall of Teotihuacan and the beginnings of the Late Classic Maya period. In the Thompson correlation (correlation constant = 584,283) this period is dated as A.D. 650 – 750. The data from Xochicalco demonstrates that by this time, at the latest, the marriage of the planet Venus and the Feathered Serpent had been consummated. Piña Chan (Davies 1977: 67) emphasizes the importance of the Xochicalco stelae 1, 2, and 3 in providing representations of Quetzalcoatl as the Morning Star. It is also interesting to note his insistence that the major part of the offerings associated with the main temple of Xochicalco come from the Gulf Coast, principally from the Maya area. It is also apparent from the Xochicalco material that Quetzalcoatl is closely tied to Tlaloc. Thus, in his earliest manifestation as a Venus god, the Feathered Serpent is still associated with the rain.

In later ages Quetzalcoatl was to assume a plethora of functions, as befits a deity with such ancient origins. His cult was to spread among the Zapotecs, Mixtecs, Toltecs, Huastecs, Aztecs and Mayas, yet his origin as a rain god was never far from view.

Thompson (1971: 134) considered that the later Quetzalcoatl was "primarily the deity of fresh vegetation, of growth when the rains come". His view is derived from an analysis of the Song to Xipe Totec, the Aztec god of spring. The following fragment of the song (Caso, 1958: 75 – 76) is of particular interest:

> Oh, my god, thy water of precious stones
> Has fallen;
> The tall cypress
> Has changed into a quetzal bird.
> The fire serpent
> Has been changed into a plumed serpent.
>
> The fire serpent has left me go free.
> Perhaps he will disappear,
> Perhaps he will diappear, and I will destroy myself,
> Like unto the precious jade
> My heart is green;

But I shall yet see the gold
And I shall rejoice if it has ripened
If the leader of the war is born.

The song is an invocation to the god of spring requesting rain (the water of precious stones) so the cypress will become green (like the quetzal bird) and the dry season (fire serpent) will be transformed into the rainy season (plumed serpent). With the disappearance of the dry weather and the coming of the rains, the tender young (green) maize appears and holds forth the promise of the ripe golden maize to come. In this analysis, unlike that of Thompson, the Plumed Serpent symbolizes the coming of the rains and not the fresh vegetation. The fresh vegetation is represented by the quetzal bird and quintessentially by the new maize. This song fragment exemplifies the idea of a Venus (Plumed Serpent)-maize-rain complex at the heart of the agricultural cycle.

Quetzalcoatl is known to the Quiche Maya of the Guatemalan highlands under the name of Q'uq' Kumatz. In addition, he is to be identified with the Quiche god Tohil, as is made clear in the "Popol Vuh" (Edmonson 1971: 183).

Tohil is the god of the ninth day of the calendar, Rain, and his name is translated as "Storm" or "Thunder". Therefore, among the Quiche the association of Quetzalcoatl with the rains has been maintained. This connection was also maintained elsewhere in the highlands as is shown by passages in "The Annals of the Cakchiquels" (Recinos, Chonay, and Goetz 1953, 59, 76).

The most detailed information available on traditional Maya beliefs concerning Venus comes from the Kekchi, Kekchi-Chol and Mopan Maya of Southern and Central Belize (Thompson 1930). In this region Venus is known as Xulab, Noh Ich or Nohoch Ich, the latter two names meaning "Great Eye", and he is ranked next to the Christian God in power. He is the patron of agriculture, hunting and fishing. However, he delegates his authority to his servants the Mams. The Mams are recognized by the Mopan as equivalents of the Yucatecan rain gods, the Chacs. Thus, the ultimate power over the rains is implicitly held by Venus and the rain gods are his servants.

The relationship between Venus and the rains is also revealed in the story of a dispute the sun had with the clouds (Thompson 1930: 159 f.). The clouds maintained that they caused the rain when they formed themselves. The sun denied that they caused the rain, as without his permission they could not cross his face. The sun was so annoyed that he refused permission to the clouds to cross the heavens. As a result there was a terrible drought, and the people began to die of famine. At the con-

clusion of the tale, the people received rain, having followed instructions sent by Mam, and the sun made his peace with the clouds. "I now see," the sun said, "that I am not quite so powerful as you. In a few minutes your clouds covered the sky, and made it so that I could not see anything. You will be my elder brother." The last statement is very significant since Lord Xulab, the planet Venus, is the elder brother of Lord Kin, the sun (Thompson 1930: 120).

Further evidence to support the Venus-Cloud equation can be derived from the Maya story in which Sun suspects that Moon is having an affair with Venus. A Kekchi version of this tale has Cloud as the suspected adulterer. (Thompson 1939: 169 – 170 and 1971: 230).

The equating of the rain clouds with Venus recalls a similar concept among the Huicholes where rain clouds are considered to be plumed serpents (Davies 1977: 56).

There is also evidence in the codices linking Venus and the rain. Lahun Chan, the manifestation of Venus as Morning Star on Dresden 47, is depicted with the nose of the rain god Chac. God L, the manifestation of the Morning Star on Dresden 46, appears as a protagonist in the celestial downpour scene on Dresden 74. 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.

The Venus-maize-rain complex appears in its entirety in myths relating to the discovery of maize. A description of this all important event, from the Mexican plateau, is given in the "Leyenda de los soles" (Thompson 1970: 348). The source relates that Quetzalcoatl asked the ant, who is credited with the initial discovery of maize, where he obtained the maize which he was carrying. Upon receiving the information, he transformed himself into a black ant and accompanied his informant to the deposit of maize secreted beneath a mountain. He then took some grains and carried them to the other gods in Tamoanchan. Eventually the mountain was broken open by Nanahuatl and the grain was secured. Subsequently it was stolen by the Tlalocs.

Thompson (1930: 140) also gave another description of this myth taken from the "Anales de Cuauhtitlan". The only difference with the above is that Xolotl, the god of Venus as Evening Star, splits open the mountains rather than Nanahuatl. Thompson (1971: 79) writes elsewhere that there is a close relationship between Xolotl and Nanauatzin. He notes that one can be substituted for the other in the series of days and weeks and that the two are confused in mythology. He considers that Nanuatzin is merely a variant of Xolotl.

The Mopan and Kekchi also attribute the initial discovery of maize to the ants. The ants supplied the other animals with maize taken from

beneath a great rock but soon could not keep up with the demand. The problem was overcome by Yaluk, the greatest of the Mams, who hurled a thunderbolt at a spot on the rock indicated by a woodpecker and thereby shattered it. Once the maize was freed, most of it was stolen by the other Mams (Thompson 1970: 349 – 350).

The Bachajon-Tzeltal have a similar myth of the finding of the maize. It is a large black ant *(xolop)* who is first seen carrying maize. After some persuasion the ant reveals the source of the maize within a rock. Following some initial assistance from a woodpecker, the red Chahuuc, one of the Tzotzil rain gods, split the rock open with lightning. When the maize had been freed, most of it was stolen (Thompson 1970: 351 f.).

The Tzeltal of Tenejapa say that God took maize from the ants who had obtained it from the Anheles (Thompson 1970: 352). The Anheles are again Tzotzil rain gods.

All of these myths involve ants, maize and the corresponding regional rain gods. In particular, the Mexican version informs us that Quetzalcoatl became a black ant. Thus at the core of the myth we are provided with the allegory ant-maize-rain gods for Venus-maize-rain gods. There is additional support for this allegory. In the Bachajon-Tzeltal version we are told that the black ant is called *xolop.* This is probably cognate with Yucatec *xulab,* also a species of ant. We recall that Xulab is the name of the Mopan and Kekchi Venus god.

Venus is also associated with the maize by virtue of sharing the same day name in the 260-day calendar. The Aztec god of maize, Centeotl, has the day name One Flower. The corresponding day in the Maya calendar is One Ahau. Now, 1 Ahau (Hun Hunahpu) is an important mythical character in the "Popol Vuh", who, after his death and resurrection, becomes the Morning Star (Edmonson 1971: 143 f.). It may also be noted that 1 Ahau is the base date for Venus calculations in the Dresden Codex.

D. Kelley (1965: 108 – 110) has suggested that 1 Ahau and 1 Flower may be one and the same god. In defense of this identification he refers to a stylized 1 Ahau which is directly above the head of the maize god on the tablet from the Temple of the Foliated Cross at Palenque. In addition, M. Cohodas (1976: 160) comments that the Maya maize god is patron of the number 8, the number of days Venus spends in the underworld before its rebirth as morning star. He also notes that the Aztec ceremony celebrating the completion of the Venus-solar cylcle of $5 \times 584 = 8 \times 365$ days is dedicated to the rejuvenation of the maize. The 8 years required for the Venus cycle to harmonize with the agricultural year, once again recalls the maize god's patronage of the number 8.

The above considerations indicate profound relationships between Venus and the rains and between Venus and the maize. We have seen that

a Venus-maize-rain complex appears in the Song to Xipe Totec as well as in the mythology relating to the discovery of maize. This same complex finds an architectural realization in Temple 22.

A COSMOLOGICAL REALITY

The Song to Xipe Totec, the myths of the discovery of maize and the iconography of Temple 22 all suggest that the Venus-maize-rain complex is connected with the new maize and the coming of the rains. The beginning of the rainy season is the single most important climatic factor in the agricultural cycle of the Maya. Its actual occurance is variable from year to year and region to region, but its ritual celebration is not. S. G. Morley and G. W. Brainerd (1956: 134) write: "Planting is begun immediately after the first rains, which all Maya believe will fall on the Day of the Holy Cross (May 3)." While this is something of an overstatement, it seems to be generally applicable in the Maya lowlands.

R. Redfield and Y. Villa Rojas (1962: 84, 110) speaking of the Yucatecan village of Chan Kom, write: "The most important festal day of the year is the Day of the Cross, the third of May." They also write: "Novenas may be offered to the Holy Cross at any time; but during April and May, and especially on May 3 ... the Holy Cross is honored by novenas and *jaranas* in all the villages of the region."

Thompson (1970: 268) describes celebrations and offerings made by the Tzotzil on May 3 for abundant rains and bountiful crops.

Thompson (1930: 112 f.) elsewhere discusses a pig ceremony maintained by the Maya of Socotz in Central Belize. The ceremony is held on Holy Cross Day and a connection between the hog and the produce of the milpa is strongly emphasized. Thompson (1930: 55) also notes that among the Mopan Maya of San Antonio in Southern Belize, Holy Cross Day marks for many milpa owners the time when the maize crop should be sown.

Since the ancestors of the Chorti may have inhabited ancient Copan, it is of special interest to investigate their beliefs concerning the coming of the rains and the planting of the new maize. The exceptional importance which the onset of the rainy season has for the Chorti is well summarized by Wisdom (1940: 462 f.) in the following passages.

> "The social, religious, and economic year may be said to begin with the rainy season, usually in the latter part of April or in the early part of May. The official day of its beginning is April 25, St. Mark's Day, which is the first day of the rain-making festival, sometimes called St. Mark's festival. This date, called the 'beginning of the year', or, more commonly, the 'beginning of win-

ter', is noted primarily as the beginning of the rainy season, which is by far the most important season of the year for the Indians, and secondarily as the beginning of the year itself. ...

All the Indians make ready for the annual rain-making ceremony and festival which are celebrated to bring on the first rains of the year, so that the all-important crops of maize and beans can be planted. The ceremony itself is held on April 25, and the festival continues for eight days, until May 2 ..."

Cohodas (1976: 163) refers to the same ceremony and describes some aspects of the rain-bringing ritual. It includes sacrifices at a sacred fountain where the Noh Chih Chan, the great water serpent of the north, is sleeping and must be awakened to begin the rainy season. Because of its preservation of pre-European forms, the Chorti celebration is the best model we have for the ancient ceremonies dedicated to the coming of the rains. In fact, these ceremonies may derive from the ancient rituals performed in Copan at the time Temple 22 was in use.

The 8-day duration of the Chorti ceremony, an unusual period in Maya ritual, suggests the influence of the maize god, patron of the number 8.

The most important part of the festival is the rain-making ceremony which takes place on April 25. Wisdom (1940: 440) notes that as a result of the ceremony, "the rains are expected to come not later than the first day after the end of the festival, which is May 3, and during the eight-day period the deities are said to be getting ready to send the rains over the earth".

Concerning the planting of the new maize, Wisdom (1940: 440) writes:

"May 3 marks the beginning of the planting festival, which continues for four days. This date is the Day of the Holy Cross and is the official day on which the first rains are to come. During the day and evening the planting ceremonies, which are the most important part of the festival, are performed."

To bring Venus into the discussion, we ask ourselves if that planet exhibited any conspicuous astronomical phenomena which can be associated with the coming of the rains and the planting of the new maize, in the era when Copan flourished. The answer is affirmative as can be seen in the last column of Table 1. *All* the great northerly extremes of Venus between A.D. 700 and A.D. 900 were visible in April or May. This is the period which was singled out as particularly appropriate for celebrations in honor of the Holy Cross in the Chan Kom region. More specifically, within this period, the Venus extremes tend to occur in late April or early May. This coincides with the usual onset of the rainy season in the Chorti area. In fact, the Venus extremes cluster around the 8-day interval between April 25 and May 3, the formal ceremonial period for the coming of the rains and the planting of the new maize. Indeed, between A.D.

700 and A.D. 781, 8 of the 10 extremes of Cycle A lie inside this interval. The remaining extremes are within 3 days and 1 day, respectively, of it. Between A.D. 824 and A.D. 897, 7 of the 10 extremes of Cycle B lie inside the interval. The others are within 6, 2, and 2 days, respectively, of it. In the years intervening between A.D. 781 and A.D. 824, the 5 extremes of Cycle A and the 5 extremes of Cycle B, lie an average of about 7 days away from the interval. As a result, we can affirm that great northerly extremes of Venus are seasonal phenomena occurring at the time which is tradionally associated with the coming of the rains. Hence, the Venus-maize-rain complex does reflect a cosmological reality.

We recall that in the Chorti rain-making ritual the coming of the rains is associated with the awakening of the water serpent of the north. Since the cosmological voyage of Venus to a northern extreme indicates that the beginning of the rainy season is imminent, Venus may have been envisaged as the agent who was responsible for awakening the great serpent, although it must be realized that great northerly extremes of Venus are not annual events. This association of Venus with the north may account for the unusual word for north in the Moran vocabulary of Manche Chol. Here north is rendered as *no ec,* almost certainly meant for *noh ec,* "Great Star", the Manche Chol term for Venus. That expression may have an indirect relation to expressions for north found in some other Maya languages where north bears a descriptive name such as "from here the water" (Thompson 1971: 249).

ORIENTATIONS IN THE WINDOW OF TEMPLE 22

Since the iconography of Temple 22 at Copan expresses the Venus-maize-rain complex, we might logically examine whether the temple structure, in particular its window, points to Venus. In fact, it fails to point in the direction of the horizon extremes of Venus by a wide margin. Inquiring further into the matter we ask when was Venus visible in the window during the period of architectural activity at Temple 22 and do the periods of visibility bear any reasonable relationship to seasonal phenomena? The first half of the question is easy enough to answer with the use of a computer. Thus we have combined our transit and tape measurements of the orientation and angular extent of the horizon viewed through the window together with the data from Tuckerman's tables to generate a list of dates which indicate when Venus would have actually appeared in the window during periods of dark sky. To make the search as thorough as possible we have programmed the solution for oberservers viewing on-axis and along diagonals through the window from

the rear of the chamber which houses it. We found, as shown in Table 1, that the apparitions of Venus using either sighting scheme almost always occurred in April or May. Moreover, the data of the great northerly extremes complemented that of the window in a remarkable manner. In the year prior to a great extreme, the *first* day of visibility of Venus almost alway fell in or was very close to the 8-day period from April 25 to May 3. In the year following a great extreme, the *last* day of visibility of Venus had the same property.

It follows that the apparitions of Venus through the window of Temple 22 exhibit the same type of seasonal relationship as did the great northerly extremes of Venus. However, the data from the window complements that of the great northerly extremes. Consequently, the two kinds of Venus phenomena can be combined in such a way as to generate an almost annual pattern of seasonal observations of Venus which could be ritually associated with the onset of the rainy season and the planting of the maize. To illustrate this cycle of seasonal observations, we list a partial sequence below. The sequence is obtained from Table 1, using the diagonal sighting scheme for Venus apparitions in the window of Temple 22 and the data for northerly extremes.

Year (A.D.)	Type of Venus Observation	Date
700	earliest apparation in window	April 22
701	great northerly extreme	May 2
702	latest apparition in window	April 22
703	earliest apparition in window	May 12
704	great northerly extreme	May 11
705	latest apparition in window	May 6
708	earliest apparition in window	April 30
709	great northerly extreme	April 30
710	latest apparition in window	April 20
711	earliest apparition in window	May 10
712	great northerly extreme	May 14
713	latest apparition in window	May 4
716	earliest apparition in window	April 28
717	great northerly extreme	April 28
718	latest apparition in window	April 18

There are a few gaps in the cycle of observations in the above list, namely, in the years 706, 707, 714, and 715. However, the near annual pattern of seasonal Venus events is very surprising in view of the 8-year period actually required to harmonize the Venus and solar cycles.

Whether or not the Maya of ancient Copan used the above scheme, or a reasonable facsimile, to relate observable Venus phenomena to the coming of the rains and the planting of the new maize cannot be known.

Nevertheless, we can assert that this type of scheme is natural to the physical orientation of the window of Temple 22, is consistent with a known interest in Venus extremes, is in agreement with the symbolism of Temple 22, and is plausible in the light of ethnohistoric references concerning Venus and the agricultural year.

CONCLUSION

In the foregoing, we have shown that great northerly extremes of Venus occur at the same time as the traditional period associated with the onset of the rainy season. These extreme points can be determined by simple visual observation of the planet's 8-year oscillation along the horizon. The Maya interest in such extremes is confirmed by their erection of structures oriented to such points, We have also seen that the first appearance of Venus in the window of Temple 22 coincides with the coming of the rains in the year preceding a great northerly extreme, while the last appearance of Venus in the window marks the coming of the rains in the year after a great northerly extreme. The northerly extremes of Venus and the Venus apparitions in the window are complementary and can be combined to yield a scheme for making (almost) annual observations of Venus at or near the beginning of the rainy season. We have further noted that Temple 22 is bedecked with ornamentation symbolic of the rains and contains images of the young maize god as well as Venus glyphs. We conclude that the principal purpose of the temple was to host ceremonies for the annual coming of the rains and the growth of the new maize in association with the Venus phenomena described above. Post-conquest survivals of these ancient rituals, for the most part transmuted by Christianity, occur in celebrations centered on St. Mark's Day, April 25, and Holy Cross Day, May 3.

Evidence for the existence of a Venus-maize-rain complex on the Mexican plateau and in the Maya lowlands has been presented. In this complex Venus is attributed with the discovery of maize and securing it for the people. The rain gods are given responsibility for its growth and sustenance. Venus appears as a high god with the rain gods in a subservient position bearing a more direct relationship with man. The function of Venus in this context is reflected cosmologically by its journey to the north preceding the onset of the rainy season. This cosmic voyage of Venus may be equivalent to Quetzalcoatl's carrying of the first grains of maize to Tamoanchan. Indeed, the rains are connected with the north in Maya thought and Tamoanchan is "the land of rain and mist" (Davies 1977: 104). Furthermore, it is related in the hymn to Cen-

teotl, the Aztec maize god, that he was born in Tamoanchan (Caso 1958: 76). Finally, Tamoanchan is referred to in the song dedicated to the Aztec feast of Atamalqualoya (Davies 1977: 103) which is associated with the rejuvenation of the maize and the completion of the 8-year Venus-solar cycle.

Though we have concentrated on relating Venus to Temple 22 and the agricultural cycle, it should not be assumed that we are denying the existence or importance of similar solar relationships. We have commented on the solar alignment determined by the window of Temple 22. We may also note that the 8-day interval from April 25 to May 3, which we have associated with the coming of the rains, includes the significant celestial event of solar zenith passage on April 30. Moreover, an apparent duality embracing the sun and Venus in Maya mythology is suggested by the bicephalic monster over the inner doorway of Temple 22, for one of its heads is marked with the symbol of the sun while the other is marked with the symbol of Venus. Such a duality may well be a consequence of the 8-year Venus-solar cycle, as much a function of the sun as of Venus. Our emphasis on the Venus aspect of this duality is justified since the importance of Venus in ancient Mayan agricultural rites does not seem to have been recognized. The cosmological-mythic role of Venus which we have described may account in a large part for the importance of that planet in the Mesoamerican world.

Table: Apparitions of Venus in Temple 22 correlated with great northerly extremes of the planet.

	Dates of Venus Visibility		
Year (A.D.)	Using diagonal sighting scheme	Using main axis to jamb limits	Date of northerly extreme and cycle (A or B)
700	22 Apr – 22 May	7 May – 12 May	
701			2 May (A)
702	2 Apr – 22 Apr	7 Apr – 12 Apr	
703	12 May – 6 June	22 May – 27 May	
704			11 May (B)
705	16 Apr – 6 May	21 Apr – 26 Apr	
708	30 Apr – 20 May	5 May – 10 May	
709			30 Apr (A)
710	31 Mar – 20 Apr	7 Apr – 12 Apr	
711	10 May – 4 June	20 May – 30 May	
712			14 May (B)
713	14 Apr – 4 May	24 Apr – 29 Apr	
716	28 Apr – 18 May	8 May – 13 May	
717			28 Apr (A)
718	29 Mar – 18 Apr	8 Apr – 13 Apr	
724	1 May – 21 May	6 May – 11 May	
725			26 Apr (A)
726	1 Apr – 21 Apr	6 Apr – 11 Apr	
727	11 May – 5 June	21 May – 26 May	
728			10 May (B)
729	15 Apr – 5 May	20 Apr – 23 Apr	
732	29 Apr – 19 May	4 May – 9 May	
733			29 Apr (A)
734	30 Mar – 19 Apr	4 Apr – 9 Apr	
735	9 May – 3 June	19 May – 24 May	
736			Planet does not quite attain great extreme
737			
740	27 Apr – 17 May	4 May – 10 May	
741			27 Apr (A)
742	28 Mar – 17 Apr	3 Apr – 11 Apr	
743	12 May – 1 June	17 May – 27 May	
744			11 May (third cycle)
745	11 Apr – 11 May	21 Apr – 26 Apr	
748	25 Apr – 20 May	5 May – 10 May	
749			30 Apr (A)
750	26 Mar – 15 Apr	5 Apr – 10 Apr	
751	10 May – 30 May	20 May – 25 May	
752			9 May (third cycle)
753	10 Apr – 29 Apr	19 Apr – 24 Apr	
756	28 Apr - 18 May	3 May – 8 May	

Dates of Venus Visibility

Year (A.D.)	Using diagonal sighting scheme	Using main axis to jamb limits	Date of northerly extreme and cycle (A or B)
757			3 May (A)
758	29 Mar – 18 Apr	3 Apr – 8 Apr	
759	8 May – 2 June	18 May – 28 May	
760			10 May (B)
761	12 Apr – 2 May	17 Apr – 22 Apr	
764	26 Apr – 21 May	4 May – 8 May	
765			6 May (A)
766	27 Mar – 16 Apr	4 Apr – 8 Apr	
767	11 May – 31 May	16 May – 21 May	
768			10 May (B)
769	10 Apr – 30 Apr	18 Apr – 23 Apr	
772	24 Apr – 19 May	2 May – 7 May	
773			4 May (A)
774	25 Mar – 14 Apr	4 Apr – 9 Apr	
775	9 May – 29 May	16 May – 21 May	
776			8 May (B)
777	8 Apr – 1 May	18 Apr – 23 Apr	
780	22 Apr – 12 May	2 May – 7 May	
781			27 Apr (A)
782	28 Mar – 17 Apr	2 Apr – 7 Apr	
783	7 May – 1 June	17 May – 25 May	
784			11 May (B)
785	11 Apr – 1 May	16 Apr – 21 Apr	
788	25 Apr – 15 May	30 Apr – 5 May	
789			20 Apr (A)
790	26 Mar – 15 Apr	1 Apr – 5 Apr	
791	10 May – 30 May	15 May – 23 May	
792			4 May (B)
793	9 Apr – 29 Apr	17 Apr – 21 Apr	
796	23 Apr – 13 May	1 May – 5 May	
797			13 Apr (A)
798	24 Mar – 13 Apr	1 Apr – 6 Apr	
799	8 May – 28 May	15 May – 20 May	
800			7 May (B)
801	7 Apr – 27 Apr	17 Apr – 22 Apr	
804	21 Apr – 11 May	1 May – 6 May	
805			21 Apr (A)
806	22 Mar – 11 Apr	1 Apr – 6 Apr	
807	6 May – 31 May	16 May – 21 May	
808			10 May (B)
809	7 Apr – 28 Apr	15 Apr – 20 Apr	
812	24 Apr – 14 May	29 Apr – 4 May	
813			19 Apr (A)
814	25 Mar – 14 Apr	30 Mar – 4 Apr	
815	4 May – 29 May	14 May – 19 May	
816			13 May (B)

Dates of Venus Visibility

Year (A.D.)	Using diagonal sighting scheme	Using main axis to jamb limits	Date of northerly extreme and cycle (A or B)
817	8 Apr – 28 Apr	15 Apr – 19 Apr	
821			12 Apr (A)
823	7 May – 27 May	13 May – 18 May	
824			3 May (B)
825	6 Apr – 26 Apr	15 Apr – 20 Apr	
828	20 Apr – 5 May	29 Apr – 4 May	
829			15 Apr (A)
830	21 Mar – 10 Apr	30 Mar – 4 Apr	
831	5 May – 25 May	13 May – 17 May	
832			9 May (B)
833	4 Apr – 24 Apr	14 Apr – 19 Apr	
836	23 Apr – May 13	28 Apr – 3 May	
837			13 Apr (A)
838	19 Mar – 10 Apr	29 Mar – 3 Apr	
839	3 May – 28 May	13 May – 18 May	
840			7 May (B)
841	7 Apr – 27 Apr	12 Apr – 17 Apr	
844	21 Apr – 11 May	27 Apr – 2 May	
845			11 Apr (A)
846	22 Mar – 11 Apr	29 Mar – 2 Apr	
847	6 May – 26 May	12 May – 17 May	
848			5 May (B)
849	5 Apr – 25 Apr	12 Apr – 17 Apr	
852	19 Apr – 9 May	27 Apr – 31 Apr	
855	4 May – 24 May	12 May – 16 May	
856			3 May (B)
857	3 Apr – 23 Apr	12 Apr – 17 Apr	
860	17 Apr – 12 May	27 Apr – 2 May	
863	2 May – 27 May	11 May – 16 May	
864			1 May (B)
865	1 Apr – 26 Apr	11 Apr – 16 Apr	
868	20 Apr – 10 May	26 Apr – 31 Apr	
871	5 May – 25 May	10 May – 15 May	
872			29 Apr (B)
873	4 Apr – 24 Apr	11 Apr – 15 Apr	
876	18 Apr – 8 May	25 Apr – 30 Apr	
879	3 May – 23 May	10 May – 17 May	
880			2 May (B)
881	2 Apr – 22 Apr	10 Apr – 14 Apr	
884	16 Apr – 6 May	16 Apr – 1 May	
887	1 May – 21 May	10 May – 15 May	
888			30 Apr (B)
889	31 Mar – 25 Apr	10 Apr – 15 Apr	
892	14 Apr – 9 May	24 Apr – 29 Apr	
895	4 May – 24 May	9 May – 14 May	
896			28 Apr (B)
897	3 Apr – 23 Apr	9 Apr – 14 Apr	

REFERENCES

Aveni, Anthony F.
1975 "Possible Astronomical Orientation in Ancient Mesoamerica." In Anthony F. Aveni (ed.): *Archeoastronomy in Pre-Columbian America.* pp. 163 – 190, Austin.

1977 "Concepts of Positional Astronomy Employed in Ancient Mesoamerican Architecture." In Anthony F. Aveni (ed.): *Native American Astronomy,* pp. 3 – 19, Austin.

Aveni, Anthony F., Sharon L. Gibbs and Horst Hartung
1975 "The Caracol Tower at Chichen Itza: An Ancient Astronomical Observatory? In *Science,* 188 (4192): 977 – 985, Washington.

Aveni, Anthony F., and Horst Hartung
1976 "Investigación preliminar de las orientaciones astronómicas de Copán." In *Yaxkin,* 1.3 8 – 13, Tegucigalpa, Honduras.

Caso, Alfonso
1958 *The Aztecs, People of the Sun.* Norman.

Closs, Michael P.
1977 "The Date-reaching Mechanism in the Venus Table of the Dresden Codex." In Anthony F. Aveni (ed.): *Native American Astronomy,* pp. 89 – 99, Austin.

Coe, Michael D.
1973 *The Maya Scribe and his World.* New York.

1975 *Classic Maya Pottery at Dumbarton Oaks.* Dumbarton Oaks, Washington, D.C.

Cohodas, Marvin
1976 "The Iconography of the Panels of the Sun, Cross and Foliated Cross at Palenque: Part III." In *The Art, Iconography and Dynastic History of Palenque,* part III, pp. 155 – 176, The Robert Louis Stevenson School, Pebble Beach, California.

Davies, Nigel
1977 *The Toltecs. Until the Fall of Tula.* Norman.

Edmonson, Munro S.
1971 *The Book of Counsel: the Popol Vuh of the Quiche Maya of Guatemala.* Middle American Research Institute, Publ. 35, New Orleans.

Joralemon, Peter D.
1971 "A Study of Olmec Iconography." *Studies in Pre-Columbian Art and Archaeology,* 7, Dumbarton Oaks, Washington, D.C.

Kelley, David, H.
1965 "The Birth of the Gods at Palenque." In *Estudios de Cultura Maya,* 5: 93 – 135, México.

Maudslay, Alfred Percival
1889 – 1902 *Archaeology. Biologia Centrali-Americana* ... 5 vols., London.

Morley, Sylvanus Griswold
1920 *The Inscriptions at Copan.* Carnegie Institution of Washington, Publ. 219, Washington.

1926 *Archaeology: The Copan Expedition.* Carnegie Institution of Washington, Year Book 25: 277 – 286, Washington.

Morley, Sylvanus G., and G. W. Brainerd
1956 *The Ancient Maya.* Stanford.

Recinos, Adrián, Dionisio José Chonay and Delia Goetz
1953 *The Annals of the Cakchiquels and Title of the Lords of Totonicapan.* Norman.

Redfield, Robert, and Alfonso Villa Rojas
1962 *Chan Kom. A Maya Village.* Chicago.

Schele, Linda
1976 "Accession Iconography of Chan-Bahlum in the Group of the Cross at Palenque." In *The Art, Iconography and Dynastic History of Palenque,* part III, pp. 9 – 34, The Robert Louis Stevenson School, Pebble Beach, California.

Thompson, John Eric S.
1930 *Ethnology of the Mayas of Southern and Central British Honduras.* Field Museum of Natural History, Publ. 274. Chicago.

1938 "Sixteenth and Seventeenth Century Reports on the Chol Mayas." In *American Anthropologist,* 40: 584 – 604, Washington.

1939 *The Moon Goddess in Middle America: with Notes on Related Deities.* Carnegie Institution of Washington, Publ. 509, Contrib. 29, Washington.

1970 *Maya History and Religion.* Norman.

1971 *Maya Hieroglyphic Writing: An Introduction.* Norman.

1972 "A Commentary on the Dresden Codex, a Maya Hieroglyphic Book." *Memoirs of the American Philosophical Society,* 93. Philadelphia.

Trik, Aubrey, S.
1939 *Temple XXII at Copan.* Carnegie Institution of Washington, Publ. 509, Contrib. 27, Washington.

Tuckerman, Bryant
1964 "Planetary, Lunar and Solar Positions, A.D. 2 – 1649." *Memoirs of the American Philosphical Society*, 59, Philadelphia.

Wisdom, Charles
1940 *The Chorti Indians of Guatemala.* Chicago.

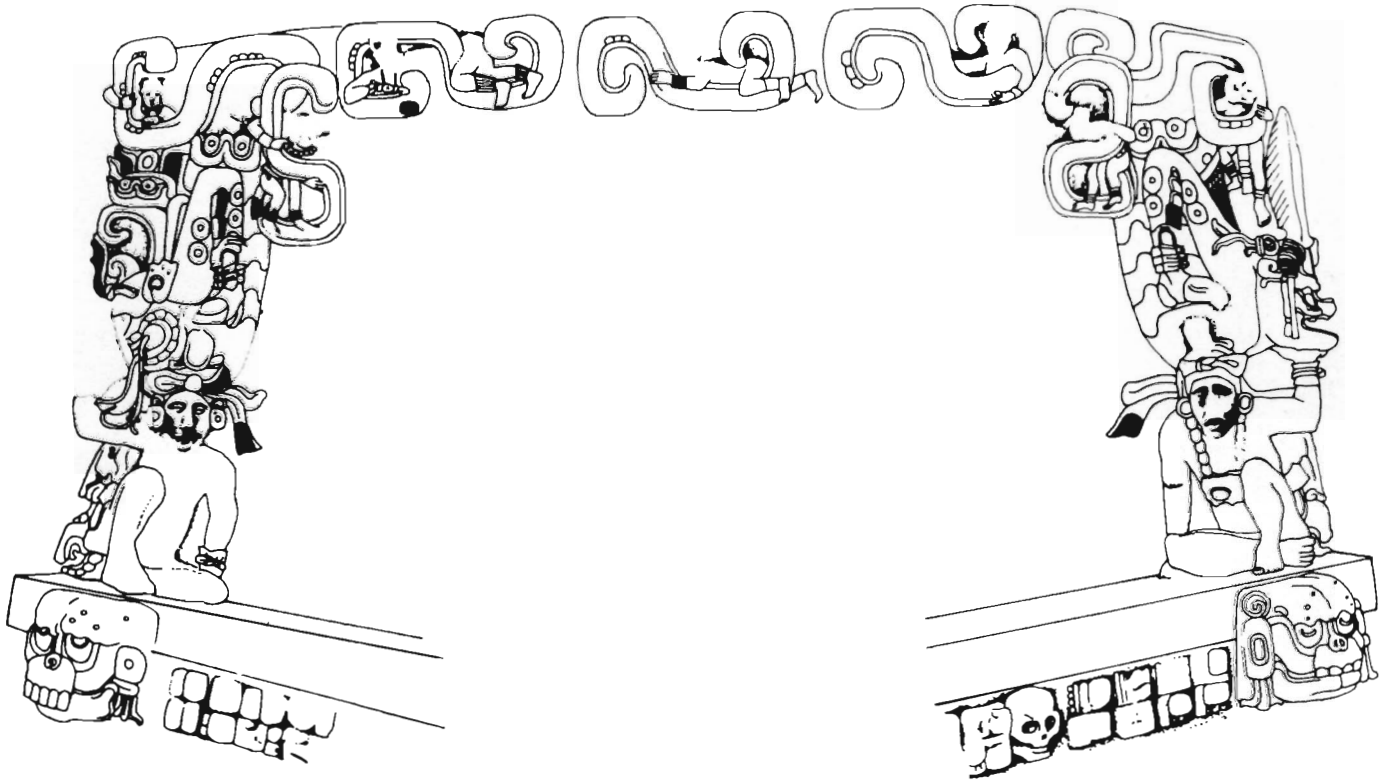
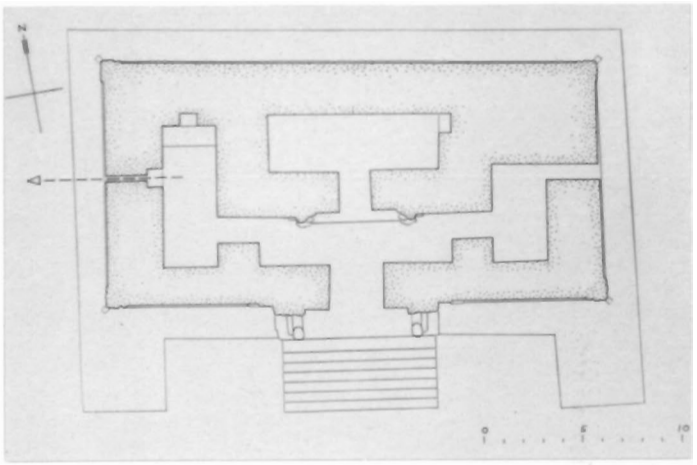


Fig. 1: The facade of the interior doorway of Temple 22. (Courtesy of Linda Schele).

Fig. 2: Detail of a Venus glyph on Temple 22. (Courtesy of Horst Hartung).



4

Fig. 3: The window in the west wall of Temple 22. (Courtesy of Horst Hartung).

Fig. 4: The floor plan of Temple 22 with an indication of the direction of viewing through the window in the west wall. (Courtesy of Horst Hartung).