Astronomy and the Iconography of Creation Among the Classic and Colonial Period Maya

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Westerners have been fascinated by the astronomical knowledge of the ancient Maya since travelers and scholars first reported ruined cities in the Americas and Precolumbian manuscripts in European libraries. Beginning in the late nineteenth century, students of the Maya speculated on the astronomical identities of iconographic motifs and characters portrayed in the codices and on monumental sculptures. In addition to identifying the signs for the sun, moon, and Venus, they also produced tentative reconstructions of the Maya zodiac and other constellations. Alternate interpretations of the nature of Maya astronomy have appeared throughout this century.

Based on recent advances in our understanding of the natural and astronomical foundations of Classic and Post-Classic Period Maya conceptions of Creation, we present another model of the so-called Maya zodiac. We then show how Creation-based cosmology survived in Yucatán well into the Colonial era. The Katun Prophecies of the Books of Chilam Balam name patrons for each incipient twenty-year period. Employing recently discovered evidence dating the prophecies, we demonstrate that these metaphorical references to deities and objects actually describe maps of the sky on the nights specified.

Is There a Maya Zodiac?

The nineteenth century saw the earliest widespread notice of the ancient and Colonial Period Maya. John Lloyd Stephens and others published accounts and views of the ruins of southern Mexico, Honduras, Guatemala, and then British Honduras (Del Río and Cabrera 1822; Stephens 1841, 1843; Catherwood 1844; Norman 1843; Charnay 1863, 1885; Maudslay and Maudslay 1899). At the same time, academics and bibliophiles across the Atlantic discovered Precolumbian Maya codices and Colonial Spanish accounts of the Maya. In Germany, Alexander von Humboldt's account of travels in the New World included the first publication of a Maya codex, five pages of the Dresden manuscript (Humboldt 1810:Plate 45). Humboldt's folio size work also first reproduced Maya art, a stucco relief from Palenque (Humboldt 1810:Plate 11). In nearby Paris, the Abbé Brasseur de Bourbourg published the Quiché Maya *Popol Vuh* in 1861, and Diego de Landa's *Relación de las cosas de Yucatán* in 1864 (Brasseur de Bourbourg 1861, 1864).

The first progress in deciphering Maya writing centered on the three surviving Precolumbian codices then known, found in libraries in Dresden, Paris, and Madrid. Naturally, the codices also furnished the grist for the first speculations on Maya astronomy. Although earlier scholars made significant contributions to the decipherment of Maya writing, especially Constantine Rafinesque, James McCulloh, Lord Kingsborough, León de Rosny, Cyrus Thomas, and Abbé Brasseur de Bourbourg, the German librarian Ernst

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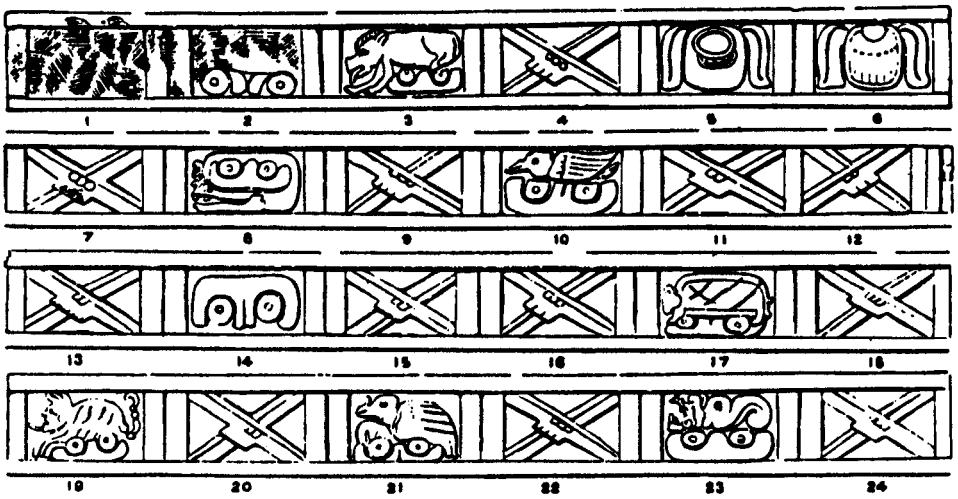

Fig. 1. Sky-band from the east facade of the Nunnery Complex at Chichén Itzá. After Maudslay 1889-1902: Plate 13.

Förstemann deserves credit as the single individual responsible for most of what we know today about the chronology, mathematics, and calendrical operations of the Maya codices. In addition to publishing the first complete edition of the Dresden Codex, Förstemann discovered that sections of the manuscript described the motions of Venus (Förstemann 1880, 1886). Other codical periods matched known astronomical cycles, including those pertaining to the sun and moon (Förstemann 1886, 1906). Förstemann also suggested that signs enclosed in pictorial bands in the codices actually denoted astronomical bodies (Förstemann 1886:16, 1904).[1] These were the so-called "sky-bands," filled with the glyphs for the sun, moon, and planets.

Once it was clear that astronomical observation and prediction played important roles in the Maya codices, scholars naturally expected that other spheres of ancient Maya culture also contained astronomical referents. Although examples of Maya stone sculpture with sky-bands appeared in a few publications beginning in the early nineteenth century, Alfred P. Maudslay produced the first reliable drawings of ancient Maya architecture, sculpture, and writing.[2] Issued in sixteen fascicles between 1889 and 1902, Maudslay's archaeological appendix to Godman and Salvin's 63 volume *Biologia Centrali-Americana* consisted of four volumes of plates (402 in all), and one volume of descriptive text (Maudslay 1889-1902; Godman and Salvin 1879-1915). Maudslay's artist, Annie Hunter, produced amazingly accurate renditions of sky-bands found in the sculpture of Palenque and on the east facade of the Nunnery Complex at Chichén Itzá (fig. 1).

In addition to Maudslay's *Archaeology,* other developments around the turn of the twentieth century engendered continued speculation on the nature of ancient Maya astronomy. Archaeological discoveries added to the known repertory of Maya images eligible for interpretation as astronomical bodies. In 1906, villagers at Acanceh, a small town 25 km southeast of Mérida, Yucatán, uncovered a remarkable polychrome stucco frieze featuring a procession of humanoids and animals, including, a bat, jaguar, monkey, several birds, and many more (Miller 1991:1).[3] British scholar Stansbury Hagar immediately proposed, on rather flimsy evidence, that the frieze represented a Maya zodiac (Hagar 1914).[4] He argued that since our zodiac consisted of a collection of mythological humans and animals, the Acanceh frieze would be a likely candidate for a Maya zodiac. Hagar later argued that the murals of Santa Rita Corozal, Belize, represented another Maya zodiac (Hagar 1917). First published in 1900 by Thomas Gann, the murals also feature a procession of humanoid characters and animals (Gann 1900). Particularly interesting is the rendition of the god Itzamná riding a peccary. Unfortunately for Hagar, the imagery of the Santa Rita murals added little to his previously proposed Acanceh zodiac.

Also active at the turn of the century, Eduard Seler published several articles exploring the natural origins of Aztec and Maya imagery (Seler

1898b, 1907, 1909-1910). He demonstrated that the Chichén Itzá sky-band was similar to a sequence of animals and deities pictured hanging from a sky-band in the Paris Codex, and suggested that each denoted a constellation (fig. 2) (Seler 1909-1910, 1910:162-165, 1902-1923:4: 638-642). Since the Chichén Itzá entities were accompanied by Förstemann's Venus glyph, Seler argued that the frieze represented constellations in conjunction with that planet.[5]

The so-called Paris Codex zodiac, found on pages 23 and 24, features thirteen columns of dates separated by 28 days. Beginning with the reconstructible Tzolkin position 12 Lamat, the table repeats five times, for a total of 1,820 days (Kelley 1976:45). Seven beasts hang by their teeth from a sky-band above the table. Beginning on page 23, these include a bird, a *xoc* fish, or shark, another bird, a scorpion, a turtle, a rattlesnake, and an effaced creature. At least five additional beasts hang from a serpent's body beneath the calendrical table: a jaguar, a skeleton, a destroyed character, a bat, and another badly eroded image.

Herbert Spinden proposed in 1916 that Paris 23 and 24 represented a Maya zodiac, where the columns of 28 days separated thirteen zodiacal constellations (13 x 28 = 364 days) (Spinden 1916:74-78). Discussing the Chichén Itzá Nunnery facade, he argued that since the sky-band box paired Venus—an astronomical body traveling on or near the ecliptic—with each asterism, these signs must also denote objects on the ecliptic. Since the frieze pictured similar beasts as those found in the Paris Codex, it must also present a zodiac. Spinden later attempted to match the Paris Codex beasts with Western zodiacal constellations (Spinden 1924:54-55). Citing entries in the Colonial Yucatec Mayan *Diccionario de Motul,*

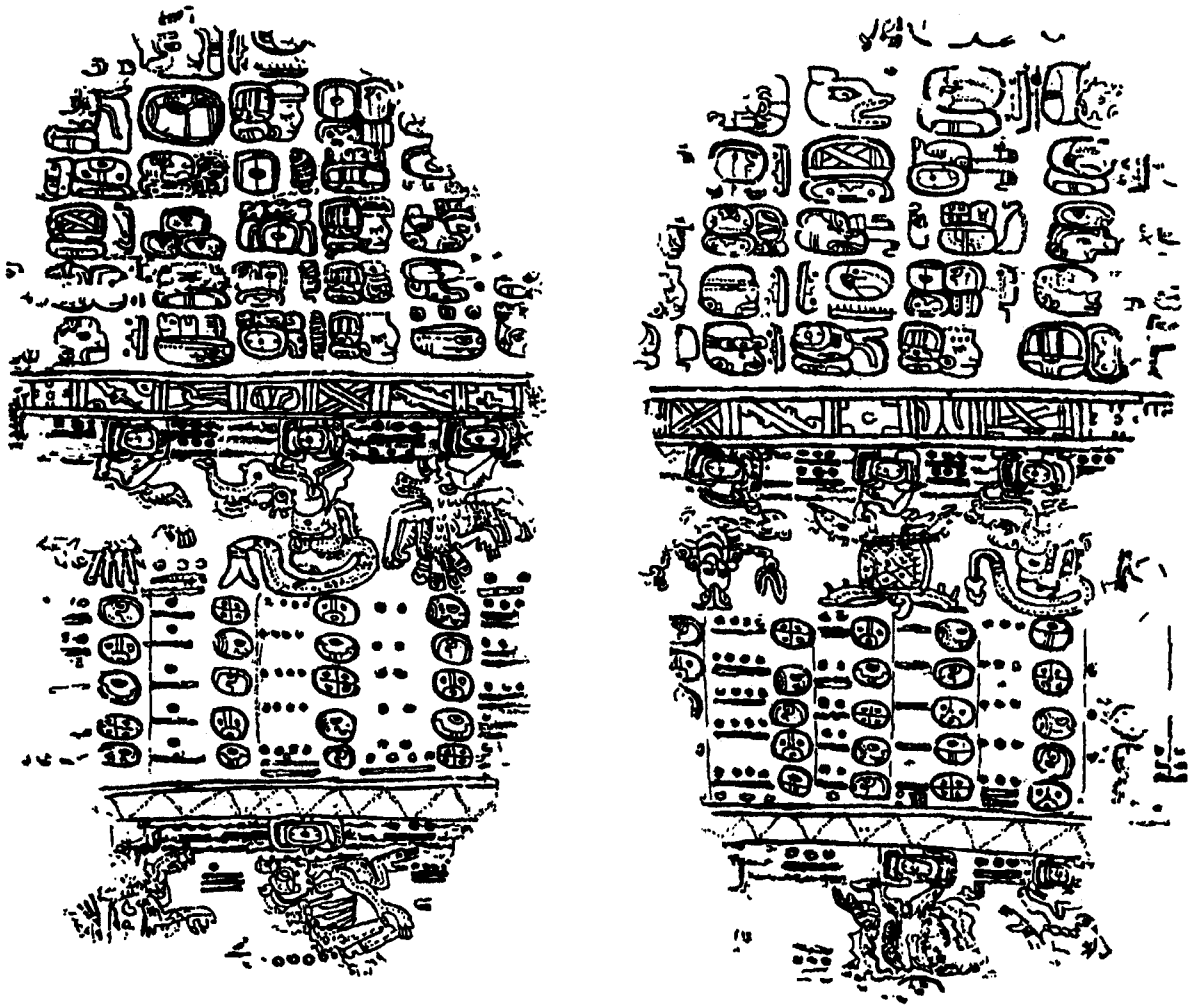

Fig. 2. Paris Codex 23-24, the Maya "Zodiac." After Villacorta and Villacorta 1930.

he argued that the turtle constellation found both in the Paris Codex and on the Chichén Itzá frieze coincided at least partly with our zodiacal Gemini.

Finally, a half century later, David Kelley demonstrated that the Paris Codex constellations were not immediately adjacent to one another in the sky, as Spinden thought. 168 day distance numbers between the pictures instead placed them on opposite sides of the sky (Kelley 1976: 49). He proposed a reconstruction associating the Paris Codex constellations, their apparent analogs at Chichén Itzá, and likely counterparts in the Western zodiac (Kelley 1976:48). Kelley argued that the asterisms pictured on the Chichén Itzá "zodiac" were probably *not* associated with Venus. Förstemann's Venus glyph here simply identified the asterism pictured, a turtle, scorpion, fish, etc., as a star or constellation (Kelley 1976:47).

A Creation Based Model of the Maya Zodiac

In early 1992, Linda Schele and a group of colleagues proposed that most ancient Maya iconographic assemblages reflected native cosmology and astronomical knowledge. Art at Palenque, Copán, Tikal, and other cities presented strikingly literal maps of the sky on the dates associated with both Maya Creation and with important events in each polity's history (Schele and Villela this volume). Pictured were not only the ecliptic and Milky Way, but also animals and laces identified as constellations by Colonial and modern Maya sources (Schele 1992b; Freidel, Schele, and Parker 1994).

At the urging of the German physicist Werner Nahm, Schele tested Kelley's 1976 reconstruction against the astronomical identifications suggested by the recent Creation centered model of Maya cosmology. She began with *Sinan-Ek',* or Scorpion Star, identified with the Western zodiacal Scorpius both in ancient Maya iconography and in ethnohistoric and anthropological accounts (Schele 1992a, 1992b). Assuming that Paris 23 and 24 depicted constellations on the ecliptic, Schele added the given 168 day distance number to the morning in A.D. 690 when the sun rose in Scorpio. Twelve repetitions yielded a rough zodiac confirming the identifications advanced by Creation Cosmology (fig. 3). The Paris Codex Turtle did actually correspond to the Western Gemini.

Nahm later provided the authors with proof that the Paris Codex zodiac functioned throughout the Classic Period (A.D. 150-900) in the Maya Lowlands. Reacting to Schele's identification of the ecliptic as the snake so often pictured in Maya art, Nahm noted that the creatures crawling up the serpents on the Hauberg Stela and Tikal Stela 1 matched those depicted in the Paris Codex. The monuments portray the same creatures as those flanking the Paris Codex scorpion: a jaguar, rattlesnake, shark, and the god Chak (Nahm 1992).[6] On the Hauberg Stela, supernaturals climb a serpent marked both with stars on its upturned nose and with a glyphic caption reading *Wakah-Chan,* 'Six-Sky', or 'Raised-up Sky' (fig. 4). Schele earlier demonstrated that the term *Wakah-Chan* described the Milky Way when extended from North to South in the night sky (Schele 1992a, 1992b). Tikal Stela 1 shows the same beasts climbing the protagonist's serpentine back-rack (fig. 5).

In addition to corroborating the sequence of the Paris Codex "zodiac," the Hauberg Stela and Tikal Stela 1 also represented literal maps of the sky on the evenings of their dedications, March 18, A.D. 197, and April 30, A.D. 451, respectively.[7] On each evening, the *Wakah-Chan,* Milky Way, filled the sky from North to South. Scorpius appeared on the Milky Way flanked by Capricorn, Sagittarius, Libra, and Virgo: the jaguar, rattlesnake, shark, and peccary (Schele 1992b:143).

Richard Johnson and Michel Quenon later refined Schele's zodiac by plotting 28 day intervals from the west edge of Scorpius (fig. 6) (Johnson and Quenon 1992). Corresponding only roughly with the Western Zodiac, their reconstruction better reflects the zones the ancient Maya likely associated with each zodiacal constellation. Johnson and Quenon also demonstrated that animals and supernaturals held by rulers on the monuments of Xultun, Guatemala, almost certainly reflected the constellations flanking the Milky Way in the night sky on their dedication dates.

Astronomical References in the Katun Prophecies of the Books of Chilam Balam

A Creation centered model of Maya cosmology and the zodiac finally permits dating of notoriously difficult passages in the Colonial Period Books of Chilam Balam. Named after the Maya seer whose prophecies appear in several

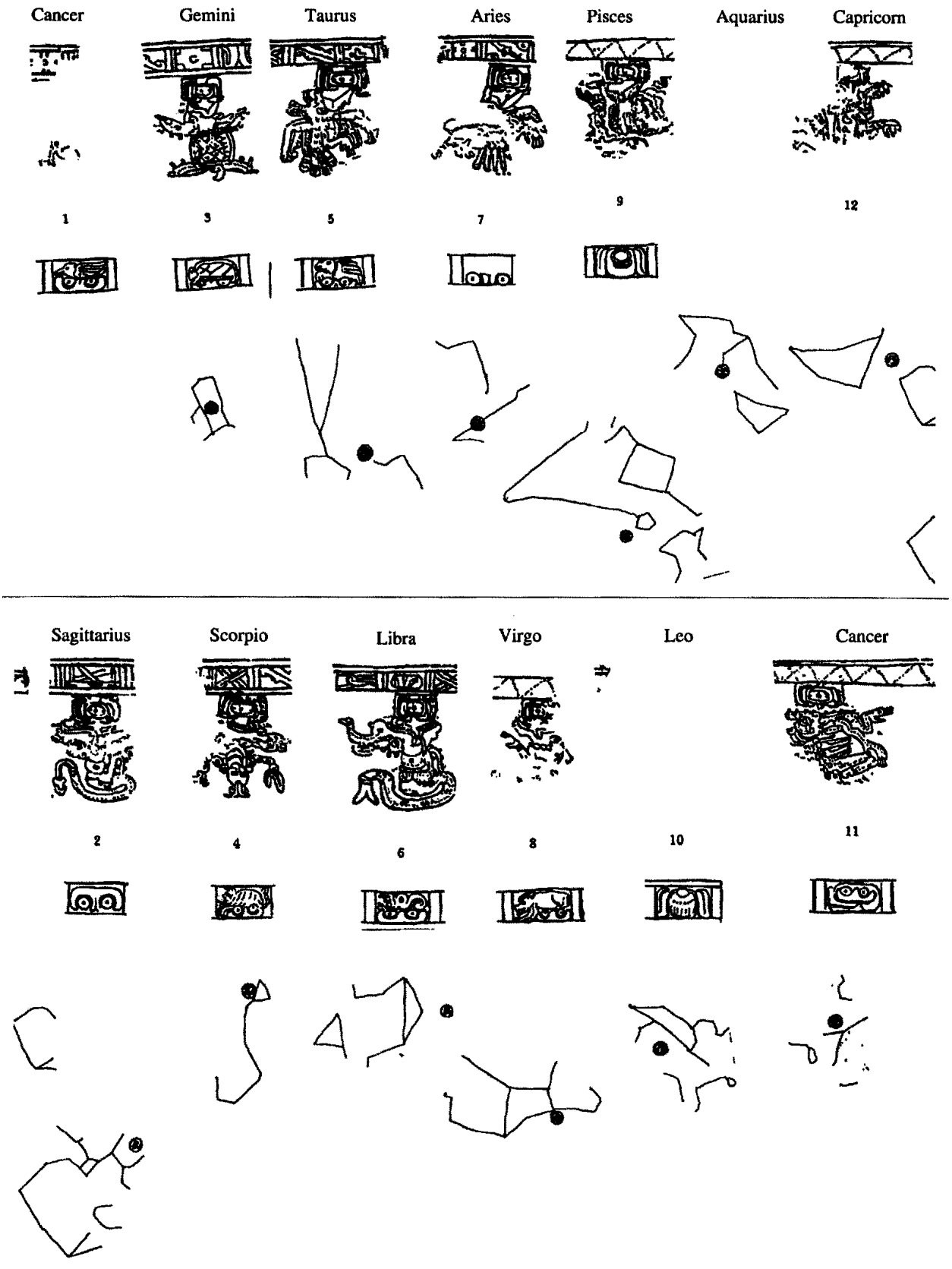

Fig. 3. Schele's early reconstruction of the Maya Zodiac. Paris Codex beasts, Chichén Itzá frieze, and possible star groups compared.

of the manuscripts, the Books of Chilam Balam contain texts on medicine, history, Christian doctrine, calendrics, prophecy, and astrology (Roys 1933:3; Gibson and Glass 1975:379-380). Most scholars agree that the Books of Chilam Balam date to the eighteenth and nineteenth centuries in their final form. However, as Ralph Roys noted, each book is a small library in itself, incorporating information dating from both pre-Spanish times and the Colonial era (Roys 1933: 3). Although each Yucatecan town likely kept its own Book of Chilam Balam, hardly more than a dozen examples survived until the present day.[8]

Fig. 4. Hauberg Stela. Drawing by Linda Schele.

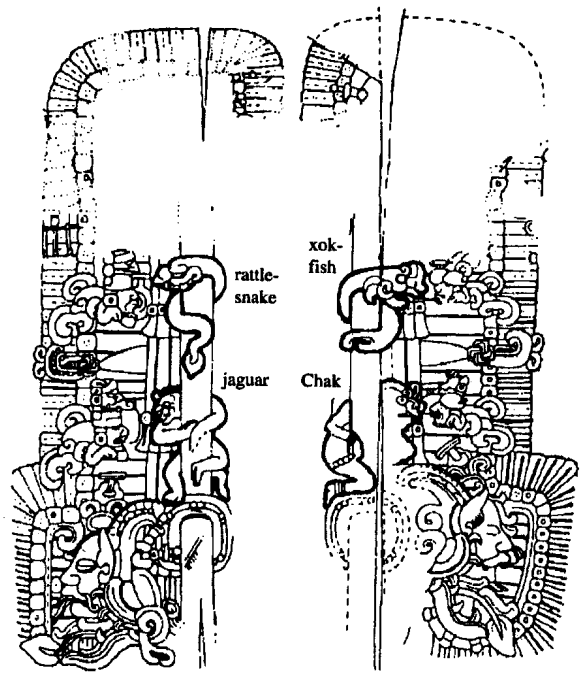

Fig. 5. Tikal Stela 1. After Schele 1992b.

With the exception of the Chilam Balam of Nah, each manuscript is named after the town where it was discovered (Paxton 1992:216).[9] The Chilam Balam books were written in Yucatec Mayan by scribes trained in European writing. Sections were probably transcribed verbatim from now lost hieroglyphic manuscripts (Barrera Vásquez and Morley 1949). Since the codices contain valuable data on Precolumbian Maya astronomy and cosmology, then transcriptions of codices, the Books of Chilam Balam, should not be overlooked as repositories of additional astronomical information.

Floating chronology has always hampered the search for astronomical references in the Books of Chilam Balam. Historical and prophetic sections dated according to the Maya count of Katuns have proven particularly recalcitrant. Most commentaries on the Books of Chilam Balam noted wherever known terms for stars or constellations appeared in the text. In the 1930s, one diffusionist even argued that every proper name in the Chilam Balam of Chumayel was an asterism (Reko 1934, 1935, 1936a, 1936b, 1937, 1938). However, no previous study matched objects and beings mentioned in the Books of Chilam Balam with asterisms actually visible on the specified date. We here present evidence both dating the Katun Prophecies of the

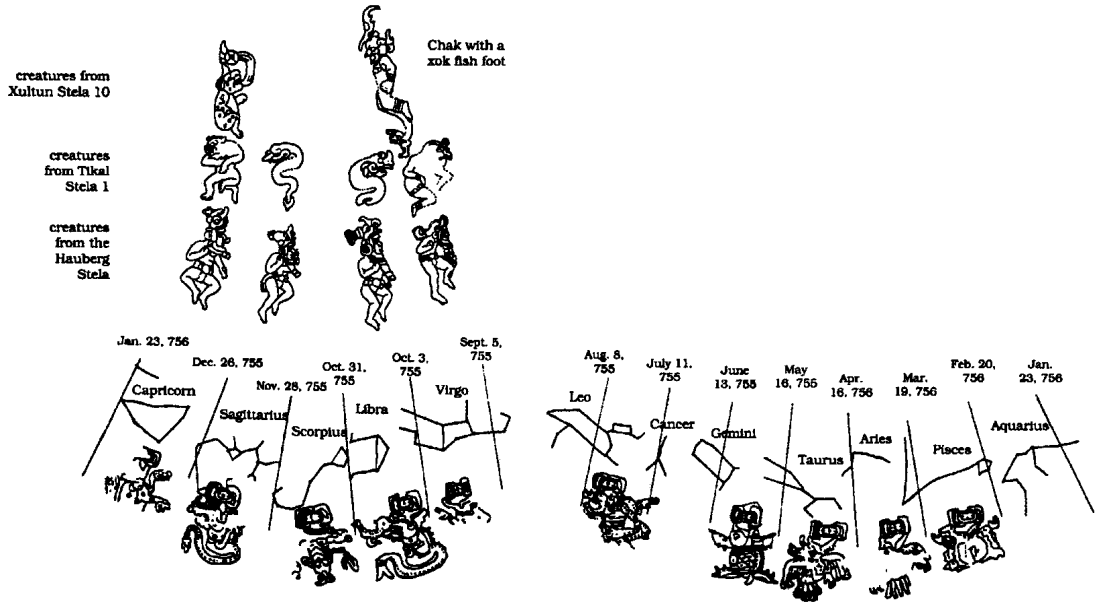

Fig. 6. Johnson and Quenon reconstruction of the Maya Zodiac. Beasts from the Hauberg Stela, Tikal Stela 1, and Xultun Stela 10 laid over. Drawing by Linda Schele.

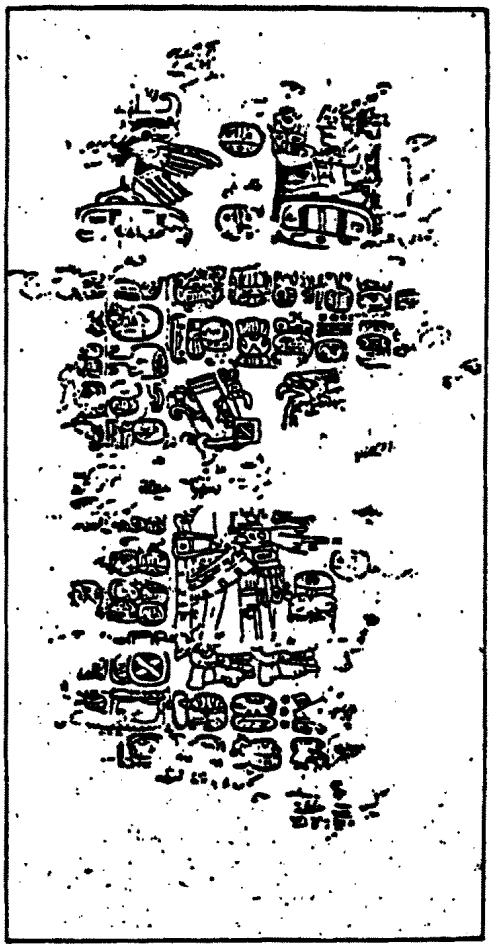

Fig. 7. Paris Codex 2. Prophecies and Rituals for Katun 2 Ahaw. After Villacorta and Villacorta 1930.

Chilam Balam Books, and demonstrating that the prophecy patrons were asterisms visible on the Katun ending.

The Katun Prophecies of the Books of Chilam Balam are organized into counts of 13 named Katuns of 7,200 days each. The entire cycle repeated after 256 European tropical years and 98 days ((7,200 x 13)/365.25) (Paxton 1992: 218). The greatest stumbling-block to astronomical analysis of the prophecies is selecting the correct equivalent year in our calendar for any Katun ending described. Does the prophecy for Katun 2 Ahaw refer equally to every Katun ending on that date? Should we assume that patrons and prophecies applied equally to every Katun with the same Ahaw coefficient? Or did the Katun prophecies originally favor one twenty year span over all others, for example, the 2 Ahaw of A.D. 1007, or the 2 Ahaw of A.D. 1263? Werner Nahm recently provided evidence that the Katun Prophecies of the Paris Codex were originally linked to a single 256 year span.

Early this century William Gates demonstrated that pages 2 through 11 of the Paris Codex represented a fragmentary series of Katun prophecies (Gates 1910:17). Although badly effaced, prophecies for ten Katuns survive.[10] The extant series begins on page 2 with the rituals and prophecies associated with Katun 2 Ahaw (fig. 7). Meredith

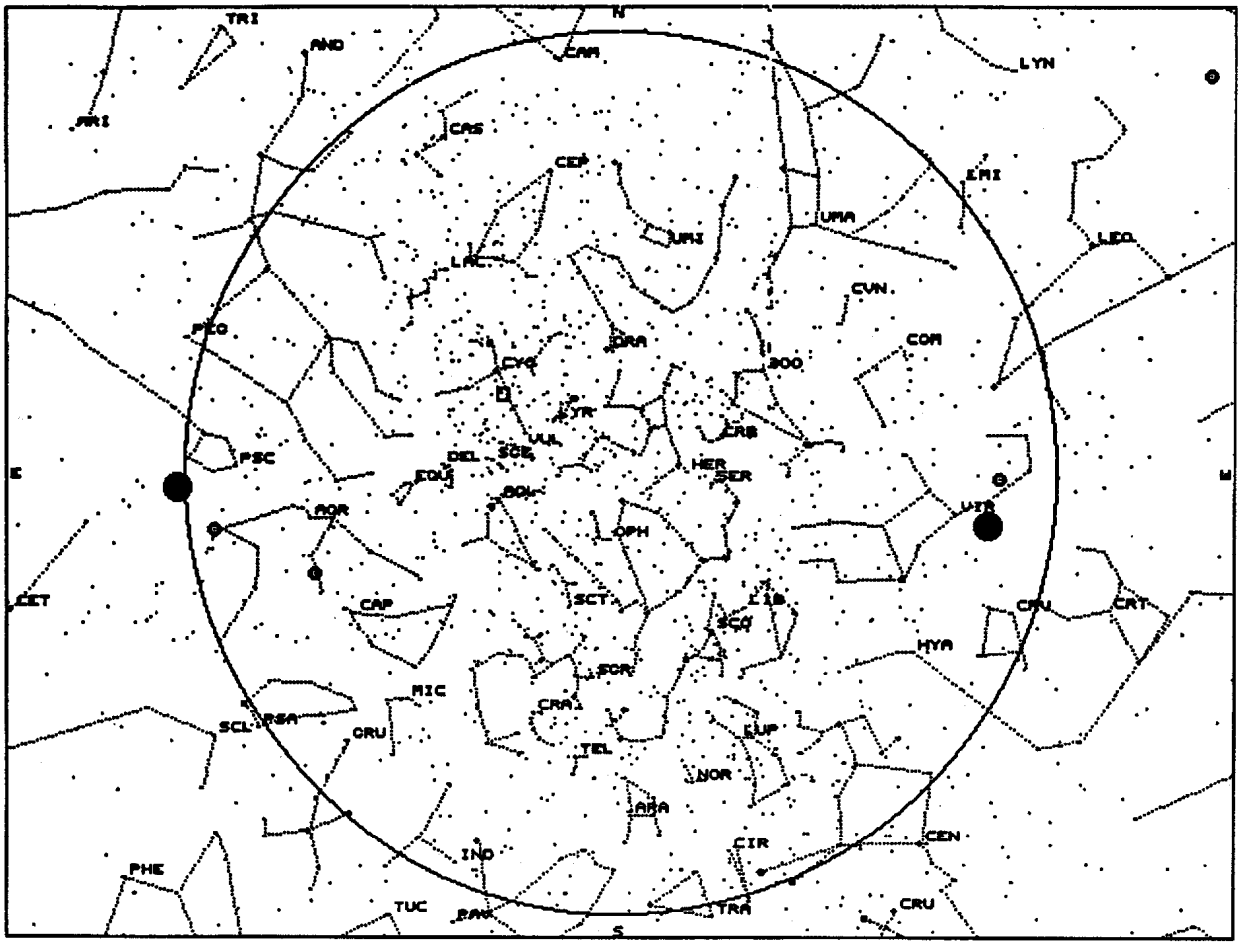

Fig. 8. EZCosmos 3.0 SkyPlot for February 26, 1244, 6:10 AM, Chichén Itzá, Yucatán, Mexico.

Paxton recently suggested that the Paris Codex Katun Prophecies were in some way related to stars and constellations (Paxton 1992:222). She compared the Paris Katun Series patrons (pages 2-11) with the beasts pictured in the so-called zodiac on pages 23 and 24 of the same manuscript. Unfortunately, since no Paris Katun patron survived intact, few comparisons to the "zodiac" were demonstrable.

Based on new readings of passages on Paris 2, Werner Nahm reconstructed the chronological framework of the Paris Codex Katun Series. He proposed that a phrase on Paris 2 reading *peta-u-k'ak',* or 'it turned, its fire', referred to a supernova visible in the Maya region during Katun 2 Ahaw, which closed on 10.9.0.0.0, on August 9, 1007 (Nahm, personal communication 1993). As we noted above, Paris 2 related the rituals and prophecies associated with Katun 2 Ahaw.

We agree with Paxton, that the Paris Codex Katun patrons do likely refer to astronomical bodies. The proof of this can be found in a better preserved series of Katun prophecies and patrons: those found in the Books of Chilam Balam. Nahm's Paris Codex chronology proved the key to dating the Katun Prophecies of the Books of Chilam Balam.

Each Chilam Balam Katun Prophecy states that a being or series of beings were the "face," or aspect of the Katun (Roys 1960:5). These we argue were the constellations visible on the night each Katun closed. Chilam Balam Katun Prophecy Series I states that the patrons of Katun 4 Ahaw were *Ah-Chicum-Ek',* the guidestar, *Yax-Aclam, Yax-Ah-Cocah-Mut,* the awakener, and *Ah-Ahsah,* the Morningstar (Roys 1960:43; Barrera Vásquez and Rendón 1949:119).[11]

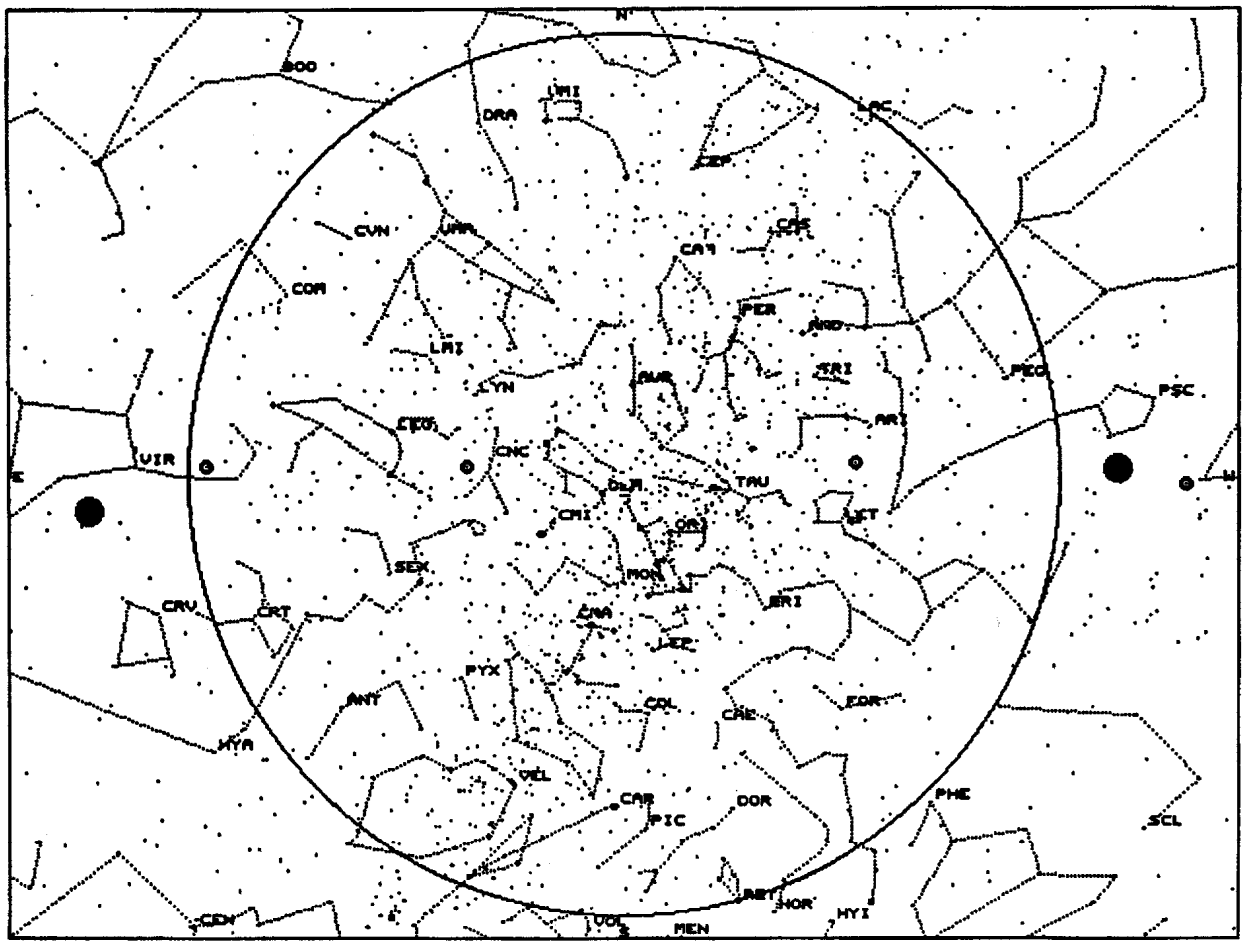

Fig. 9. EZCosmos 3.0 SkyPlot for February 26, 1244, 6:30 PM, Chichén Itzá, Yucatán, Mexico.

Each patron of Katun 4 Ahaw refers to a known asterism. Roys earlier identified *Ah-Chicum-Ek'* as Venus as Morningstar, and *Yax-Aclam* as the turtle constellation, *Ak-Ek',* corresponding roughly with the Western zodiacal Gemini (Roys 1949:117). Thompson produced evidence that *Yax-Ah-Cocah-Mut* referred to the god Itzamná as the Pleiades and a celestial bird (Thompson 1939:161). We recall that in 1697, Father Andrés de Avendaño reported a stela at Tayasal, or Tah-Itzá, named *Yax-Cheil-Cab.* He noted that the monument was dedicated to *Ah-Cocah-Mut* (Villagutierre y Soto-Mayor 1983).

To plot the sky on the evening specified by the Katun Prophecy for 4 Ahaw, we selected the next Katun ending with this coefficient after Nahm's Paris Codex chronological anchor (i.e. 2 Ahaw = 10.9.0.0.0). Plotting the sky on 11.1.0.0.0 yielded productive results (figs. 8, 9). As stated in the Chilam Balam prophecy, Venus as Morningstar, Gemini, and the Pleiades all played significant roles in the sky in the night 4 Ahaw closed. Venus preceded the Sun on the morning of February 26, A.D. 1244. At dusk, Gemini and the Pleiades were at zenith. Our evidence confirmed Roys' suggestion that the 4 Ahaw of Chilam Balam Katun Prophecy Series I refers to the years 1224-1244 (Roys 1960:8).

Another Katun prophecy confirmed that astronomy could date entire sections of the Books of Chilam Balam. The night sky returns to the same configuration every seven Katuns. If the Katun prophecy patrons were truly asterisms, we would also expect their repetition after about 140 years, or seven Katuns. Adding seven Katuns to 4 Ahaw yielded 3 Ahaw, which ended on 11.8.0.0.0, or February 21, A.D. 1382. The Books of Chilam Balam relate that the patrons of Katun 3 Ahaw were *Yax-Cocah-Mut* and *Yax-Aclam* (Roys 1960:39; Barrera Vasquez and Rendón 1949:

Fig. 10. EZCosmos 3.0 SkyPlot for February 21, 1382, 6:30 PM, Chichén Itzá, Yucatán, Mexico.

106- 107). Since this Katun 3 Ahaw ended only 5 calendar days before Katun 4 Ahaw (February 26 v. February 21), the sky was naturally configured identically (fig. 10). *Yax-Cocah-Mut* and *Yax-Aclam,* the Pleiades and Gemini, were again at zenith when the sun set. Our chronology again confirmed Roys' placement of Katun 3 Ahaw of Series I at 1362-1382 (Roys 1960:9).

Conclusions

Up until the present day, the Paris Codex has been the touchstone of nearly every reconstruction of the ancient Maya zodiac. Recently, some have questioned whether there was ever a true Maya zodiac. Perhaps the Paris Codex and Chichén Itzá Nunnery facade do not represent Maya zodiacs. After all, if *Ak-Ek',* the turtle constellation, corresponds to the belt of Orion, as some sources suggest, then these zodiacs portray some constellations not located on the ecliptic. Bruce Love lately suggested that Paris Codex pages 23 and 24 may not depict *any* constellation or asterism on the ecliptic (Love 1994, and personal communication 1993). He preferred the dominant constellation model, as advanced by Barbara Tedlock (B. Tedlock 1985, 1992; D. Tedlock 1985, 1992a, 1992b).[12] Whether the Paris Codex and Chichén Itzá Nunnery facade show a true Maya zodiac of 13 stations will likely remain a mystery. In this essay, we have presented a zodiacal model based on both ancient and modern Maya conceptions of the astronomical reflexes of Creation cosmology (Schele and Villela this volume; Schele 1992a, 1992b; Freidel, Schele, and Parker 1994).

Since the nineteenth century, commentators on the Books of Chilam Balam insisted that the texts contained information of mostly Spanish, or European origin (e.g. Paxton 1992:217). This conclusion should be revised in light of the connections to Creation cosmology presented above.

Although the Chilam Balam Katun Prophecies may provide evidence that the Maya viewed history as cyclical process, the prophecies *were* originally linked to a specific Katun and the astronomical bodies visible on the evening of the Katun ending. The astronomical foundation of Maya iconography persisted well beyond the Spanish foundation of Mérida in 1542 and Martín de Ursúa's conquest of the last free Maya kingdom at Tah-Itzá in 1697.

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Notes

1 See Bowditch (1904) for English translations of many of Förstemann's articles on Maya writing. Unfortunately, the volume does not contain his path-breaking 1886 study.

2 Early publications of Maya sky-bands appeared in Humboldt (1810); Del Río and Cabrera (1822); Dupaix (1834); Waldeck (1838); Kingsborough (1830-1848); Ritter (1853); and Brasseur de Bourbourg (1866). Frederick Catherwood's renditions of Palenque reliefs were the most widely disseminated images of ancient Maya art (Stephens 1841; Catherwood 1844). Volume 2 of Stephens' *Incidents of Travel in Central America, Chiapas, and Yucatán* included engravings of sky-bands from Palenque's Temple of the Inscriptions, Houses A and D of the Palace, the Temples of the Cross and Sun. In fact, with the exception of Ritter, who pictured Tikal, every source cited above illustrated sky-bands from Palenque. For Palenque's unique role in the history of Maya studies, see Coe (1992), and Stuart (1992).

3 Although mentioned by Adela Breton in 1908, Seler's 1911 essay remained the sole in-depth treatment of the Acanceh facade for most of this century. More recently, von Winning (1985), and V. Miller (1991) produced monographs on the stuccoes.

4 Aveni recently suggested that scholars reconsider the Acanceh frieze in light of our current understanding of ancient and modern Maya astronomy (Aveni 1980:199-200).

5 Earlier, in 1898, Seler compared the Chichén Itzá Venus signs with those found in the Dresden Codex and on Copán Altar R (Seler 1898a).

6 Chak replaces the peccaries of the Paris Codex on the Hauberg Stela and Tikal Stela 1.

7 Unless otherwise noted, all dates given according to the Julian Calendar. Maya Long Count dates were 8.7.17.14.4 for the Hauberg Stela, and 9.0.15.11.0 for Tikal Stela 1.

8 These include the books of Chan Kan, Chumayel, Ixil, Kauah, Nah, Teabo, Tekax, Telchac, Tixcocob, Tizimin, and Tusik. The Pérez Codex, named after the nineteenth century Yucatecan scholar Juan Pío Pérez, contains fragments of the now lost Mani and Oxkutzcab Books of Chilam Balam (Gibson and Glass 1975:382-387).

9 Two scribes from the town of Teabo with the surname Nah recorded the Chilam Balam of Nah (Paxton 1992:216).

10 In the years since its creation, every page of the Paris Codex has suffered damage. The codex was discovered in 1859 by Léon de Rosny in a sooty corner near a fireplace in Paris's Bibliothèque Nationale (Thompson 1950: 25).

11 The First Series of Katun Prophecies are found in the Pèrez Codex Chilam Balams (Pérez I and II), and in the Tizimin and Kaua manuscripts. The Chilam Balam of Chumayel also contains a fragment of the Series I Katun Prophecies, namely those associated with Katuns 4, 2, and 13 Ahaw. Barrera Vásquez and Rendón published a synthesized Spanish translation of both Series I and Series II Katun Prophecies (Barrera Vásquez and Rendón 1949). Roys later produced an annotated English version of the prophecies of Series I (Roys 1960).

12 Victoria and Harvey Bricker have advanced yet another reconstruction of the ancient Maya zodiac (Bricker and Bricker 1992).