

SEASONAL CYCLES, *VEINTENA* RITUALS, AND YEARBEARER CEREMONIES IN CENTRAL MEXICO*

RITUALES DE LAS *VEINTENAS* Y CARGADORES DE LOS AÑOS EN EL MÉXICO CENTRAL

Susan Milbrath**

Fecha de recepción: 02 de noviembre de 2017 • Fecha de aprobación: 09 de diciembre de 2021.

Resumen: La exploración del ciclo del año en el *Códice Borgia* en relación con las ceremonias de fin de año representadas en las páginas 49-52 del *Borgia* permite entender mejor el ciclo de las 18 *veintenas* (periodos de veinte días) en las comunidades orientales nahuas, especialmente del valle de Puebla-Tlaxcala, lugar de origen de este códice. Los rituales de las *veintenas* representados en este almanaque y la sección narrativa de las páginas 29-46 proporcionan evidencia de que las *veintenas* realmente estaban ligadas a las estaciones. Las fechas del año, sin embargo, siguieron un sistema diferente, coordinado con el ciclo continuo de 260 días en el *tonalpohualli*. Ningún ajuste fue posible en el ciclo de 52 años, pero este no es el caso de las *veintenas*, que nunca se nombran como parte del *xihmolpilli*. Parece probable que la flexibilidad del sistema de las *veintenas* permitiera que los «meses» se ajustaran para mantenerse en sintonía con las estaciones.

Palabras clave: calendarios; estacionalidad; rituales anuales; *Códice Borgia*; aztecas.

Abstract: An exploration of the cycle of the year in the Codex Borgia in relation to the year-end ceremonies represented on pages 49-52 of the Codex Borgia allows us to better understand the cycle of 18 *veintena* festivals (periods of 20 days) in the eastern Nahua communities, especially the Puebla-Tlaxcala Valley, the point of origin of the Codex Borgia. The *veintena* rituals depicted in this almanac and the narrative section on pages 29-46 provide evidence that the *veintenas* were tied to the seasons. The year dates, however, followed a different system, coordinated with the continuous cycle of 260 days in the *tonalpohualli*. No adjustment was possible in this cycle of 52 years, but this is not

* Quiero agradecer a Élodie Dupey García, Elena Mazzetto y Gabriel Kruell, quienes editaron el manuscrito original y a tres revisores anónimos.

** Florida Museum of Natural History, University of Florida (UF), EE. UU., milbrath@flmnh.ufl.edu.

the case with the *veintenas*, which were never named as part of the *xiuhmolpilli*. It seems that the flexibility of the *veintena* system allowed the «months» to be adjusted to stay in tune with the seasons.

Keywords: calendars; seasonality; annual rituals; Codex Borgia; Aztecs.

Résumé : L'exploration du cycle de l'année dans le Codex Borgia en relation avec les cérémonies de fin d'année représentées dans pages 49-52 nous permet de mieux comprendre le cycle des 18 «vingtaines» (période de 20 jours) dans les communautés orientales nahuas, en particulier de la vallée de Puebla-Tlaxcala, lieu d'origine du Codex Borgia. Les rituels des «vingtaines» représentés dans cet almanach et dans la section narrative du page 29-46 prouvent que les «vingtaines» étaient vraiment liées aux saisons. Les dates de l'année, cependant, ont suivi un système différent, coordonné avec le cycle continu de 260 jours du *tonalpohualli*. Aucun ajustement n'était possible au cours d'un cycle de 52 ans, mais ce n'était pas le cas avec les «vingtaines», qui ne sont jamais mentionnées comme faisant partie du *xiuhmolpilli*. Il semble probable que la flexibilité du système des «vingtaines» permet d'ajuster les «mois» pour rester en phase avec les saisons.

Mots-clés : calendriers ; saisonnalité ; rituels annuels ; Codex Borgia ; Aztèques.

This article studies seasonal festivals represented in two sections of the Codex Borgia, a central Mexican screen-fold book that probably dates to the last decades prior to the Spanish conquest. Borgia pages 49-52 records four year dates with calendar inscriptions that coordinate with the annual festival of Izcalli, the last 20-day *veintena* of the year in central Mexico (Milbrath 2013, 35, Table 3.1; 2020). *Veintena* festivals also appear on pages 29-46 of the Codex Borgia in a unique 18-page narrative that depicts scenes related to seasonal events (Milbrath 2013; 2015). The narrative includes a number of Venus events that are explored in my book, *Heaven and Earth in Ancient Mexico: Astronomy and Seasonal Cycles in the Codex Borgia* (Milbrath 2013). The Codex Borgia is the only surviving central Mexican codex that records 15th century dates that may relate to astronomical events (Aveni 1999; Bricker 2001; Milbrath 2013, Table 3.1).

Codex Borgia pages 49-52 and the narrative on pages 29-46 represent *veintena* rituals that are keyed to the seasons, and these images enhance our understanding of the festival calendar in the Puebla-Tlaxcala valley, the most likely origin point for the Codex Borgia (Boone 2007, 227-230). The provenance of the Codex Borgia may be more specifically located in Tlaxcala, where murals very similar to the codex have been discovered (Milbrath 2013, 1-3). The 365-day calendar recorded in Tlaxcala by Diego Muñoz Camargo has a format similar to other 16th century calendars from the Valley of Mexico, sharing the same sequence of *veintena* festivals (Acuña 1984; Caso 1967, Table 10; Durán 1971, 410-12; Milbrath 2013, 124-90, Tables 2.1, 2.2; Nicholson 1971, Table 4; Sahagún 1950-1982, 2: 1-32).

Yearbearers in the Central Mexican Calendar

The 365-day year in central Mexico, known as the *xibuitl*, incorporated one complete 260-day divination calendar (*tonalpohualli*), using 20 day signs and 13 numbers, and 105 days of the *tonalpohualli* were repeated in the last part of the year. The 365-day year had 18 *veintenas* and an added five-day *nemontemi* (18 x 20 + 5 days) at yearend. Since the *veintenas* were counted using the 20 day signs and numbers of the *tonalpohualli* calendar, there were actually two occurrences of the numbered day sign used to name a specific year, and the second occurrence was usually the «yearbearer.» Based on Aztec models, it seems likely that the year was named for a day sign that coordinated with the last

20-day festival in the year. Each yearbearer was combined with a sequence of numbers running from 1 to 13 to designate one of the 52 years in the Calendar Round. Known as the *xiuhmolpilli* or «tying of the years,» this cycle of 52 years is similar to our century, but only half as long. Throughout the course of the 52-year *xiuhmolpilli*, no single yearbearer date is repeated, and because of the way the *tonalpohualli* calendar integrated with the 365-day year, only four day signs could name the year. With the *nemontemi* period at yearend, the day sign used to name the year shifted five days later in the *tonalpohualli* sequence each year, but in the fifth year, the cycle went back to the first yearbearer, but the numeral coefficient increased by four. For example, 1 Reed is followed by 2 Flint, the yearbearer in the next year, then 3 House, 4 Rabbit, and 5 Reed, and the count continued on using all 13 numbers in combination with the four yearbearers to form a cycle of 52-years. The concept of cyclical time is clearly apparent in calendar wheels made in the colonial period to explain the Aztec calendar to Europeans.

Although most show the 260-day calendar or the yearbearer cycle of 52 years, some record the annual festival cycle. The Aztecs ended the 52-year cycle with a festival to bury the «bundle» of years that represent the *xiuhmolpilli* (Milbrath 1997, 202). Generally the year bundle was buried in Tititl, the 17th *veintena* festival in most Aztec calendars (Caso 1967, Table 10). Nonetheless, a number of festival calendars and calendar wheels provide evidence that different *veintena* festivals could end the year.¹ Veytia Calendar Wheel 5, a Tlaxcalan calendar, shows the year ending in Panquetzalitzli, like the Mixtec system (Anders, Jansen & Reyes García 1993), but the *Relaciones Geográficas* from Tlaxcala places the year ending in Izcalli, like the most common Aztec pattern (Acuña 1984, 228; Milbrath 2013, Fig. 1.3).

Veintena festival names in Tlaxcala and the Valley of Mexico are similar and their placement in the year is roughly the same (Milbrath 2013, Tables 2.1, 2.2). These central Mexican festival calendars share many elements, including the ceremonies and deities honored in specific festival periods. The *veintena* festivals are closely related to seasonal cycles, but they sometimes incorporate reenactments of «mytho-historical» events. Aztec festivals clearly dramatized events that we consider mythological, such as the birth of the Aztec solar god Huitzilopochtli and the migration legend reenacted in the Aztec Panquetzalitzli festival (Schwaller 2019, 104).²

Seasonal Adjustments to the Festival Calendar

The yearbearers cycle of 52 years is equivalent to 73 *tonalpohualli* cycles, integrating the two cycles in a continuous sequence ($73 \times 260 = 365 \times 52$). No seasonal adjustment was possible in this form of dating because it depends on an unbroken sequence of 260 days. Nonetheless, since the *veintena* festivals are not included in the central Mexican *xiuhmolpilli* inscriptions, these could be shifted to follow the seasonal cycle.

A subject of great debate is whether the dates of the festivals were adjusted to account for leap years. Publications by Michel Graulich (1990, 316–24; 2002; 2008) argue against the inclusion of a leap year, but some form of calendar adjustment is implied by the link between the festival cycle and solar events, as discussed by Anthony Aveni, Calnek & Hartung (1988, 289–90), Johanna Broda de Casas (1969; 1982, 93), Carmen Aguilera (1989), and others (Jansen & Peréz Jiménez 2017, 17; Šprajc 2000; Tena 1987, 68–69). In 1519, the majority of Aztec calendars began the year in February, and possibly the February date was memorialized in Aztec architectural orientations, such as the alignment at Malinalco to the sun's horizon position on February 12 and again on October 29, (Broda de Casas 2015, 222–23; Galindo 1994, 129–30; Šprajc 2001, 355–56). This type of orientation divides the year into segments of 260 and 105 days, and perhaps could have been used to adjust the position of the first month of the year.

A number of ethnohistorical sources maintain a leap year adjustment existed and the festivals themselves seem to be correlated with seasonal events.³ Sahagún (1950–1982, 2: 35; 4: 144) noted that an extra day was added every four years by extending the *nemontemi* for six days rather than five. He also suggested that a leap year adjustment took place during a special ceremony held every four years in Izcalli, the last festival of the year (Castillo Farreras 1971, 84). If any such intercalation was made, it apparently was not in 1520, a bissextile year in the European calendar, and no apparent adjustment was made in 1519 or 1521, based on the correlations compiled in Alfonso Caso's (1967) extensive study of the calendar. If there was some form of adjustment to the festival dates, it did not impact the *tonalpohualli* and the associated yearbearers, which ran on continuously. It is not clear how an intercalation could be accomplished without altering the pattern of yearbearers naming the year, but it is possible these shifts were made by changing the yearbearers, as may be the case in the Maya area (Milbrath in press). Perhaps this explains why we see different yearbearer sets chosen at different points in time in Mesoamerican history (Caso 1967; Edmonson 1988).

Alternatively, the beginning of the year could have changed over time, which may explain why some calendars begin on different months in central Mexico (Caso 1967, Table 10).

For the yearbearer to maintain a relationship with a specific *veintena* festival, these 20-day periods could not be easily shifted. Caso (1971) concluded that each year was named for the last *tonalpohualli* day in the last *veintena* festival of the year, arguing that under these circumstances, no intercalation was possible because any adjustments to the position of festivals would have affected the continuous *tonalpohualli* count and the yearbearer dates derived from this calendar (Milbrath 2013, 113-14, n.17). Nonetheless, it is clear that the *veintenas* show some relationship to the seasonal cycle, and perhaps periodical adjustments kept the festivals in synch with the seasons. The Aztecs could have made such an adjustment during Panquetzaliztli, for Sahagún (1950-82, 4: 143-44; 7: 27) notes the New Fire Ceremony was timed by the midnight zenith of the Pleiades, which would provide a guide to readjusting the *veintenas* to the seasonal cycle every 52 years. Adding 13 days to the length of the festival calendar every 52-years would shift the position of the yearbearer, so instead of the yearbearer falling on 1 Reed, as in 1519, in 52 years the yearbearer would be 13 days later in the *tonalpohualli*, falling on 2 Deer, which is not one of the Aztec yearbearers. Clearly the yearbearers did not change every 52 years, and the yearbearer must have been allowed to drift in relation to the *veintenas*, so that it would not always be positioned in the same place relative to the *veintenas*. It should be noted that the yearbearer could shift forward 26 days through the last *veintena* and the *nemontemi* and still remain in the same year.

Integrating the Festival Cycle and the Yearbearers

There is considerable disagreement about the positioning of the yearbearers in the year. The *Relaciones Geográficas* states that the Tlaxcalan year was named for the first day of the year, which is like the pattern recorded in the Codex Magliabecchiano (Acuña 1984, 222; Batalla Rosado 2002; Boone 1983). On the other hand, Alfonso Caso (1971, 346, Table 4) noted that the Aztec yearbearer had to fall in a «significant position,» which he argued was the 360th day of the year, just prior to the five-day *nemontemi*. In order to align the yearbearer with the last day of the last *veintena*, his model ended the Aztec year in Tititl, even though his tables compiling actual records of the *veintena* cycle most often show the year ending in

Izcalli (Caso 1967, Table 10). The Codex Telleriano-Remensis, Codex Vaticanus A, and the calendars collected by Durán and Sahagún all name Izcalli as the last *veintena* of the year (Batalla 2002, 225-29; Quiñones Keber 1995, 150-51). H. B. Nicholson's (1971, Table 4) synthesis of the festivals indicates that Izcalli ended the year, thus the yearbearer was positioned very near the end of the year, but was not the last day of the last *veintena* festival. Although Nicholson never explicitly discussed the placement of the yearbearer, it would be the last day of T'ititl, which is the 340th day of the year in his alignment of the festivals (Table 1).

I have proposed that around the time of the conquest the yearbearers all coordinated with the first day of Izcalli, the 341st day of the year, because the *veintena* festivals actually began a half-day earlier than the *tonalpohualli* days (Table 2; Milbrath 2013, Table 1.5). Positioning the *veintena* festivals a half day earlier than the *tonalpohualli* date would place the yearbearer on the first day of Izcalli, if the festival began on the previous *tonalpohualli* day (compare Tables 1 and 2). Such a pattern would not alter the otherwise sound principles of Caso's correlation with the year dates, which have withstood «the test of time.»⁴

Caso (1971, 345) pointed out that a difference of one day in the positioning of the *veintenas* relative to the European calendar should not be considered significant because, even though the «day» started at midnight for the Europeans, the Aztecs began the day at either dawn or noon. Caso noted that there is some uncertainty about when the day began, but he argued that the day began at noon, based on the Codex Telleriano-Remensis 48v, which says «ellos cuentan el día, desde medio día hasta otro día a medio día» (Caso 1967, 53).⁵ On the other hand, the Dominican friar Diego Durán (1971, 134) tells us that dawn was considered to be the «birth of the day.» His Franciscan counterpart, friar Bernardino de Sahagún (1950-1982, 2: 141, 143) also noted that the *tonalpohualli* day began at dawn, but the festival period for Panquetzaliztli began at midnight and the feast day itself began at dawn of the 20th day, implying that the *veintena* began at a different time than the *tonalpohualli* day. With the *tonalpohualli* day beginning at dawn or noon, and the *veintena* festivals at midnight, it seems there could be some «wiggle room» to adjust the festivals by shifting the beginning of the *veintena* by one day every four years or six hours every year, leaving the yearbearer cycle and *tonalpohualli* running continuously without adjustment.

It seems that Izcalli, the last *veintena* festival in the year, actually began up to a half day earlier than the *tonalpohualli* day, so Izcalli incorporated the day sign and number used to designate the yearbearer as the first day in the *veintena* (Table 2). Sahagún's (1959-1982, 2: 159-66) description of Izcalli in the

Table 1. Aztec *veintena* festival cycle for 1 Reed (1519) based on Caso (1971, Table 4), with the *tonalpohualli* days and *veintena* festivals both beginning at noon, and the year ending in Izcalli, as in Nicholson (1971, Table 4).

<i>festivals</i>	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX*
1519-1520	2/14	3/6	3/26	4/15	5/5	5/25	6/14	7/4	7/24	8/13	9/2	9/22	10/12	11/1	11/21	12/11	12/31	1/20	2/9
Jaguar	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9
Eagle	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10
Vulture	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11
Movement	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Flint	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Rain	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	
Flower	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	
Crocodile	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	
Wind	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	
House	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	
Lizard	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	
Serpent	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	
Death	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	
Deer	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	
Rabbit	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	
Water	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	
Dog	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	
Monkey	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	
Grass	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	
Reed	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	

* The 19th «festival» of the *xibuitl* is the 5-day *nemontemi* period. The yearbearer appears on the last day of the second to last *veintena* festival, which is Tititl, according to Nicholson (1971, Table 4). In the Mixtec system the year ended 40 days earlier, so 13 Reed is the name of the year 1519.

Table 2. Year 1 Reed (1519) ending in Izcalli, with all *tonalpohualli* days beginning at noon and the *veintena* Festivals beginning at dusk or midnight of the previous day*

<i>festivals</i>	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	XIII	XIV	XV	XVI	XVII	XVIII	XIX
Reed	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8
Jaguar	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9
Eagle	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10
Vulture	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11
Movement	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Flint	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Rain	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1
Flower	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2
Crocodile	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3
Wind	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4
House	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5
Lizard	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6
Serpent	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7
Death	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8
Deer	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9
Rabbit	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10
Water	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11
Dog	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Monkey	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Grass	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1

* This shifts the *veintena* festivals one day earlier in relation to the *tonalpohualli* dates. The yearbearer appears on the first day of the last *veintena* festival, which is Izcalli according to Nicholson (1971, Table 4). See Table 1 for festival names.

Florentine Codex indicates that at midnight the priest began to drill the fire. If the Izcalli festival began at midnight it would already be in progress by the time the *tonalpobualli* day shifted, six or twelve hours later at dawn or noon. This means the yearbearer day sign would correspond to the first day of Izcalli. In Maya dating, there are also some calendar records in which the *veintena* dates in the year (Haab) are a day earlier than the Tzolkin day, so this patterning has precedents (Tokovinine 2010, 17-18).

Codex Borgia Yearbearer Pages 49-52

We now turn to the Codex Borgia pages 49-52, where the yearbearer festival clearly coordinates with Izcalli, the last *veintena* of the year. These four pages show the yearbearers 4 House, 4 Rabbit, 4 Reed and 4 Flint, all marking the second occurrence of these dates in the year (Figs. 1a-d). The iconography here suggests yearbearer festivals were actually yearend ceremonies, with fire drilling rituals like those performed in Aztec accounts of Izcalli, the *veintena* ending the year (Sahagún 1950-1982, 2: 170). The yearbearer pages (49-52) appear with dates that coordinate with Izcalli, a festival characterized by a fire-drilling ceremony that is shown on these pages (Fig. 1, lower right). The central trees and the skybearers holding up the heavens on the upper right of the Codex Borgia yearbearer pages evoke concepts of world renewal associated with the trees that helped raise the sky after the great flood in Aztec accounts (*Historia de los Mexicanos por sus pinturas*, Garibay 1979, 32). Yearbearer ceremonies showing trees and skybearers symbolically reestablish world order at yearend, not unlike the Uayeb ceremonies in Maya codices (Bricker & Bricker 2011, 120-42; Vail andLooper 2015, 202-04).

Although there are a number of different calendars in central Mexico, most include the same month names and the majority end the year in Izcalli (Caso 1967, Table 10), but the dates for the months in different calendars may vary up to 20 days. For example, the *Relaciones Geográficas* records month dates that are 16 days later than those in Nicholson's synthesis (Acuña 1984; Nicholson 1971, Table 4; Milbrath 2013, Tables 2.1, 2.2). In order to discuss calendar dates in the Codex Borgia, I have had to work with one calendar format so I have chosen the festival dates compiled for the Handbook of Middle American Indians. These have been adjusted for their position in near the end of the 15th century in the year 4 Flint, the year shown as the last yearbearer on Codex Borgia page 52

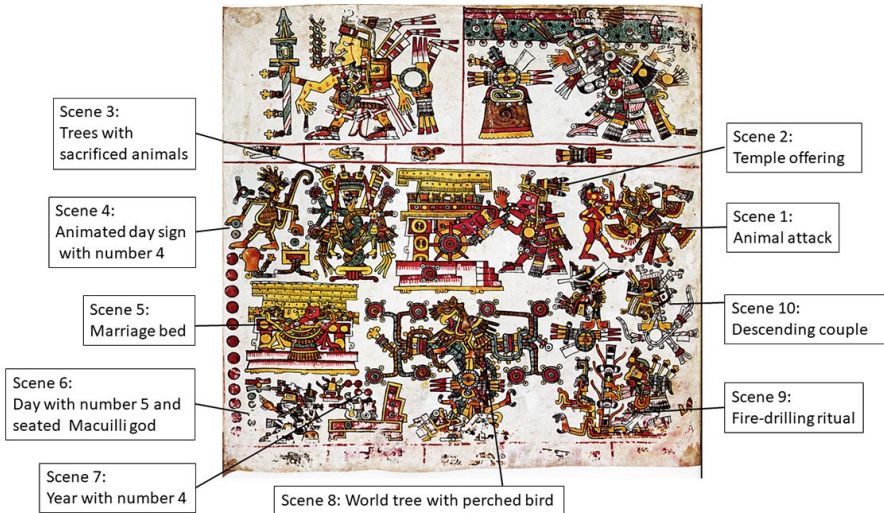


Figure 1a. Codex Borgia page 49, with scenes labeled and year 4 House and day 5 Movement (scenes 6 and 7) referring to 17 February 1458 during Izcalli, the last *veintena* of the year (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García 1993).

(Fig. 1d). The dates used here for the festivals in the Codex Borgia employ no intercalation, and because the events are close to the time of the conquest, the differences between these festival dates and the Aztec dates in 1519 are minimal, with or without an intercalation. Fortunately, the yearbearers and *xiuhmolpilli* dates in the Codex Borgia are not affected by the issue of an intercalation, because they are based on dates drawn from the repeating *tonalpohualli* cycle of 260 days.

The four yearbearer pages on Codex Borgia 49-52 is followed by page 53 that includes images referencing the central direction, so that on Codex Borgia pages 49-53 are most often described as an almanac representing the five cardinal directions (Anders et al. 1993, 261-84; Batalla Rosado 2008, 445-54; Boone 2007, 121-32; Nowotny 2005, 112-21). Here, the yearbearers record dates with year signs spaced at 13-year intervals, naming the years as 4 House, 4 Rabbit, 4 Reed, and 4 Flint, and taken together they refer to the entire 52-year cycle.⁶ The late date of the codex (Aveni 1999; Boone 2007; Bricker 2001; Milbrath 2013, 15-16) suggests these yearbearers refer to the 15th century or early 16th century. Standing alone, the yearbearers mark both the *tonalpohualli* day naming the year and the year itself, with the date on Codex Borgia page 52b referencing the



Figure 1b. Codex Borgia page 50, with the year 4 Rabbit and day 5 Wind referring to 14 February 1471 during Izcalli, the last *veintena* of the year (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García).



Figure 1c. Codex Borgia page 51, with the year 4 Reed and day 5 Deer referring to 11 February 1484 during Izcalli, the last *veintena* of the year (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García 1993).



Figure 1d. Codex Borgia page 52, with detail of the year 4 Flint and day 5 Grass, referring to 7 February 1497 during Izcalli, the last *veintena* of the year (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García 1993)

day 4 Flint in the year 4 Flint, corresponding to January 24, 1497 in the Julian calendar employed until the 1582 Gregorian reform (Fig. 1d; Table 3; add 9 days for the Gregorian calendar equivalent). In a festival calendar with the year ending in Izcalli (XVIII), the day 4 Flint in the year 4 Flint on Codex Borgia page 52b would be positioned as the yearbearer on the last day in Tititl (XVII), as in Table 3. But if the *veintena* began a half day earlier than the *tonalpobualli* day, as I have proposed, the yearbearer would fall on the first day of Izcalli, the last 20-day *veintena* festival in the calendar, as in Table 4.

On the lower left of each page, alongside day signs with the number five, seated deities represent the Macuiltonaleque, easily recognized by the white hand painted across the chin. These *tonalpobualli* notations do not seem to be the names of the Macuiltonaleque and probably represent Calendar Round dates when paired with the year dates (see detail boxes in Fig. 1). The idea that these day signs with the number five represent dates was first suggested by Anton Nowotny in the 1961 German edition of *Tlacuilolli* and restated in the English translation (Nowotny 2005, 251). Christine Hernández (2004, 336-56, Table 11.11) proposed that the year signs with numbers can be paired with day signs

Table 3. Years 1496–1497 (4 Flint) with the *tonalpoobuulli* days and *veintena* festivals both beginning at noon, and the year ending in Izcalli*

<i>Festivals</i>	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>	<i>VII</i>	<i>VIII</i>	<i>IX</i>	<i>X</i>	<i>XI</i>	<i>XII</i>	<i>XIII</i>	<i>XIV</i>	<i>XV</i>	<i>XVI</i>	<i>XVII</i>	<i>XVIII</i>	<i>XIX</i>
1496-97	2/20*	3/11	3/30	4/20	5/10	5/30	6/19	7/9	7/29	8/18	9/7	9/27	10/17	11/6	11/26	12/16	1/5	1/25	2/14
Rain	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Flower	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Crocodile	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1
Wind	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2
House	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3
Lizard	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	
Serpent	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	
Death	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	
Deer	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	
Rabbit	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	
Water	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	
Dog	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	
Monkey	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	
Grass	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	
Reed	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	
Jaguar	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	
Eagle	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	
Vulture	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	
Movement	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	
Flint	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	

* Because 1496 was a leap year, the month of February was 29 days long.

Table 4. Years 1496-1497 (4 Flint) ending in Izcalli, with all *tonalpobualli* days beginning at noon and the *veintena* Festivals beginning at dusk or midnight of the previous day*

<i>Festivals</i>	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>V</i>	<i>VI</i>	<i>VII</i>	<i>VIII</i>	<i>IX</i>	<i>X</i>	<i>XI</i>	<i>XII</i>	<i>XIII</i>	<i>XIV</i>	<i>XV</i>	<i>XVI</i>	<i>XVII</i>	<i>XVIII</i>	<i>XIX</i>
1496-97	2/20	3/11	3/30	4/20	5/10	5/30	6/19	7/9	7/29	8/18	9/7	9/27	10/16	11/6	11/26	12/16	1/5	1/25	2/14
Flint	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11
Rain	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12
Flower	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13
Crocodile	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1
Wind	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2
House	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	
Lizard	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	
Serpent	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	
Death	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	
Deer	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	
Rabbit	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	
Water	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	
Dog	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	
Monkey	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	
Grass	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	
Reed	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	
Jaguar	5	12	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	
Eagle	6	13	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	
Vulture	7	1	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	
Movement	8	2	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	
Flint	9	3	10	4	11	5	12	6	13	7	1	8	2	9	3	10	4	11	

* This shifts the *veintena* festivals one day earlier in relation to the *tonalpobualli* dates. The yearbearer appears on the first day of the last *veintena* festival, which is Izcalli according to Nicholson (1971, Table 4). See Table 1 for festival names.

bearing the number five, forming *xiuhmolpilli* dates that refer to specific dates in the 52-year cycle. Boone (2007, 129–30) lends support by pointing out that these *tonalpohualli* dates are not the usual names for the Macuiltonaleque, as seen on Codex Borgia pages 47a–48a.

The *tonalpohualli* dates (5 Earthquake, 5 Wind, 5 Deer, and 5 Grass) all have two occurrences in the 365-day year, but paired with the yearbearers they mark the second occurrence in the year, falling in T'ititl.⁷ When the year signs on pages 49–52 are paired with the *tonalpohualli* date alongside, the date falls midway through the month Izcalli. These *tonalpohualli* dates consistently fall 14 or 15 days after the yearbearer dates on these pages. For example, on Codex Borgia page 52, the yearbearer date 4 Flint marks both the day and year 4 Flint, and counting forward to the *tonalpohualli* date 5 Grass leads to the 14th day of Izcalli (Table 3). However, if we presume that Izcalli began at midnight, half a day earlier, 5 Grass would be the 15th day of Izcalli (Table 4). In any case, all the *tonalpohualli* dates maintain the same relationship to the dates in the European calendar. Using the Julian calendar, these *xiuhmolpilli* dates are as follows: 17 February 1458 (4 House 5 Motion, 49b); 14 February 1471 (4 Rabbit 5 Wind, 50b); 11 February 1484 (4 Reed 5 Deer, 51b); and 7 February 1497 (4 Flint 5 Grass, 52b), dates that are included in a large set of *xiuhmolpilli* notations in the Codex Borgia (Milbrath 2013, 12, Table 3.1).

Another set of numbers is represented on the far left, in a vertical column on Codex Borgia pages 49–52. Here twelve red dots mark intervals between day signs in the cells moving from one page to the next, as on Codex Borgia page 49, where 1 Crocodile + 12 days leads to 1 Jaguar on Codex Borgia page 50. This is the standard interpretation of the dots as intervals, counting the number of days between the *treceñas* (13-day periods) when moving from page to page, but they may also play a second role. In the context of the yearend festivals, they can be used to count forward from dates represented by the day signs with the number five to the yearend and on to the first day of the New Year (Milbrath 2013, 35). For the year 4 Flint, adding an interval of twelve days to the date 5 Grass carries the count to through the yearend and on to the *veintena* day beginning the next year on 4 Lizard, as in Table 3, or 3 House in the layout that shifts the *veintenas* a half day earlier, as in Table 4.

The *xiuhmolpilli* dates on Codex Borgia pages 27–28 and the yearbearers almanacs on Codex Borgia pages 49–52 record dates ranging from 1467 to 1497, and many dates reference significant astronomical events (Fig. 2; Milbrath 2013, Table 3.1).⁸ The *xiuhmolpilli* dates on Codex Borgia page 28 span from May

1467 to January 1472, and here images of Tlaloc are associated with dates that correspond to *veintena* festivals honoring Tlaloc (Hernández 2004; Milbrath 2013, 33-35, Table 2.6). This helps link *veintena* iconography directly with the recorded dates, as in the pattern we see on Codex Borgia pages 49-52, where the dates are linked to Izcalli, portrayed by fire rituals shown in the lower right of each page (Milbrath 2013, 2020).

On Codex Borgia page 27, the 52-year cycle begins with the day 1 Crocodile in the year 1 Reed, on the lower right, referring to March 26, 1467 and the same *tonalpohualli* date 260 days later on the winter solstice in 1467 (December 11; Milbrath 2013, Table 3.1). This is followed by a *xiuhmolpilli* date 13 years later in 1 Flint (1480) on the upper right, then another date to the left corresponding to 1 House (1493), and then a date of 1 Rabbit (1506) with the implied cycle projecting forward to the initial 1 Reed year date, but now 52 years later in 1519.

Even though the narrative on Codex Borgia pages 29-46 lacks any year dates, it falls in the same 52-year cycle laid out on Codex Borgia page 27. The yearbearer 4 Flint on Borgia 52 represents the year 1496, the same year associated with the narrative on pages 29-46. This is the year of a total solar eclipse depicted on



Figure 2. Codex Borgia page 28, with year dates that begin on the lower right with 1 Reed, followed by 2 Knife in the upper right, and 3 House in the upper left, and 4 Rabbit in the lower right and 5 Reed in the center (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García 1993).

page 40, one seen all across Mexico (Milbrath 2013, 44-45).⁹ Furthermore, in the year 4 Flint, Venus phases coordinated with important solar dates, transitioning from Evening Star to Morning Star just after the winter solstice, reaching maximum altitude around the spring equinox, and then the Morning Star disappeared around the fall equinox and reappeared as the Evening Star just before the winter solstice (Milbrath 2013, Plates 1, 2, 5, 13, 18). This seasonal pattern would repeat every eight years over the course of a century, but the year 4 Flint had special importance because it was the year of a total solar eclipse, the only one recorded in Aztec annals (Aveni y Calnek 1999).

A review of the most notable interpretations of the Codex Borgia pages 29-46 will provide a background for understanding the evolution of ideas related to this unique narrative and my identification of *veintena* festivals in the sequence. At the beginning of the 20th century, Eduard Seler [1904-1909] 1963, 2, 9-10, 20, 50, 61) interpreted the narrative on pages 29-46 as a Venus sequence that started with the disappearance of Venus as the Morning Star and a 77-day interval in Superior Conjunction, when Venus was invisible behind the sun (pages 29-31). Then a 252-day Evening Star phase (pages 32-39) was followed by a 12-day Inferior Conjunction phase on pages 40-44 that ended with the rise of the Morning Star on pages 45-46. Although he attempted to work out these intervals based on some of the day signs, iconographic analysis rather than calendrics underpins his study of the Venus phases. Seler's astronomical interpretation has been largely rejected, even though scholars still rely on many of his deity identifications (Boone 2007; Márquez Huitzil 2017).

Elizabeth Boone's (2007, 178-210) discussion of the narrative assigned Venus only a minor role, and she divided the sequence on Codex Borgia pages 29-46 into eight episodes that are steeped in legends of creation cosmology, featuring the birth of the gods and the calendar. Her emphasis on mythological underpinnings for the narrative certainly has merit, but I would argue that the representations of the *veintenas* in the narrative may also allude to mythological events. This can be seen in the festival of Quecholli, which refers to the Chichimec past, the mythical time of peregrinations, and the origins of cosmic warfare (Broda de Casas 1991, 103-05). As will be seen, Codex Borgia page 45 represents Quecholli, marking the beginning of the dry season, a time for warfare in central Mexico (see Fig. 6; Milbrath 2013, 77, 96, 98, 106).

Juan José Batalla (2008, 413-37) also described an eight-part division of Codex Borgia pages 29-46, but he emphasized ritual events. Pages 29-32 are interpreted as images of a ritual in the Temple of Cihuacoatl, followed by the se-

cond ritual on pages 33-38 in the Temple of the Heavens and the Sacred Bundle, and the third rite involves the sacrifice of the new sun on pages 39-40, while pages 41-42 refer to a fourth rite showing ritual sacrifice offered to Itztlacolihqui. The last four pages (43-46) are recognized as separate rituals, but only the last page is related in any specific way to Aztec rituals. Page 46 is interpreted as the New Fire Ceremony, known only from Aztec sources, but this seems unlikely because the Codex Borgia is from the Puebla-Tlaxcala Valley, an area where there is no known record of such a ceremony (see Fig. 7). Indeed, the New Fire Ceremony is a distinctly Aztec ceremony featuring the Aztec tribal god Huitzilopochtli, and he does not appear in any of the images of the Codex Borgia and would not be expected to be present given the origin point of the Codex Borgia in a neighboring valley that was hostile to the Aztecs (Milbrath 2013, 118n34).

Karl Nowotny (2005, 26-34, 267-75) proposed that the scenes on Codex Borgia pages 29-46 are a series of temple rituals with attendant priests, a proposition first made in 1961 German edition of *Tlacuilolli*. He argued that the images represent a unified cycle of festivals and rituals, and the days recorded may represent the same position in the 365-day year over a sequence of four years, but he noted that the relationship to the 18 annual festivals could not be determined. Contrary to Nowotny, I think it is possible to recognize *veintena* festivals in the images on Codex Borgia pages 29-46, but these festivals are positioned at key moments in the seasonal cycle, as will be discussed further in the next section.

Gordon Brotherston (2003) proposed a specific sequence of 18 festivals is shown on the 18 pages of the Codex Borgia narrative and he compared certain details in the images to the *Florentine Codex*, arguing that this provides a key to the festival represented on each page. Brotherston (2003, 85) says:

At precisely the right intervals, there is clear evidence of the Feasts we identified as a template for the cycle as whole. Threads and broom, albeit rudimentary, mark Ochpaniztli (F1.9; p. 33-34); the birds, the arrow, the bag and even the nose-bone of the hunter in Quecholli (F2.3) emerge on page 36 and are carried down the left margin to page 38; falling water poured by Tlaloc at Atemoztli (F2.5) runs off the very bottom of the following page, the last of the obverse (p. 38); the conical cap is worn at Tlacaxipehualiztli (F2.9; p. 42); Tezcatlipoca and the feathered warriors of Toxcatl (F1.3) dominate page 45; and on the next and final page, the sequence culminates in the pozole pot of Etzalcualiztli (F1.4), at the summer solstice (p. 46).

His evidence seems very tenuous, and often simply wrong. For example, he says a *pozole* pot on Codex Borgia page 46 is linked to Etzalcualiztli, but the pot

is boiling the body of Quetzalcoatl and is clearly not a bean stew consumed in Etzalcualiztli (see Fig. 6). And, he also misses some key elements, such as the image of Xipe Totec on the stone of sacrifice during Tlacaxipehualiztli on page 33 (Fig. 3; Milbrath 2013, 26).

Recently, Maarten Jansen and Gabina Aurora Pérez Jiménez (2017, 474, 479, 523) have abandoned the lyrical reading of the narrative and the nine-part division they presented in their Codex Borgia commentary (Anders, Jansen & Reyes García 1993, 175-245), and they now link Codex Borgia pages 29-46 directly with the Aztec festival calendar, but they also miss some obvious connections. Even though they recognize Xipe's sacrifice on page 33 (Fig. 3), they say the Tlacaxipehualiztli festival dedicated to this god is represented on the previous page by a personified sacrificial knife used in that ceremony. In their summary of the festival alignments, they claim to have identified elements of all 18 festivals on pages 29-46 (Jansen & Pérez Jiménez 2017, 523). Although they most often assign one festival per page, in some cases two festivals or even four are assigned to a single page using questionable logic. They say page 29 is «introductory,» and then go on to say that pages 30-31 represent a single festival beginning the year (Cuahuitlehua), and page 32 depicts Tlacaxipehualiztli, while pages 33-34



Figure 3. Codex Borgia page 33, showing Xipe's sacrifice in front of the temple during Tlacaxipehualiztli, the *veintena* of the spring equinox (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García 1993).

represent Tozoztonltli and Huey Tozoztli. Then pages 35-38 are related to Toxcatl and Etzalcualiztli (Figs. 4, 5). Pages 39-40 are said to depict Tecuilhuitontli and Huey Tecuilhuitl, and pages 41-42 represent Micccailhuitontli and Huey Micccailhuitl, and all the remaining pages similarly represent one festival per page except page 45, which they link to four sequential festivals, all lumped together as Quecholli-Panquetzaliztli-Atemoztli-Tititl (see Fig. 6).

An analysis of their interpretation of Codex Borgia page 45 shows the flaws in their approach. They describe the central figure on page 45 as Tlahuizcalpantecuhtli merged with Mixcoatl, identifying this god as the hunting god honored in Quecholli, agreeing with an interpretation I published in 2013, but omitting that I also noted a link with Camaxtli, the Tlaxcalan god honored in Quecholli (Milbrath 2013, 23, 30). Then they go on to relate the skull rack just below to the Tititl festival, even though the skull rack also plays an important part in the Quecholli festival (Durán 1971, 147-48; Milbrath 2019; Olivier 2015, 360, 382, 459, 579; Sahagún 1950-1982, 2: 138, 180, 185-86). The banners are said to a sign of Panquetzaliztli, but similar banners appear page 29, which I have interpreted as war banners representing insignia that mark the dry season as the season of warfare. War banners are appropriate here on page 45 because this page correlates with the beginning of the dry season (Milbrath 2013, 31, 77, 96, Plates 1, 18). Their evidence for Atemoztli on page 45 is even weaker, for the only connection they note is that the descending eagle above a river may be related to the 16th month Atemoztli («Water Descending»; Jansen & Pérez Jiménez 2017, 518). There is no know precedent for a descending eagle representing descending water and the basin of water probably symbolizes a lake rather than a river (compare the rivers represented on pages 13b, 65b, 67b). Also, they seem to ignore that the eagle god is extracting Tlahuizcalpantecuhtli's heart, which seems to be the key element in this image (see Fig. 6).

Also on shaky ground, Jansen & Pérez Jiménez (2017, 451, 521-523n123) relate Codex Borgia page 46 to the new fire ritual in Izcalli, a festival they also identify on pages 49-52 (Figs. 1, 7). Although I have also linked pages 49-52 to Izcalli (Milbrath 2013, 42, 105), the format of these pages differs considerably from page 46. The fire drilling scenes on pages 46 and 49-52 are somewhat similar, but Jansen and Pérez Jiménez do not explain the prominence of the fire serpents on page 46, which are not noted in Sahagún's (1950-1982, 2: 159-172) account of the new fire drilled during Izcalli. In fact, the fire serpents correspond to his description of Panquetzaliztli, when the flaming fire serpent was brought

down from the pyramid temple as a symbol of warfare (Milbrath 2013, 30; Sahagún 1950-1982, 2: 141-150).

There are some points of agreement in our interpretations, for Jansen and Pérez Jiménez (2017, 488, 491, 515, 528) seem to follow my alignment of certain festivals. As in my 2013 book, they link page 36 to Tezcatlipoca's festival in Toxcatl at the beginning of the rainy season, and they relate page 37 to Tlaloc's festival of Etzalcualiztli, and they also share my view that page 44 corresponds to Xochiquetzal's festival in Hueypachtli (Milbrath 2013, 29, 86). But we disagree fundamentally on the organization of the narrative, for they assign festivals in an irregular pattern, sometimes even identifying four *veintenas* on a single page, whereas I propose that each page represents a 20-day period, providing a chronological framework for the 18 pages, and I argue that the *veintena* festivals are only represented as points of seasonal transition and in conjunction with major solar events.

The narrative is not a festival calendar but it makes references to festivals at key points in the solar year to provide a chronological framework using 20-day intervals.¹⁰ At least six festivals are referenced in the scenes, but the images more generally focus on events involving Venus and the seasonal cycle over the course of a year (Milbrath 2013, 106-07). It is noteworthy that the sequence begins on page 29 with the new moon and the disappearance of Venus as the Evening Star after the winter solstice (Milbrath 2013, 77, Plate 1). *Veintena* festivals are referenced primarily on pages associated with important solar events, such as the spring equinox focusing on Xipe Totec in Tlacaxipehualiztli on page 33, the summer solstice showing both Tlaloc and a solar god in Etzalcualiztli on page 37, and the winter solstice in *Panquetzaliztli* featuring the fire serpents on page 46 (Figs. 3, 5, 7; Milbrath 2013, 26-31, Plates 5, 9, 18). Representations of *veintena* festivals appear in the narrative sequence on pages 29-46 in an abbreviated form because the focus of these 18 pages is on a sequence of astronomical events. Festivals similar to those pictured in colonial Aztec sources are not easy to recognize in this context, but there are scenes that can be related to specific festivals.

Codex Borgia Veintena Festivals

Codex Borgia pages 29-46 are also loosely integrated with the seasonal cycle of festivals, beginning on page 29 with Atemoztli, just following the winter solstice, and closing on page 46 during Panquetzaliztli, the *veintena* of the winter solstice

when the sun's light was rekindled in a fire ceremony (Milbrath 2013, 24, 76). The festivals represented in the narrative on pages 29-46 are spaced at appropriate intervals, presuming each page represents a 20-day period, as seems to be indicated by the sets of day signs marking 20-day intervals on six of the 18 pages (Milbrath 2013, 79, 103-104). In the sequence represented on pages 29-46, six seasonal festivals can be recognized as a focal event in the central image (pages 33, 36, 37, 44, 45 and 46). Although the 20-day periods of the festival calendar provide a chronological framework, the narrative is *not* a representation of the festival calendar because it includes references to the annual *veintena* rituals only at pivotal points in the solar cycle.

In the sequence of festivals on Codex Borgia pages 29-46, the first clear *veintena* festival appears on page 33, depicting Xipe Totec's sacrifice in Tlacaxiphehualiztli, a spring equinox ceremony celebrated in March (Fig. 3, Durán 1971, 142-48; Milbrath 2013, 21, 26; Sahagún 1950-1982, 2: 57-60). Here Xipe is represented with closed eyes, lying face up on a round stone of sacrifice. Page 33 also shows a sun disk on the roof top, probably representing the sun's position rising above the temple on the spring equinox in March (Milbrath 2013, 26, Plate 5).

The narrative also refers to seasonal transitions at the solar zenith, marking the beginning of the rainy season during Toxcatl on page 36 (Fig. 4; Milbrath 2013, Plate 8). Here, Tezcatlipoca appears with a bundle at the center of the page wearing the buccal mask of Ehecatl, the wind god. This seems to be a representation of Toxcatl, the festival of Tezcatlipoca in May, at the beginning of the rainy season when the winds brought rainfall (Durán 1971, 426-29; Milbrath 2013, 22, Plate 8; Sahagún 1950-1982, 2: 66-77). The period assigned to Toxcatl on page 36 in my analysis (May 10-May 29, 1496) probably overlaps with the solar zenith when the sun's apparent declination is equal to the observer's location in degrees of latitude. In the Aztec area at the time of the conquest, Toxcatl was dated May 5-24, corresponding to the first solar zenith (May 8 in the Julian calendar or May 18 in the Gregorian calendar at the latitude of 19°28' in central Mexico).¹¹

The following page features the summer solstice festival of Etzalcualiztli honoring the rain god Tlaloc, pictured with his Tlaloc vessel in the center of page 37, standing on clouds that brought rain during Etzalcualiztli (Durán 1971, 430-33; Milbrath 2013, 29; Sahagún 1950-1982, 2: 78-90). On the upper left of the page, a solstice ritual may be represented by a solar god playing music in a flowered temple (Fig. 5; Milbrath 2013, 29, Plate 9).¹²

Codex Borgia page 44 shows a link with the October festival of Hueypachtli, dedicated to Xochiquetzal and Tlaloc, here represented in combination at the

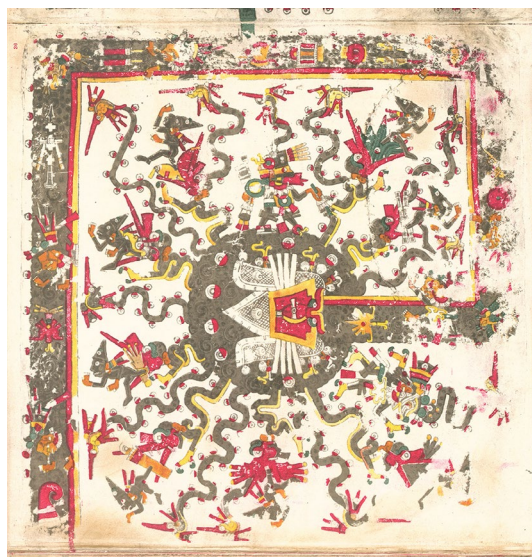


Figure 4. Codex Borgia page 36, featuring Tezcatlipoca the god honored in Toxcatl, on a bundle with the winds emerging at the beginning of the rainy season (1898 Loubat edition, Wikimedia Commons).



Figure 5. Codex Borgia page 37, showing Tlaloc the god honored in Etzalcualiztli, standing on rain clouds, while a solar god plays music on the summer solstice (1898 Loubat edition, Wikimedia Commons).

center of the page (Durán 1971, 452-56; Milbrath 2013, 29-30; Sahagún 1950-1982, 2: 23, 131-133). This scene also incorporates images of the Atamalqualiztli ceremony performed every eight years during October (Milbrath 2000; 2013, 30). In Sahagún's *Primeros Memoriales* (f. 154r) this ceremony pictures Xochiquetzal, Tlaloc, and a flowering tree, all elements represented on page 44 (Jiménez Moreno 1940; Sahagún 1993).

And on page 45, we see an image related to Quecholli honoring the god Mixcoatl-Camaxtli, seen here carrying a net bag for hunting, and an atlatl and darts, but the skeletal face and headdress indicate Mixcoatl-Camaxtli is now fused with the god of the Morning Star, Tlahuizcalpantecuhtli (Fig. 6; Milbrath 2013, 96, 108, Plate 17). The festival of Quecholli in the Valley of Mexico was dedicated to Mixcoatl at the beginning of the dry season in November, but Tlaxcala honored his counterpart, Camaxtli, a closely related god of the hunt (Durán 1971, 142-49, 455-56; Olivier 2015; Sahagún 1950-1982, 2: 25, 134-40).

On Codex Borgia page 46, we see clear references to Panquetzaliztli, the winter solstice festival, which featured the fire serpent and the fire god, Xiuhtecuhtli, shown here encased in the fire serpent at the bottom of the page (Fig. 7; Milbrath 2013, 30, 107, Plate 18). The fire serpent was associated with fire ceremonies performed in Panquetzaliztli in late November through mid-December (Durán 1971, 457-60; Milbrath 2013, 30; Sahagún 1950-1982, 2: 141-150). Page 46 represents the fire serpent six times, evoking the Panquetzaliztli festival, which featured the fire serpent descending the pyramid to be burned in the *cuauxicalli* (eagle vessel), here represented on the lower left of page 46 by two descending eagles carrying bowls on their backs. This annual ceremony should not be confused with the Aztec New Fire Ceremony, which was performed every 52 years in either Quecholli or Panquetzaliztli (Sahagún 1950-82, 4: 143-144; 7: 27). And the fire serpent ceremony in Panquetzaliztli is also quite different from the annual new fire ceremony performed during the Izcalli, because the fire serpent does not play a prominent role in Izcalli, though it may have been present as a costuming element worn by the Fire God, Xiuhtecuhtli, who was honored during Izcalli (Nicholson 1971, Fig. 10; Table 4).

The 18-page narrative in the Codex Borgia features an embedded festival calendar associated with changing seasonal images over the course of a year (Milbrath 2013, 106-07; 2015). Imagery of fire ceremonies and fire deities appear on pages linked with the dry season (Figs. 3, 7), in contrast to scenes on pages 36-44 that show images related to the rainy season, such as bees, butterflies, hummingbirds, and flowers (Figs. 4, 5). Also, images representing maize show a



Figure 6. Codex Borgia page 45, depicting the god of the hunt, Mixcoatl-Camaxtli, honored in Quecholli at the beginning of the dry season (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García 1993).



Figure 7. Codex Borgia page 46, showing the fire serpents and fire ceremony in Panquetzaliztli, the *veintena* of the winter solstice (Restoration by Ian Breheny of photographic facsimile by Fondo de Cultura Económica, Anders, Jansen & Reyes García 1993).

seasonal transformation with the alternation of the rainy and dry seasons. Maize fields and maize consumption are represented during the rainy season, as on Codex Borgia page 43 which shows a mature maize field and deities eating maize, whereas death deities appear to be carrying maize into the underworld during the dry season on Codex Borgia page 31.

Concluding Remarks

The seasonal *veintena* festivals represented in the Codex Borgia provide a chronological structure for the narrative sequence, but the principal focus is on a series of astronomical events. The analysis of «real-time» astronomical events in relation to *veintena* rituals represents a complete departure from interpretations published by other scholars. In my opinion, the narrative is not a representation of the central Mexican festival calendar, but it records specific festivals that coordinate with solar events and seasonal changes in the year. The narrative begins with the new moon following the winter solstice, setting up the context for astronomical events in the year. *Veintena* festivals in the narrative appear primarily on pages associated with important solar events, such as the spring equinox in Tlacaxipehualiztli on page 33, the summer solstice in Etzalcualiztli on page 37, and the winter solstice in Panquetzaliztli on page 46. The end of the year in Izcalli receives no special emphasis in the narrative because it is not actually intended to be a representation of the festival calendar, and instead it begins with a significant astronomical event and ends with a *veintena* that marks the winter solstice. The *veintena* rituals at yearend are instead found in the yearbearer almanac on Codex Borgia pages 49-52, which shows the new fire drilled in Izcalli and dates that reference the yearend in Izcalli, as well as a count that leads to the New Year, setting the *veintena* cycle in the context of the solar year and the 52-year *xiuhmolpilli*.

The seasonal coordinates in the Aztec festival calendar suggest that the *veintenas* were adjusted periodically to keep in tune with the seasons. This may have been done by adding an extra day every four years during Izcalli or adding 13 days to the length of the festival calendar every 52-years during Panquetzaliztli. In the Aztec calendar, Izcalli and Panquetzaliztli began at midnight, at least six hours before the *tonalpohualli* shifted to the next day, so that the yearbearer corresponded to the first day of Izcalli, and the same may be true in the Codex Borgia. Comparative evidence from Tlaxcalan and Aztec calendars helps to confirm the placement of Izcalli as the last *veintena* festival of the year.

The last yearbearer on Codex Borgia page 52 is 4 Flint, the same year represented by the sequence of festivals on pages 29-46. The year 4 Flint is very significant in terms of astronomy, for it is the year of the only total eclipse recorded in Aztec annals, and it was also a year that Venus transitioned from the Evening Star to the Morning Star just after the winter solstice, and transitioned back to the Evening Star just before the winter solstice in 1496. This explains why the narrative focuses on this series of astronomical events. Aztec colonial annals depicted important events in each year that include a number of astronomical references, but the Codex Borgia narrative highlights events in much greater detail, focusing on a single year to show specific astronomical cycles coordinating with *veintenas* festivals in the year of a total eclipse seen all across Mexico.

References

- Anders, Ferdinand, Maarten Jansen, and Luis Reyes García 1993. *Los Templos del cielo y de la oscuridad: Oráculos y liturgia, libro explicación del llamado Códice Borgia*. Accompanied by a facsimile of the codex. Graz, Madrid and Mexico City: Akademische Druck- und Verlagsanstalt / Sociedad Estatal Quinto Centenario / Fondo de Cultura Económica.
- Acuña, René, ed. 1984. *Relaciones geográficas del siglo XVI: Tlaxcala*. México: Instituto de Investigaciones Antropológicas / Universidad Nacional Autónoma de México.
- Aguilera, Carmen. 1989. «The Mexica Leap Year Once Again.» In *World Archaeoastronomy*, edited by Anthony F. Aveni, 227-31. Cambridge: Cambridge University Press.
- Aveni, Anthony F. 1999. «Astronomy in the Mexican Codex Borgia.» *Journal of the History of Astronomy* 30 (24): S1-S20. doi: 10.1177/002182869903002401.
- Aveni, Anthony F., and Edward E. Calnek. 1999. «Astronomical Considerations in the Aztec Expression of History: Eclipse Data.» *Ancient Mesoamerica* 10 (1): 87-98. doi:10.1017/S0956536199101111.
- Aveni, Anthony F., Edward E. Calnek y Horst Hartung. 1988. «Myth, Environment, and the Orientation of the Templo Mayor of Tenochtitlan.» *American Antiquity* 53 (2): 287-309. doi: 10.2307/281020.
- Baird, Ellen Taylor. 1993. *The Drawings of Sahagún's Primeros Memoriales: Structure and Style*. Norman: University of Oklahoma Press.
- Batalla Rosado, Juan José. 2002. *El Códice Tudela y el Grupo Magliabechiano: la tradición medieval europea de copia de Códices en América*. Colección Thesaurus Americae, 4. Madrid: Ministerio de Educación, Cultura y Deportes / Agencia Española de Cooperación Internacional / Testimonio Compañía Editorial.
- . 2008. *El Códice Borgia: Una guía para un viaje alucinante por el Inframundo*. Madrid: Biblioteca Apostólica Vaticana / Testimonio Compañía Editorial.

- Boone, Elizabeth Hill. 1983. *The Codex Magliabechiano and the Lost Prototype of the Magliabechiano Group*. Berkeley: University of California Press.
- . 2007. *Cycles of Time and Meaning in the Mexican Books of Fate*. Austin: University of Texas Press.
- Bricker, Harvey M., and Victoria R. Bricker. 2011. *Astronomy in the Maya Codices: Memoirs of the American Philosophical Society Held at Philadelphia for Promoting Useful Knowledge*. Philadelphia, PA: American Philosophical Society.
- Bricker, Victoria R. 2001. «A Method for Dating Venus Almanacs in the Borgia Codex.» *Journal for the History of Astronomy* 32 (26): S21–43. doi:10.1177/002182860103202602.
- Broda de Casas, Johanna. 1969. *The Mexican Calendar as Compared to Other Mesoamerican Systems*. Acta Ethnologica et Linguistica, 15. Vienna.
- . 1991. «The Sacred Landscape of Aztec Calendar Festivals: Myth, Nature and Society.» In *To Change Place: Aztec Ceremonial Landscapes*, edited by David Carrasco, 74–120. Niwot: University Press of Colorado.
- . 2015. «Political Expansion and the Creation of Ritual Landscapes: A Comparative Study of Inca and Aztec Cosmivision.» *Cambridge Archaeological Journal* 25 (1): 219–38. doi:10.1017/S0959774314001061.
- Brotherston, Gordon. 2003. «The Year in the Mexican Codices: The Nature and Structure of the Eighteen Feasts.» *Estudios de Cultura Náhuatl*, 34: 67–98. <https://www.historicas.unam.mx/publicaciones/revistas/nahuatl/pdf/ecn34/675.pdf>.
- Castillo Farreras, Victor M. 1971. «El bisiestro náhuatl.» *Estudios de Cultura Náhuatl*, 9: 75–104.
- Caso, Alfonso. 1967. *Los calendarios prehispánicos*. México: Instituto de Investigaciones Históricas / Universidad Nacional Autónoma de México.
- . 1971. «Calendrical Systems of Central Mexico.» In *Handbook of Middle American Indians, volumes 10 and 11: Archaeology of Northern Mesoamerica*, edited by Gordon F. Ekholm and Ignacio Bernal, 333–48. Austin: University of Texas Press. doi: 10.7560/701502.
- Codex Telleriano-Remensis, see Quiñones Keber, Eloise 1995.
- Durán, Diego. 1971 *Book of the Gods and Rites and the Ancient Calendar*, translated and edited by Fernando Horcasitas and Doris Heyden. Norman: University of Oklahoma Press.
- Edmonson, Munro S. 1988. *The Book of the Year: Middle American Calendrical Systems*. Salt Lake City: University of Utah Press.
- Galindo Trejo, Jesús. 1994. *Arqueoastronomía en la América Antigua*. Madrid: Editorial Equipo Sirius.
- Garibay, Angel María. 1979. *Teogonía e historia de los mexicanos*. México: Editorial Porrúa.
- Graulich, Michel. 1990. *Mitos y rituales del México antiguo*. Madrid: Ediciones Istmo.
- . 2002. «Acerca del “problema de ajustes del año Calendárico mesoamericano al año trópico”.» *Estudios de Cultura Náhuatl*, 33: 45–56. <https://nahuatl.historicas.unam.mx/index.php/ecn/article/view/9267>.
- . 2008. «Las fiestas del año solar en el “Códice Borbónico”.» *Itinerarios: Revista de estudios lingüísticos, históricos y antropológico*, 8: 186–94.

- Hernández, Christine. 2004. «Yearbearer Pages” and Their Connection to Planting Almanacs in the Borgia Codex.» In *The Madrid Codex: New Approaches to Understanding an Ancient Maya Manuscript*, edited by Gabrielle Vail and Anthony F. Aveni, 321-64. Boulder: University Press of Colorado.
- Jansen, Maarten, and Gabina Aurora Pérez Jiménez, eds. 2017. *Time and the Ancestors: Aztec and Mixtec Ritual Art*. Leiden and Boston: Brill.
- Jiménez Moreno, Wigberto. 1940. «Signos cronográficos del códice y calendario mixteco.» In *Códice de Yanhuítlán*, edited by Wigberto Jiménez Moreno y Salvador Mateos Higuera, 69-76. México: Instituto Nacional de Antropología e Historia.
- Kruell, Gabriel Kenrick. 2012. «Las horas en la vida cotidiana de los antiguos nahuas.» *Estudios Mesoamericanos* 2 (13): 33-57.
- Márquez Huitzil, Ofelia. 2017. «Algunas lecturas de los códices del grupo Borgia en el trabajo de Elżbieta Śiarkiewicz.» *Antilha: Revista Latinoamericana de historia, arte y literatura* 6 (17): 9-25.
- Milbrath, Susan. 1989. «A Seasonal Calendar with Venus Periods in Codex Borgia 29-46.» In *Imagination of Matter: Religion and Ecology in Mesoamerican Traditions*, edited by David Carrasco, 103-27. Oxford: BAR International Series 515.
- . 1997. «Decapitated Lunar Goddess in Aztec Art, Myth, and Ritual.» *Ancient Mesoamerica* 8 (2): 185-206. doi: 10.1017/s095653610000167x.
- . 2000. «Xochiquetzal and the Lunar Cult of central Mexico.» In *Precious Greenstone, Precious Quetzal Feather: Mesoamerican Studies in Honor of Doris Heyden*, edited by Eloise Quiñones Keber, 31-54. Lancaster: Labyrinthos.
- . 2007. «Astronomical Cycles in the Imagery of Codex Borgia 29-46.» In *Skywatching in the Ancient World: New Perspectives in Cultural Astronomy*, edited by Clive Ruggles and Gary Urton, 157-208. Boulder: University Press of Colorado.
- . 2013. *Heaven and Earth in Ancient Mexico: Astronomy and Seasonal Cycles in the Codex Borgia*. Austin: University of Texas Press.
- . 2015. «A Seasonal Calendar in the Codex Borgia.» In *Cosmology, Calendars, and Horizon-Based Astronomy in Ancient Mesoamerica*, edited by Anne S. Dowd and Susan Milbrath, 139-64. Boulder, Colorado: University Press of Colorado.
- . 2019. «Underworld Transformations of Camaxtli-Tlahuizcalpantecuhtli in the Codex Borgia.» *XI Congreso Internacional de Mayistas: Tradiciones y reelaboraciones*, Chetumal, Quintana Roo Mexico, 26 June.
- . 2020. «Thresholds of Time and Space: Year-Bearer Imagery in Postclassic Codices.» *Latin American and LatinX Visual Culture* 2(3): 8-28. doi: 10.1525/lavc.2020.2.3.8.
- . In press. «Imagery of the Yearbearers in Maya Culture and Beyond.» In *Crafting Time: Mythic History and Ritual Order in the Ancient Maya World*, edited by David A. Freidel, Arlen F. Chase, Anne S. Dowd and Jerry Murdock. Gainesville: University of Florida Press.
- Motolinía, Fray Toribio de Benavente. 1903. *Memoriales de Fray Toribio de Motolinía*: manuscrito de la colección del Señor Don Joaquin García Icazbalceta. Madrid: Librería de Gabriel Sánchez.

- _____. 1951. *History of the Indians of New Spain*, translated and edited by Francis Borgia Steck. Washington, D.C.: Academy of American Franciscan History.
- Nicholson, Henry B. 1971. «Religion in Pre-Hispanic Central Mexico.» In *Handbook of Middle American Indians. Volumes 10 and 11: Archaeology of Northern Mesoamerica*, edited by Gordon F. Ekholm and Ignacio Bernal, 395-445. Austin: University of Texas Press.
- Nowotny, Karl Anton. 2005. *Tlacuilolli: Style and Contents of the Mexican Pictorial Manuscripts with a Catalog of the Borgia Group*, translated and edited by George A. Everett Jr. & Edward B. Sisson. Norman: University of Oklahoma Press.
- Olivier, Guilhem. 2015. *Cacería, sacrificio y poder en Mesoamérica: Tras las huellas de Mixcóatl, «Serpiente de nube.»* México: Fondo de Cultura Económica.
- Quñiones Keber, Eloise. 1995. *Codex Telleriano-Remensis: Ritual, Divination, and History in a Pictorial Aztec Manuscript*. Austin: University of Texas Press.
- Sahagún, Bernardino de. 1950-1982. *Florentine Codex: General History of the Things of New Spain*, 12 vols., translated by Arthur J. O. Anderson and Charles E. Dibble. Santa Fe, New Mexico: School for American Research.
- _____. 1993. *Primeros Memoriales*. Facsimile edition, photographed by Ferdinand Anders. Norman: University of Oklahoma Press.
- Schwaller, John F. 2019. *The Fifteenth Month: Aztec History in the Rituals of Panquetzaliztli*. Norman: University of Oklahoma Press. doi: 10.1017/tam.2020.73.
- Seler, Eduard. (1904-1909) 1963. *Comentarios al Códice Borgia*, vol. 2. México: Fondo de Cultura Económica.
- Šiarkiewicz, Elżbieta. 1995. *El tiempo en el Tonalámatl*. Varsovia: Universidad de Varsovia.
- Šprajc, Ivan. 2000. «Problema de ajustes del año calendárico mesoamericano al año trópico.» *Anales de Antropología*, 34: 133-60.
- _____. 2001. *Orientaciones astronómicas en la arquitectura prehispánica del centro de México*. México: Instituto Nacional de Antropología e Historia.
- Tedlock, Barbara. 1992. *Time and the Highland Maya*. Albuquerque: University of New Mexico Press.
- Tena, Rafael. 1987. *El calendario mexica y la cronografía*. México: Instituto Nacional de Antropología e Historia.
- Tokovinine, Alexandre. 2010. «The Western Sun: An Unusual Tzolk'in – Haab Correlation in the Classic Maya Inscriptions.» *The PARI Journal* 11 (2): 17-21.
- Vail, Gabrielle, and Matthew G. Looper. 2015. «World Renewal Rituals among the Postclassic Yucatec Maya and Contemporary Ch'orti' Maya.» *Estudios de Cultura Maya*, 45: 121-40. doi: 10.19130/iifl.ecm.2015.45.135.

Notes

- ¹ Like the Aztec sources, Mixtec codices record a yearbearer cycle that uses dates drawn from the 260-day cycle, employing the same four days as yearbearers, but the yearbearer dates are different because they began the year in Atemoztli, which is the 16th festival in the most common Aztec sequence (Caso 1967, Table 10; Nicholson 1971, Table 4). Wigberto Jiménez Moreno (1940, 69-75, Fig. 13) demonstrated long ago that the year ended 40 days earlier in the Mixtec system, meaning the yearbearer for the same European year had a different numerical coefficient. This was later supported by Caso's (1967) correlation of Mixtec yearbearers with European dates, so the year 1519 was 1 Reed in the Aztec system and 13 Reed, in the Mixtec calendar. In the Mixtec system, the year ended in Panquetzaliztli. In the year 2 Reed (1507), the Aztecs celebrated their New Fire Ceremony marking the end of a 52-year cycle in Panquetzaliztli, and the equivalent year in the Mixtec system was 1 Reed, which may have similarly ended a 52-year cycle. Fire drilling represented in the Mixtec codices often appears with the date 1 Reed in the Codex Vindobonensis, suggesting a direct correlation with the 2 Reed New Fire Ceremony in the Aztec festival calendar.
- ² Although we see these events as mythological, to the ancient Mexicans they were couched in history and integrated with the religious festival cycle in a similar manner to the way Christians today reenact events in the life of Christ in the seasonal cycle of the liturgical calendar, positioning Christmas around the winter solstice and Easter on the Sunday following the first full moon after the spring equinox.
- ³ In his *Historia*, Motolinía says the Aztecs began the year in March and they had no leap year (Motolinía 1951, 111), but the longer text in his *Memoriales* has an annotation (written by friar Olmos?) that there was a bissextile year every four years, and the years were named for the first *tonalpohualli* day in the *first* festival of the year (Motolinía 1903, 43, 50-51, 53, Appendix 35-36). The *Relaciones Geográficas* in Tlaxcala also records that the year was named for the first day of the year, and it notes that the bissextile year always took place in a year named Flint. Citing the example of the year 8 Flint, when the yearbearer fell on February 24, 1552, the text says that this was a year with an intercalation, because the day 10 Grass (Malinalli) covered two days rather than just one (Acuña 1984, 222). In the year 1560 (12 Flint), there was another bissextile year, and here the adjustment was again made on the day Grass in the third *veintena* festival of the year. If this were true, the 260-day count was essentially stopped for a day, which is certainly not the case in surviving examples of the Maya Tzolkin (Tedlock 1992). This form of intercalary adjustment would mean we must accept a discontinuous *tonalpohualli*, which most scholars would reject on principle.
- ⁴ Caso's correlation with the European calendar is based on linking the day Cortés entered Tenochtitlan with November 8, 1519. Two early sources record as the day 8 Wind (Ehecatl) and the ninth day of Quecholli in the year 1 Reed (1519). The second coordinate is August 13, 1521, the date when Cortés returned to Tenochtitlan, which is linked to the *tonalpohualli* day 1 Serpent in the year 3 House. Caso discusses an apparent inconsistency when counting back from the 1521 date to 1519 because the *tonalpohualli* date in 1519 should be 7 Crocodile (Cipactli), not 8 Wind. He argues that this provides evidence that the Aztecs began their day at noon rather than midnight. Thus he notes that November 8 in the European Julian calendar correlated with either 7 Crocodile or 8 Wind, depending on the time of day. The same could be said of the ninth day of Quecholli, which could be 7 Crocodile at one point in the day and 8 Wind later in the day. If a given festival actually began a half day earlier, the *tonalpohualli* day

- would not have shifted yet, so the ninth day of Quecholli would be 7 Crocodile (XIV in Table 2; 14th festival in Milbrath 2013, Table 1.5).
- ⁵ There are also variations in the number of hours counted in a day. Gabriel Kruell (2012, 36) has studied concepts related to the hours in the central Mexican day, noting: «Entre los tlaxcaltecas vimos que eran por lo menos siete [horas], cuatro diurnas y tres nocturnas, mientras entre los pueblos de la cuenca de México, las divisiones del día alcanzaban el número de once.»
 - ⁶ Each yearbearer is intertwined with what scholars refer to as a «trapeze-and-ray» year sign that appears above a symbol positioned on a throne: a Xipe headdress on page 49b, a water stream on page 50b, a double-peaked turquoise crown on 51b, and a solar headband on 52b. Since one of these year dates is clearly attached to a throne, Boone (2007, 263n38) suggests that they are prognostications of how to rule that are linked with these specific dates.
 - ⁷ When paired with the yearbearers, Hernández (2004, 351-54, Table 11.11) argued that the *tonalpohualli* dates with the number five on 49-52 all correspond to May or early June in the Julian calendar, because she followed Caso's lead in ending the year in Tititl and therefore concluded that these *tonalpohualli* dates occur only once within the years named on 49b-52b. Nonetheless, the next occurrence of the *tonalpohualli* dates all fall in the same year, corresponding to Izcalli, the last 20-day festival (*veintena*) in the year, not the first *veintena* in the next year as she had assumed.
 - ⁸ A number of yearbearer dates in the Codex Borgia seem to coordinate with Venus events, and some of these also correlate lunar phases with Venus events (Milbrath 2013, Table 3.1). Venus seems to be especially important in the dates recorded in the Borgia, with almost 30 % (15 of 50 dates in Table 3.1) representing Venus events. Dates marking the interlocking cycles of the moon and Venus seem to play a role in the almanacs on Borgia 27-28, serving as a preface to the narrative on pages 29-46. For example, on Borgia 27, the second occurrence of 1 Reed 1 Crocodile links a winter solstice date to an observation of Venus (E-last) on the full Moon in December 1467. As Elébieta Śiarkiewicz (1995) has shown, dates on Borgia 28 are appropriate for calculations involving the solar and lunar cycles. See Ofelia Márquez Huitzil (2017) for an excellent summary of these calculations.
 - ⁹ I originally identified the central image on Borgia 40 as a solar eclipse with the sun attacked by Venus gods in a paper presented at a conference honoring Anthony Aveni (Milbrath 2007). Elizabeth Boone (2007, 268-269n50) described my identification of the eclipse as «very intriguing,» but she raised objections because the sun is pictured in the underworld (inside the earth monster). Since the people from central Mexico believed that when the sun disappeared at night it traveled into the underworld, I would argue that the scene on Borgia 40 represents a metaphor for the sun engulfed in darkness during the eclipse, turning the day into night. Maarten Jansen and Gabina Aurora Pérez Jiménez (2017, 491-98) describe Borgia 40 as an image of the «night sun,» but also provide support for my interpretation of the image as a solar eclipse (Milbrath 2013, 42-45). However, they do not accept my dating the event to 1496, and they reject all «real-time» astronomical dates in my study and others studies of the Borgia using data based on archaeoastronomy (Aveni 1999; Bricker 2001).
 - ¹⁰ Certain aspects of the Borgia narrative compare with an Aztec example of the festival calendar recorded in Sahagún's *Primeros Memoriales*. Some pages have a more narrative quality, but a central ritual scene often seems to dominate the page, as in the *Primeros Memoriales*, and over half the pages have a frame-like border that includes transitional elements in the frame like Sahagún's manuscript (Milbrath 1989). Ellen Baird (1993, 116) noted that these formal qualities are very similar to those in the *Primeros Memoriales veintena* sequence, and she pointed out

that Borgia 29-46 is to be held and read vertically, much like the sequence of *veintena* festivals in the *Primeros Memoriales*, which are most often to be read vertically from top to bottom.

- ¹¹ We cannot be sure of the exact latitude associated with the origin point of the Borgia, so it is possible that the solar zenith actually took place in the previous month (Hueytozoztli), dated April 20-May 9 in 1496.
- ¹² Some other *veintena* festivals may be referenced on other pages, but they are not the central focus of the images. For example, the principal focus on page 40 is the solar eclipse event but the center of the page also features Quetzalcoatl dressed in a hummingbird costume, suggesting some parallel with the Aztec Miccailhuitontli festival honoring Huitzilopochtli, the Aztec hummingbird god (Milbrath 2013, 29, Plate 12).