

*Contents*

*Foreword*

*Jeanette Favrot Peterson* vii

*Acknowledgments*

*Susan Milbrath and Elizabeth Baquedano* ix

1. Introduction

*Susan Milbrath and Elizabeth Baquedano* 3

2. Reflections on the Scholarship of Cecelia  
Ford Klein and on Animal Symbolism in  
Mesoamerica

*Elizabeth Hill Boone* 23

3. How to Construct a Dragon for a Changing  
World: The Zoomorph on the Venus  
Platform at Chichen Itza

*Cecelia F. Klein* 35

4. Pumas and Eagles and Wolves, Oh My! The  
Appropriation and Alteration of Teotihuacan  
Processing Predators at Tula

*Keith Jordan* 104

5. An Animal Kingdom at Chichen Itza:  
Reconstructing a Sculptural Tableau at the  
Sacred Cenote

*Cynthia Kristan-Graham* 130

6. Iconography and Symbolism of Frogs and Toads in the Aztec World and Beyond  
*Elizabeth Baquedano* 160
  7. Coyolxauhqui's Serpents: Political Metaphors in Mexica-Azteca Sculptures  
*Emily Umberger and Elizabeth Aguilera* 180
  8. Quail in the Religious Life of the Ancient Nahuas  
*Elena Mazzetto* 200
  9. Lessening the Sting: *Huipil* Power and Deadly Scorpions  
*Jeanne L. Gillespie* 219
  10. Dressed to Kill: Richly Adorned Animals in the Offerings of the Great Temple of Tenochtitlan  
*Leonardo López Luján, Alejandra Aguirre Molina, and Israel Elizalde Mendez* 244
  11. Animal Symbolism in Calendar Almanacs of the Codex Borgia and Links to Postclassic Imagery in Mexico  
*Susan Milbrath* 282
  12. The New Year Pages of the Dresden Codex and the Concept of Co-essence  
*Merideth Paxton* 341
  13. Animal Manifestations of the Creator Deities in the Maya Codices and the Popol Vuh  
*Gabrielle Vail and Allen Christenson* 373
  14. A New World Bestiary in Postclassic Mesoamerica  
*Susan Milbrath* 402
- Index* 411  
*About the Authors* 425

# 1

---

## *Introduction*

SUSAN MILBRATH AND  
ELIZABETH BAQUEDANO

At the time of the Spanish conquest of central Mexico in 1521, cultures in Mesoamerica shared traditions revolving around maize agriculture and a unique 260-day ritual calendar that probably originated around 1100–900 BC in the Olmec heartland of the modern states of Veracruz and Tabasco. Olmec religion featured many important animal deities, including the mythical feathered serpent later known as Quetzalcoatl. Religious ideology from the heartland was carried along trade routes, spreading Olmec culture to Yucatan in the east and in the west through Mexico and the Pacific slope of Guatemala, eventually reaching as far south as Honduras and El Salvador.

Olmec animal deities are represented in mural paintings, stone carvings, and portable art, such as lapidary work and ceramics that were widely dispersed in Mesoamerica. These images feature apex predators such as jaguars, owls, eagles and hawks, and composite animals representing dragon-like creatures that bear what have been described as flame brows and “paw-wing” design. These creatures have crocodylian traits, leading some to interpret them as images of the earth floating on the primordial sea or possibly the Milky Way as a form of Cosmic Monster (Fields and Reents-Budet 2005, 32, 126–127, plates 26–30; Stone and Zender 2011, 76–77, figs. 1–5). Human and animal combinations are also well known in Olmec iconography, sometimes interpreted as images of shamanic transformation but more likely as a symbol of dominance and ferocity

(Saunders 1989, 73–74). One such image, originally named the “were-jaguar” for its combination of human and jaguar traits, more recently has been tentatively linked to imagery of the human embryo (Tate 2012, 32–33, 36–48).

Throughout the history of Mesoamerica, real animals were merged with fantastical creatures, creating zoological oddities not unlike medieval European bestiaries. After the Spanish conquest these bestiaries may have inspired early colonial-period records describing animals of the New World. Friar Bernardino de Sahagún and his native informants combine Aztec concepts with European classificatory systems in Book 11 of the Florentine Codex, but this natural history volume also reflects close observation of animal behavior, life cycles, and anatomy and habitats (Berdan 1994, 153, 160). Crocodiles served as companions to the water god Tlaloc in the most important Aztec temple in the Mexica capital city, Tenochtitlan, where Offering 23 in Stage IVb of the Templo Mayor contained crocodile remains associated with images of Tlaloc (López Luján 1996, 323).

In addition to observing animals in nature, animals brought from distant places in Mesoamerica were kept in royal aviaries and a vivarium or zoo maintained for the Aztec emperor, according to chroniclers such as Motolinía (Berdan 1994, 156, 158). Captive animals included jaguars, wolves, and pumas, allowing ample opportunity to study these wild animals. And this royal menagerie appears in Book 8 (fol. 31v) of the Florentine Codex, which mentions “ocelots, bears, mountain lions, and mountain cats,” and a marginal gloss in the Real Academia del la Historia manuscript heads this section as “*casa de las fieras*,” meaning “house of wild beasts” (Sahagún 1950–1982, 8:45115, plate 71). The Florentine Codex plate shows a jaguar paired with a mountain lion (puma) that more closely resembles an African lion with a woolly mane and tufted tail, and an assortment of birds includes an eagle, a roseate spoonbill, and parrots, which were part of the Totocalli (“house of birds”). Evidence of this vivarium is also apparent in a structure that shows birds and felines in pens, labeled on the 1524 Nuremberg Map of Tenochtitlan as the “House of the animals” (*Domus animalium*), which the Spaniards considered a great curiosity (Boone 2011, 34; Mundy 1998, 27, 32).

The title of this volume is inspired by the work of Elizabeth Benson, who dedicated her later career to the study of animal imagery in Precolumbian art. Her landmark exhibit, “Birds and Beasts of Ancient Latin America,” toured from coast to coast, accompanied by a book bearing the same title (Benson 1997). This volume remains one of the best overviews of animal imagery in the Americas, skillfully linking artistic images with an analysis of animal behavior and morphology. Our title also pays homage to Frances Berdan’s (1994) “Birds and Beasts in Nahua Thought,” a chapter surveying ethnohistorical sources in

a *homenaje* volume dedicated to Arthur J. O. Anderson and Charles E. Dibble.

Publications in Spanish featuring animal imagery include Carmen Aguilera's (1985) *Flora y fauna mexicana: Mitología y tradiciones*, an important early contribution to the literature. Another seminal volume published in Mexico is Carlos R. Beutelspacher's (1989) *Las mariposas entre los antiguos Mexicanos*. Two other volumes published in Mexico are also noteworthy because they include chapters featuring studies of animal imagery: *Animales y plantas en la cosmovisión mesoamericana*, edited by Yolotl González Torres (2001), and *Iconografía mexicana IX and X: Flora y fauna*, edited by Beatriz Barba Ahuatzin and Alicia Blanco Padilla (2009). This 2009 volume features a chapter on Mesoamerican butterfly imagery, a contribution analyzing Maya imagery of frogs and toads, and a broad survey of feline imagery throughout Mesoamerica by Alicia Blanco Padilla and Reina Cedillo Vargas. They point out that jaguars are called *ocelotl* in early sources, using the tupi-guaraní word meaning "fierce beast." Several chapters represent site-specific or source-specific studies of fauna. These include an analysis of the mollusks represented at Teotihuacan, a chapter on the animals represented in cave art in the Valley of Mezquital (Hidalgo), and serpents represented prominently in the *lienzos* of Coixtlahuaca. Another chapter on the Borgia Group directional almanacs by Sergio Sánchez Vásquez includes comparisons of the Borgia Group representations of birds on the directional trees (see also chapter 11, this volume).

Alfredo López Austin's (1990, 1993) comprehensive study of the role opossums play in Mesoamerican mythology, cosmology, and art was published in both Spanish and English editions. Eva Hunt's (1977) *The Transformation of the Hummingbird* is a tour de force study of the role of the hummingbird in myth and religion and emphasizes the role of seasonality in the imagery. Another important contribution is Doris Heyden's (1989) monograph tracing the symbolism of the eagle and cactus in the foundation legend of the Aztec capital (she also published a similar study in Spanish). Heyden's work combines an interest in iconography and natural history, a vital connection that is also apparent in her *homenaje* volume, which includes chapters authored by several scholars who are also contributors in this volume (Quiñones Keber 2000). Other seminal studies featuring animal imagery include Jeanette Peterson's (1983) *Flora and Fauna Imagery in Precolumbian Cultures* and her Mingei International Museum exhibition catalog, *Precolumbian Flora and Fauna: Continuity of Plant and Animal Themes in Mesoamerica Art* (Peterson 1990). We are pleased that she has contributed the foreword to this volume, not only because she is on the forefront of early studies of Mesoamerican animal imagery, but also because she was Cecelia Klein's first PhD student.

Now we are delighted to honor Cecelia Klein with her own *homenaje* volume, a process that began when we organized a Society for American Archaeology symposium on animal symbolism in Postclassic Mesoamerica. We met in Albuquerque in 2019 to present papers in her honor and, not surprisingly, Cecelia's contribution was one of the most interesting in the session. Over the past decade she has studied ideological links between the Maya and central Mexico at Chichen Itza, and her work on animal images in this context serves as an inspiration for our volume. Because Mesoamerica incorporates so many different cultures and time periods, we chose to focus on the Postclassic period, the main period of Cecelia's research. This is an era when a new "international style" was created through widespread trade. Characterized by a shared iconography, this style spanned from central Mexico to the Yucatan Peninsula and south to Belize. Study of this last period of Precolumbian art in Mesoamerica, AD 900–1521, is greatly enhanced by ethnohistorical sources dating to the early colonial period, when Spanish conquerors documented indigenous concepts in an attempt to understand an alien New World.

## THE MESOAMERICAN BACKGROUND

Many of our chapters focus on Nahuatl-speaking cultures from the Valley of Mexico, which are well represented in the ethnohistorical records and Aztec artistic traditions. The term Aztec refers to Nahuatl-speaking inhabitants of the Valley of Mexico, the dominant community at the time of the Spanish conquest. The Mexica living in the capital of Tenochtitlan were the most powerful group. During the rise of the Mexica, ca. AD 1325–1521, they expanded their territory by conquest, controlling distant provinces by collecting tribute from a widespread area of Mesoamerica and establishing military outposts. Their tribute rolls show the Mexica–Aztec hegemony even extended into the Maya area of Chiapas at Zinacantan, and they also established an outpost to the east at Xicalango, Campeche, as a gateway to the Yucatec Maya area.

Despite their far reach, the Aztec tribute empire did not include neighboring communities in the Puebla–Tlaxcala Valley, which shared traditions closely related to the Aztecs as well as their Nahuatl language. The Tlaxcalans fought constantly with the Aztecs, but when the Spanish conquerors attacked the city states in Tlaxcala, Tlaxcaltecas decided to form an alliance and help the Spaniards to conquer the Valley of Mexico and areas to the south and west.

Extensive colonial-period records are available for the Valley of Mexico, including Sahagún's twelve-volume Florentine Codex, and an earlier work called the *Primeros Memoriales*. And, given the topic of this volume, it is

especially noteworthy that Sahagún's Book 11 is devoted to natural history and includes detailed descriptions of the animal world. Although questions have been raised about the degree of European influence in these texts (Palmeri Capesciotti 2001), others find authenticity in the Nahuatl texts, including the emphasis on color in descriptions of animals (Bassett 2019, 140, 148, 150; Berdan 1994). The Spanish *Relaciones Geográficas* are also important sources of information for surrounding communities, especially those in the Puebla-Tlaxcala Valley. Colonial-period painted books are invaluable for study of animal imagery. Many are formatted like European folios with the addition of Spanish or Nahuatl glosses. A few take the form of screen-fold books, more like traditional Mesoamerican codices, but no Precolumbian Aztec codices have survived. Fortunately, the Tlaxcalan allies of the Spaniards gave them Precolumbian codices as gifts, and this may be how some manuscripts made their way to Europe early on. The Codex Borgia is a masterpiece of Precolumbian manuscript painting and the namesake of a group of related divinatory codices dating prior to the conquest (chapter 11, this volume). The Borgia Group codices incorporate many unique elements, but they also share canonical content with the colonial-period divinatory codices from the Valley of Mexico, a region that offers a treasure trove of ethnohistorical sources that serve as a foundation for studies of all manner of subjects relating to the Aztecs and their neighbors.

The documentary sources are more limited in the Maya area, which extends from the Yucatan Peninsula south to the border of Honduras and El Salvador, but major resources include Friar Diego de Landa's account written about 1566 (chapter 12) and traditional legends, such as the *Popol Vuh*, recorded in highland Guatemala during the colonial period (chapter 13). The regions of highest development among the Postclassic Maya are in Yucatan and along the east coast south to Belize, but notable centers were found in the Peten lakes region and highland Guatemala.

When dealing with different culture areas, the major periods are not always uniform. For example, the collapse of Teotihuacan in Central Mexico is now dated ca. AD 500, whereas the Early Classic extends to AD 600 in the Maya area. A similar situation occurs in the early Postclassic, which begins around AD 900 or 950 and ends 1150 or 1200, depending on the culture area and whether the preceding period is identified as the Epiclassic or Terminal Classic, two periods that overlap but are not identical in length. And the same could be said for the dates of the Spanish conquest, which is firmly dated to 1521 in Central Mexico but took much longer in the Maya area.

The Spanish conquest of the Maya area came through separate campaigns. One led by Montejo had subjugated key cities in Yucatan by 1541, but the Itza

Maya of the Peten lakes region held out for much longer, only falling under Spanish control in 1697. This area had remained a center of Maya occupation after the collapse of the Classic Maya political system in the southern lowlands around AD 800/900, when some of the Maya populations migrated north to major cities like Chichen Itza, which remained powerful during the late Epiclassic and early Postclassic (AD 800–1150/1200). Other cities in the Yucatan Peninsula rose to prominence later during the late Postclassic (AD 1150/1200–1521), most notably Mayapan, a capital city until around 1450, and cities along the east coast, such as Tulum, which was still occupied at the time the Spanish galleons traveled along its shores.

### RESOURCES FOR STUDY OF POSTCLASSIC ANIMAL IMAGERY

Spanish chroniclers and their indigenous informants document the importance of animals in the context of rituals and political and agricultural symbolism, mythology, the calendar and cosmology. Animal symbolism in Postclassic mural paintings and sculptures and animal images in painted books can be carefully interpreted with the aid of colonial-period documents, especially the accounts by friars Landa and Sahagún, written in the mid-sixteenth century, and those written somewhat later by Jacinto de la Serna and Hernando Ruiz de Alarcón. Sahagún's accounts record the influence of animals in divination practices and his observations of natural history (Books 4 and 11). Animal metaphors are important in his Book 6, a study of the annual festivals in Book 2 provides useful data on animal symbolism, as does Friar Diego Durán's Book of the Gods and Rites and The Ancient Calendar. Our understanding of animal symbolism in Postclassic Mesoamerica is also enhanced by an analysis of the architectural context of animal imagery and the remains of animals in the archaeological record, especially animals that were killed for ritual purposes.

Observations of animal morphology contributed substantially to Mesoamerican concepts of animal symbolism. Nahuatl names often included morphological features such as the "horns" on the snake called by a name that translates as "deer snake" (Berdan 1994, 160; Sahagún 1950–1982, 11:79). The Nahuatl names for the common teal and the broad-tailed hummingbird included the word *quetzal* to show their resemblance to this much-prized bird (Berdan 1994, 160; Sahagún 1950–1982, 11:24, 34). The Aztecs counted the rattles on the tail of the rattler to tell its age, and they recorded that the opossum changed its fur color with age (Berdan 1994, 158–159; Sahagún 1950–1982, 11:75–76). Physical features such as the sharp talons of the eagle and the spotted breast of the quail were incorporated in animal symbolism (chapters 3, 8).

They also noted the nocturnal behavior of the jaguar and the opossum carrying its young in a pouch. The fire sting of the scorpion certainly was much feared, and possibly this creature is related to seasonal imagery associated with the scorpion constellation (chapters 9, 11; Milbrath 1999, 264–266; Vail 1997).

Seasonality apparent in animal behavior was clearly important in animal symbolism (chapters 6, 11). Noting the absence of hummingbirds in the winter, the Aztecs believed they died during the winter dry season to be reborn in the spring, following the solar cycle (Berdan 1994, 154, 156, 159). Antler-shedding of male deer in spring was also noteworthy (Olivier 2015, 152, 377). The Maya Codex Madrid almanacs feature springtime deer-trapping picturing bucks that have shed their antlers (Vail 1997, 108–109, figs. 3–18, 3–29). Scenes representing bucks without antlers in the Codex Borgia may also be related to springtime (chapter 11).

Mesoamerican people claimed a close affinity with animals, and one of the most pervasive ideas is that individuals have animal companion spirits, a concept recorded among the Classic Maya that still survives today as the *tonalme* in Sierra Nahuatl communities (Taggart 1983, 59, 142, 199). This isolated group living in the mountains of Puebla say that people with special powers (*nagualme*) can transform into animals. In earlier times, the Aztecs associated jaguars and owls with shamanic transformations (Berdan 1994, 154). James Taggart (1983, 141–142) proposed that the intimate relationship between humans and animals distinguishes the Aztecs and their descendants from the culture of the Hispanics, and he pointed out that these traditional communities depict their gods in animal form, unlike the Europeans.

For the spelling of Maya and Nahuatl words, we are not using the accents often seen in Spanish spellings of these words, and, more significantly, the reader will notice different spellings for these words in different chapters. This is the case, in part, because the spellings that have been in use traditionally are often based on colonial-period sources. We want our authors to use the system that they determine best fits their work. For example, the Nahuatl spelling for the name of the creature scholars have commonly called the earth monster in chapter 10 is *Tlaltecuhтли*, whereas it is *Tlalteuctli* in chapter 3. The latter represents an alternate spelling seen in some colonial sources. Even the name of the last Aztec ruler (1502–1520) is spelled differently in different chapters. Motecuhzoma (chapter 10) is also known as Moctezuma (chapter 7) and Moteuczoma, replacing Montezuma, the spelling preserved in works published in the nineteenth century.

A similar situation applies to Maya orthography, which traditionally followed spellings developed in Spanish colonial documents. More recently,

Maya scholars have adopted new spellings to more accurately reflect the way the words should be pronounced. For example, based on colonial Yucatec spellings, in chapter 12 the animal companion or “co-essence” is called *uay* and the five-day period at year-end is *uayeb*, whereas in chapter 13 these same terms are spelled Way and Wayeb’ (capitalized and without italics). The latter represents a system first published in 1963, which transcribed contemporary Yucatec phonetically (Blair and Vermont-Salas 1965). This also reflects the pronunciation preferred in Maya areas. Other variations in orthography have developed over the second half of the twentieth century and modifications continue to this day. To assist the reader, we have cross-referenced the Maya and Nahuatl terms in the index.

## TOPICS AND THEMES

The Epiclassic and Postclassic periods featured in our book are by no means an afterthought in Mesoamerican art history, for painted manuscripts, mural painting, lapidary arts, gold work, and monumental stone carvings dating to AD 800–1521 are exceptional resources for iconographic studies. The chapters that follow focus on two areas that offer rich resources for study of animal imagery and animal remains: the highlands of central Mexico, home to the Aztecs and Toltecs, and the Maya area of Yucatan, believed to be the origin point for several Maya codices and home to Chichen Itza, an important archaeological site referenced in several chapters here. Both areas offer well-developed art traditions and ethnohistorical sources from the colonial period useful in interpreting Mesoamerican concepts.

Our introduction in chapter 1 sets the stage for iconographic studies of reptiles, amphibians, birds, and fierce mammals, with a focus on persistent themes in the symbolism and the chronological periods and geographical context of the imagery. In chapter 2, “Reflections on the Scholarship of Cecelia Ford Klein and on Animal Symbolism in Mesoamerica,” Elizabeth Boone provides a broad bibliographic background for contributions to Postclassic art history made by Cecelia Klein and also highlights important themes related to animal symbolism represented in this volume. Boone’s discussion demonstrates the breadth of Klein’s scholarship and the gift she has for selecting topics at the forefront of scholarly research. Boone also synthesizes prominent themes in our volume and offers her own thoughts about animal imagery. She notes how multifaceted and multivalent animals are in Postclassic symbolism and insightfully points out that “like humans, animals are sentient agents, somewhat distinct from humankind but not altogether separate from them either.”

In chapter 3, “How to Construct a Dragon for a Changing World: The Zoomorph on the Venus Platform at Chichen Itza,” Klein presents a detailed analysis of the central figure, part bird, part snake, and part crocodile, which carries an enigmatic deity in its jaws. Focusing on a Maya site for the first time in her research, Klein bravely ventures into a complex topic studied by numerous scholars. The rigor of her methodology is an inspiration for us all, and her bibliography represents an important guide for future research. Her analysis of the “Composite Creature” on the Venus Platform at Chichen Itza, dated either to the late Epiclassic (AD 800–950) or the early Postclassic (AD 950–1150/1200) period, incorporates a broad range of material, with over fifty references to the Aztecs and more than seventy references to Classic-period Mesoamerica. Her careful study of the animal traits featured on this creature led her to identify the image as a form of “theosynthesis” that combines several different animals and blends traditions from central Mexico and the Maya area. The conflation of Mexican and Maya deities on a platform that was probably used for royal investiture was clearly designed to communicate with a multicultural population. Klein suggests that the platform’s iconography, representing powerful creator deities who controlled the earth’s vegetation, conveyed a message of hope to Chichen Itza’s inhabitants at a time when climate change (i.e., drought) made food production a major concern for everyone who lived there.

Chapter 4, Keith Jordan’s contribution, “Pumas and Eagles and Wolves, Oh My! The Appropriation and Alteration of Teotihuacan Processing Predators at Tula,” examines images of predatory animals, some eating human hearts, on the early Postclassic relief friezes of Pyramid B at Tula. He shows how the iconography was inspired by Teotihuacan murals, but represented at Tula in a modified format and context. Many previous interpretations of these reliefs were limited to explaining them as a form of intimidation directed at the Tula polity’s vassals and enemies. Jordan focuses on other possible reasons for Tula’s borrowing of this Teotihuacan imagery and its reuse in sculptures designed for public space on a monument dedicated to royal accession and the legitimation of rulership. Recent evidence from Teotihuacan in the form of fragmentary reliefs of jaguars eating hearts on the Adosada platform, added to the Pyramid of the Sun around AD 300–400, suggests that a shift from residential to public space may have already started at the “City of the Gods,” but the context of the animal iconography is still quite different from its use at Tula. Imagery used mostly in private domestic spaces at Teotihuacan was transferred to public buildings at Tula, which reflects a strategy that equated monumental spaces in Tula Grande with domestic spaces linked to ancestry. Thus, the Pyramid B

carnivores probably represent lineages of real or fictive Teotihuacan descent, as well as warrior sodalities of Teotihuacan origin at Tula, ruling in coalition with or supporting the rulers depicted on the Pyramid B pillar reliefs.

Chapter 5, Cynthia Kristan-Graham's "An Animal Kingdom at Chichen Itza: Reconstructing a Sculptural Tableau at the Sacred Cenote," explores the role of animal imagery in buildings, planned spaces, and rock carvings that blended with the landscape to form meta-narratives. She emphasizes the context of animal imagery around the Sacred Cenote, a limestone sinkhole that was a major focus of rituals. The cenote rim features frogs carved from the "living rock," and at one time sculptures of jaguars and snakes were also found there. These animals allude to fertility, rulership, and the night. Imagery on ceramics in the nearby temple, and the mammals and reptiles, insects, fish, and birds that inhabit cenotes, echo these themes. They are also associated with watery worlds and concepts of death. And, as Kristan-Graham so aptly notes, frogs "announce rain, and the onset of the rainy season, with thunderous croaking and frantic hopping."

In chapter 6, "Iconography and Symbolism of Frogs and Toads in the Aztec World and Beyond," Elizabeth Baquedano discusses the context of amphibians in the archaeological record of the Templo Mayor and explores evidence from ethnohistorical and ethnographic records relevant to their symbolism. Her chapter also analyses the morphology and behavior of anurans (frogs and toads) for iconographic parallels. She notes that even today frogs and toads remain Mesoamerican symbols of the rainy season, the time of year when they are more commonly seen and heard. Their seasonal behaviors are linked with earth deities and the Postclassic rain god, Tlaloc. Both frogs and toads undergo metamorphosis, an important biological process associated with seasonality. Some species of anurans are active above ground only in the reproductive period and spend the dry season underground, and she proposes that images of Tlaltecuhli may relate to the toad species that live underground in the dry season. Toads are certainly important very early on in Mesoamerica; they may be depicted in Olmec art and are clearly represented in the art of Preclassic Izapa. Thousands of years later, frogs are featured in an Aztec (Mexica) altar at Tenochtitlan's Templo Mayor, and many other material objects with amphibian traits have been found at the site, though skeletal remains of frogs and toads are surprisingly rare in the archaeological assemblage (see also Baquedano 2022).

Chapter 7 by Emily Umberger and Elizabeth Aguilera, "Coyolxauhqui's Serpents: Political Metaphors in Mexica-Aztec Sculptures," focuses on questions about serpents and gender associations in Aztec art—issues raised by a ceramic fragment that is in storage at the Brooklyn Museum. This image

depicts Coyolxauhqui, the archenemy of the Aztec supernatural patron, Huitzilopochtli, with two different imaginary serpents, a serpent belt like those worn by fertility goddesses, here represented by a double-headed coral snake (*maquixcoatl*), and a fire serpent (*xiuhcoatl*) piercing her torso like a solar dart launched by her male rival. The role of the double-headed coral snake in this imagery is especially important and stands in contrast to imagery of the rattlesnake, the serpent most closely linked to the ruler in Aztec thought.

Chapter 8 by Elena Mazzetto, entitled “Quail in the Religious Life of the Ancient Nahuas,” focuses on imagery of the quail (*Cyrtonyx montezumae*), called *zolin* in Nahuatl sources that record Aztec culture of the late Postclassic period. Despite the important role played by quail in Postclassic social and religious life, this bird has been neglected in the study of central Mexican iconography. Mazzetto’s chapter analyzes the rites involving quail, the associated divinities and characters, as well as the specific contexts for rituals involving quail. These small birds were often killed to honor divine entities, being sacrificed in front of their effigies, and sometimes were consumed during related ritual events. Mazzetto synthesizes the symbolism of quail in these rituals and discusses their physical characteristics and representation in the codices as well as their role in religious life. She concludes that the spotted patterning of the quail feathers was seen as an icon of the starry sky, and the quail’s role in rituals and mythology can be linked to nocturnal imagery.

In chapter 9, “Lessening the Sting: *Huipil* Power and Deadly Scorpions,” Jeanne Gillespie studies Hernando Ruiz de Alarcón’s *Tratado de las supersticiones* (1626) for clues about scorpion symbolism, documented in local lore more than 100 years after the arrival of Europeans. The *Tratado* recorded invocations and prayers to specific divinities. Some assured a good catch or hunt, whereas others were meant to protect against poisonous or painful bites or stings. One of Ruiz de Alarcón’s most intriguing accounts is a myth about the creation of the scorpion. This tale recounts how three Aztec goddesses, named Citlalicue (Star-her-skirt), Chalchiuhtlicue (Jade-her-skirt), and Xochiquetzal (Flower-quetzal), interacted with a warrior-priest called Yappan while he was serving penance to improve his military prowess. As a result of contact with these divinities, Yappan was transformed into a deadly scorpion; however, one of the goddesses interceded to lessen the power of the poison. Ruiz de Alarcón recorded that the common practice for curing scorpion bites was to tie off the afflicted body part and cover the victim with a *huipil*, while invoking the goddesses for healing. Gillespie’s study also examines the broader context of Postclassic scorpion imagery, noting parallels with Borgia Group codices and Maya codices, and the context of scorpion constellations in art and ethnohistorical sources.

In chapter 10, “Dressed to Kill: Richly Adorned Animals in the Offerings of the Great Temple of Tenochtitlan,” Leonardo López Luján, Alejandra Aguirre Molina, and Israel Elizalde Méndez focus on faunal remains in offerings excavated by the Templo Mayor Project (1978–2020) of Mexico’s National Institute of Anthropology and History (INAH) over the course of four decades. More than 200 Mexica offerings buried between the fourteenth and sixteen centuries contain rich deposits that include human skeletal remains and an unusual diversity of plants, animals, minerals, and cultural objects. Prominent among the offerings are the vestiges of tens of thousands of animals from more than 500 species, including a particularly interesting set of carnivorous mammals and birds of prey that were sacrificed in ritual ceremonies and entombed in temples and under plaza floors. The corpses of these animals were adorned with all sorts of ornaments and insignia (e.g., anklets, belts, chest and back pendants, necklaces, ear and nose pieces, bracelets, loincloths, offensive and defensive arms, scepters) made of reed, wood, gold, copper or bronze, metamorphic greenstone, turquoise, flint, and shell. The authors carefully analyze the archaeological contexts of such offerings and the symbolism of the “dressed” animals in light of native pictography and sixteenth-century descriptions.

Milbrath’s chapter 11, “Animal Symbolism in Calendar Almanacs of the Codex Borgia and Links to Postclassic Imagery in Mexico,” focuses on representations of animals in an almanac on Codex Borgia 49–53 and encoded calendar cycles. Ten scenes include animals attacking one another, scenes of struggle involving animals and anthropomorphic gods, animal sacrifices, and world trees with birds that represent the cardinal directions. Representing a cosmogram of time and space, this almanac repeats scenes with variations related to different cardinal directions and the four yearbearers naming the year. These include rituals that show fire drilling and animal sacrifice related to the Aztec Izcalli festival at year-end. The world tree in these scenes also finds a parallel in ethnohistorical accounts of trees erected during the festival of Izcalli. Numerology may come into play because all the birds perched on these trees can be linked to a set of “Volatiles” representing numbers, a series of thirteen flying creatures best known from Aztec sources. Most of the animals in the directional almanac also find counterparts among the day signs in the calendar, because half of the 20 day signs represent animals. The chapter closes with a discussion of ten animals that appear as calendar day signs and their associated symbolism in Postclassic central Mexico.

Chapter 12, Merideth Paxton’s contribution entitled “The New Year Pages of the Dresden Codex and the Concept of Co-essence,” examines imagery of opossums in the Dresden Codex, a Postclassic Maya document from the

Yucatan Peninsula. The opossums in the panels at the top of the New Year pages (25–28) are clearly associated with the *uayeb*, the five nameless, unlucky days that mark the end of the 365-day *haab*. A glyph in the accompanying text, T572, was first read as the logograph WAY (or UAY), referring to the *uayeb*. Subsequently, scholars established T539 as another logograph read as WAY, with the meaning “co-essence” in the Classic Maya period. Thus, T572 came to be regarded as the codical variant of T539, and this interpretation remains most common in recent scholarly research, although the anthropomorphic opossums are now also described as *naguals*, a form of animal alter ego. Paxton’s chapter reexamines the symbolism underlying these invented creatures in the New Year pages and analyzes the use of T572 in the codices, arguing that the opossums symbolize the *uayeb* and that co-essence is indeed the best classificatory term for these creatures. In this instance the reference is most likely to a link between the opossums and other deities named in the description of the New Year ritual in an account attributed to Friar Diego de Landa.

Chapter 13, contributed by Gabrielle Vail and Allen Christenson, is entitled “Animal Manifestations of the Creator Deities in the Maya Codices and the Popol Vuh.” The Maya creator Itzamna, for example, has aspects corresponding to a bird, a turtle, and a crocodile, whereas the aged “God L” may be linked to the opossum in its anthropomorphic form (Pawah-Ooch) and to the owl. The authors examine figures named with the *parwah* (or *itzam*) prefix in the Postclassic Maya codices, a term best known for its relationship to an aged deity with a human-like appearance. This anthropomorphic god plays an important role in yearbearer ceremonies in the Madrid Codex, whereas animal deities named with the same prefix include turtles, crocodilians, and opossums. Similar patterning appears in the Popol Vuh, an early colonial manuscript from the K’iche’ region of highland Guatemala, where the aged male creator (Xpiyacoc) is associated with turtles (the *coc* in his name likely means ‘turtle’) and opossums (under the name Hunahpu Uch), and one of his sons (Xbalanque) has a special relationship with jaguars (*balan*, aka *balam*) and deer (*que*). The authors find that the Popol Vuh represents both day and night aspects of the creators, with Xmucane being associated with the coati (day) and coyote (night), whereas Xpiyacoc is linked to the peccary (day) and opossum (night), reflecting the times when these animals are most active.

The final chapter (14) summarizes the chapters and provides keys to important themes that can be explored by scholars studying other periods of time. This chapter also emphasizes the multiple levels of symbolism associated with individual animals, such as the jaguar, associated with rulership and warriors but also sometimes represented as a lunar symbol, as noted in the section that follows.

## PERSISTENT THEMES IN ANIMAL IMAGERY

Here we can only highlight a few recurrent themes in Mesoamerican animal symbolism, some of which can be seen as universal images. When we look at animal imagery in a larger context, certain notable patterns emerge. Ice Age cave art in Europe emphasized hunted animals, and there was apparently a strong connection between the living being and its image, so that the painted animal functioned as a double, and its symbolic slaughter helped ensure the hunt would be successful (Jung et al. 1964, 261). This idea is supported by remains in fires of animals such as bison, reindeer, and horses, but for lion-like creatures a more complex relationship may have existed (Packer and Clottes 2000). Lions depicted in a startling panel on one wall of the End Chamber of the Chauvet cave appear to be hunting a whole host of animals, some of which were also hunted by humans, such as bison (Clottes 2003). In that scene, Jean Clottes speculates that some distorted or misshapen lions are in the process of shape-shifting. In the chamber on a rock protrusion that ends in a point (the Sorcerer Panel or pendant), a bison-headed “man” is shown mounting a vulva associated with two legs, evoking the lower half of a woman.

Images of animals as targets for hunters to symbolize a form of magic for success in hunting is also seen in Postclassic hunting almanacs of the Codex Borgia (22) and the Maya Codex Madrid (39–49), which is a divination almanac showing deer-trapping (Vail 1997, 73–109; 2013, 107–127). Similar concepts animate contemporary Maya hunting rituals, which represent a form of hunting magic conducted in caves or rock outcrops (Brown and Emery 2008).

Ethnographic data throughout the Maya area documents the importance of negotiating with the animal guardian of the forest, for permission of the animal guardian was required before the hunt could commence or land could be cleared for farming. The supernatural Deer God, Huk Sip, had to be appeased in order to convert forest into farmland (Stone and Zender 2011, 78). Accounts from the Lake Atitlán area in Guatemala note that nonhuman agents involved in the hunt include the animal guardian, specific rock outcrops, rock shelters and caves, the hunted animal itself, hunting dogs, weapons, and the skeletal remains from successfully killed quarry (Brown and Emery 2008, 310–311). Tzutujil informants from Santiago Atitlán recount that when the hunting shrine of Pa’ Ruchi’ Abaj was in use, hunters offered domesticated animals, such as roosters, sheep, or beef, once every twenty days, and they reported that the great boulder thundered open as the animal guardian emerged to take the offerings into his cave. If he was pleased with the gifts, he appeared to hunters in dreams telling each how many animals they could take, and similar rituals may have been performed by the Classic Maya (Brown and Emery 2008, 323, 326–327).

Dancers wearing animal masks are a central feature of rituals that survive today among many Mesoamerican groups, which suggests that people symbolically transform into animals during certain festivals. The Voladores dance involves monkey-man impersonators and bird men that are identified as eagles representing the sun (Bassie-Sweet 2008, 71). And monkey impersonators also play a role in the Tzotzil Carnival festival in Chamula (Stone and Zender 2011, 84). The Deer Dance of Santiago Atitlán features dancers wearing deer pelts, and a “baby jaguar” appears in the form of a stuffed squirrel (Fields and Reents-Budet 2005, 94). The baby jaguar is an important icon in Classic Maya art, and scenes of its sacrifice have been interpreted as a substitute for the children who were killed in rituals to bring rain in other Mesoamerican cultures (Stone and Zender 2011, 30–31).

Although our volume focuses on Postclassic animal symbolism, several chapters include examples from the Preclassic and Classic periods, and here we add a few more salient examples to show persistent patterns in Mesoamerican art. Anthropomorphic animals seem to play a role in scenes showing dance in Classic Maya iconography (Looper 2009). For example, a cylinder vessel in the Princeton University Art Museum shows dancers wearing animal attributes among the alter egos or *way* of kings from Caracol and Ceibal (Miller and Martin 2004, 157, plate 88). In middle Preclassic Olmec art, Stelae 2 and 3 from La Venta and Chalcatzingo petroglyphs show figures wearing animal masks in poses that could represent figure dancing or flying around the ruler (Milbrath 1979, 36, figs. 68, 69, 71).

Animal masks are evident in Classic Maya art in royal contexts, which indicates that the masked ruler plays the role of an animal deity in specific contexts. This is seen on Tikal Lintel 3, Temple IV, where the ruler wears a mosaic serpent helmet forming a see-through mask (Harrison 1999, fig. 94; Jones 1977, fig. 11; Milbrath 1999, plate 15). A somewhat different helmet is worn by the ruler on Dos Pilas Stela 1, here shown with an elongated reptile snout with a prominent nose on top, most likely representing a crocodylian (Schele and Miller 1986, fig. 1.4e). Similar helmets appear on rulers during the Preclassic, as on Kaminaljuyu Stela 11, dated as early as 100 BC, but here the helmet may represent a bird deity (Stone 1995, 73, fig. 4–61; Schele and Miller 1986, fig. 2.2). In the late Preclassic the ruler at Izapa is dressed as a bird deity on Stela 2 and Stela 4, and similar images are known from painted ceramics of the Classic Maya (Fields and Reents-Budet 2005, 40–41, 44, 104, 152, plates 6, 53; Guernsey 2006: 86–89; 103–105, figs. 3.2, 3.11, 5.18).

As early as 800/900 BC, a man wearing a helmet representing a bird on La Venta Monument 19 is cradled by a feathered serpent (Milbrath 1979, fig. 70;

Stone 1995, 51, fig. 4-9). The bird may be the harpy eagle, so important in Olmec iconography (Coggins 2015, 117-120, figs. 5.9, 5.10). Here the serpent may symbolize the protector or alter ego of an Olmec ruler, and the cult of feathered serpent certainly was widespread at this time, as seen in Olmec cave paintings from Juxtlahuaca and Oxtotitlan in Guerrero (Stone 1995, 48-49, figs. 4-1, 4-7). Over two thousand years later, Mesoamerican rulers and the serpent remained closely connected. The Aztecs believed if someone was able to stay seated on a mat of intertwined serpents, slithering and still alive, he would earn the right to rule (Sahagún 1950-1982, 11:80-81, fig. 262). The double-headed serpent is a standard symbol of rulership for many centuries in the Maya area (Fields and Reents-Budet 2005, 17-19, 71, 165, plate 63). A Maya carving dating around AD 750 represented on Tikal Lintel 3, Temple IV, depicts a double-headed feathered serpent arching over the ruler (Jones 1977, fig. 11). In this case, it closely resembles a creature known as the "Cosmic Monster," which has two different heads, one of which depicts a crocodilian with deer attributes. This double-headed creature, prominent in Classic Maya art between AD 600 and 900, also called the Starry Deer Crocodile, most likely represents the Milky Way (Milbrath 1999, 277-282, fig. 7.5, plate 15; Stuart 2005, 72, figs. 43, 45, 46).

Fierce animals attacking human figures in Olmec relief carving on the rock faces at Chalcatzingo seem to be deities themselves, such as scenes showing humans attacked by a snake with wings and a raptor's beak on Monument 5 and the pair of jaguars wearing deity headdresses on Monument 4 (Grove 1984, figs. 29, 30; Saunders 1989, 74). This pattern persists in later art, where snakes, eagles, and jaguars attack humans or anthropomorphic deities, as on Codex Borgia pages 45, 50, 67 (chapter 11).

Jaguars also play an important part in Maya images of rulership (Fields and Reents-Budet 2005, 155, 184, plate 94). Classic Maya rulers at Tikal have jaguar protectors, as on Lintel 3, Temple I, where a deity known as the Water-lily Jaguar looms over the ruler on his throne, and Lintel 2, Temple IV, shows a giant Jaguar God of the Underworld forming a canopy over the ruler (Harrison 1999, fig. 77; Jones 1977, figs. 1, 12).

Jaguars played an important role in the Classic Maya as a "co-essence" known as *way*, a term used for wizards and animal transformations among the contemporary Maya (Houston and Stuart 1989, 5, figs. 1, 2). Here the *way* relates to the concept of an animal that has a special relationship with humans, perhaps even an alter ego like the Nahuatl *tonalme*. As John Hoopes and David Mora-Marín (2009, 312-313) note, in shamanic trances to cure illness the "association of the animal co-essence with trance and dreaming emphasizes how this entity operated in a liminal state. . . . [and] this dream state as an animal provided a context

for discerning and combating illness.” As they point out, in tropical lowland cultures a jaguar is often the animal involved in a shamanic transformation.

Central Mexican mythology links the Moon God with a jaguar that is paired with the solar eagle in the legend of the birth of the sun at Teotihuacan. Often interpreted as a solar symbol in Maya art (Stone and Zender 2011, 83), jaguars seem more strongly related to lunar iconography and stellar imagery associated with Venus, especially contexts related to warfare (Milbrath 1999, 120–135, fig. 4.5, plate 16).

Jaguar imagery seems especially linked with warfare in some Classic Maya contexts (Stone and Zender 2011, 82–83). A mural in Room 2 at Bonampak shows the ruler wearing a jaguar helmet and jaguar pelt when he takes a prisoner in battle (Schele and Miller 1986, fig. V.6). Tikal Lintel 2, Temple III, represents a ruler armed with a trident stone object and encased in a jaguar costume with human hands and feet and the ruler’s face peeking out of the jaguar helmet (Harrison 1999, fig. 112). And, more than 500 years later, valiant Aztec warriors were awarded military attire representing jaguars and eagles, considered the most valiant animals and symbols of rulership (Berdan 1994, 154).

This can only be a superficial look at the communalities in animal imagery throughout Precolumbian Mesoamerica. But two more examples will have to suffice. We cannot leave out the dog, beloved today as a companion but playing a more complex role in Mesoamerica. Although the more robust breeds were seen as companions, smaller breeds were fattened up as food, a widespread practice that may account for the abundance of ceramic dogs found in Preclassic burials in West Mexico. Were these intended to represent food for the deceased in the afterlife, or did they guide the deceased through the underworld? The dog in Classic Maya art is clearly represented as a tomb guardian, which suggests that dogs played a role as guides to the underworld (Stone and Zender 2011, 78–79, fig. 2). Sahagún (1950–1982, 3:44) noted that the Aztecs believed that the deceased needed the company of a dog, cremated along with the corpse to take the deceased person across the place of the nine rivers in the place of the dead. This recalls the link between the dog god Xolotl and the underworld, noted in Aztec myths, a role probably derived initially from the way dogs dig for bones. And then there are coyotes, said to be cunning and as “astute as a man,” their intelligence memorialized in an Aztec tale about a warrior who came upon a coyote with a boa (*cincoatl*) coiled around his neck and saved the desperate animal (Sahagún 1950–1982, 11:6–7). Later the coyote thanked him by bringing two turkey cocks, showing traits that we generally only associate with kind human beings. These are just a couple of the intriguing accounts that link animal behavior and their symbolism, and many more are to be found in the chapters to follow.

## REFERENCES

- Aguilera, María del Carmen. 1985. *Flora y fauna mexicana: Mitología y tradiciones*. Mexico City: Editorial Everest.
- Barba Ahuatzin, Beatriz, and Alicia Blanco Padilla (eds.). 2009. *Iconografía mexicana IX and X: Flora y fauna*. Mexico City: INAH, Colección Científica.
- Bassett, Molly H. 2019. "Bundling Natural History: *Tlaquimilolli*, Folk Biology, and Book 11." In *The Florentine Codex: An Encyclopedia of the Nahua World in Sixteenth-Century Mexico*, edited by Jeanette F. Peterson and Kevin Terraciano, 139–151. Austin: University of Texas Press.
- Bassie-Sweet, Karen. 2008. *Maya Sacred Geography and the Creator Deities*. Norman: University of Oklahoma Press.
- Benson, Elizabeth. 1997. *Birds and Beasts of Ancient Latin America*. Gainesville: University Press of Florida.
- Baquedano, Elizabeth. 2022. "Ranas y sapos: simbolismo entre los mexicas." In *Los animales y el recinto sagrado de Tenochtitlan*, edited by Leonardo López Luján and Eduardo Matos Moctezuma, 663–680. Mexico City: Colegio Nacional.
- Berdan, Frances. 1994. "Birds and Beasts in Nahua Thought." In *Chipping Away on Earth: Studies in Prehispanic and Colonial Mexico in Honor of Arthur J. O. Anderson and Charles E. Dibble*, edited by Eloise Quiñones Keber, 153–161. Lancaster, CA: Labyrinthos.
- Beutelspacher, Carlos R. 1989. *Las mariposas entre los antiguos Mexicanos*. Mexico City: Fondo de Cultura Económica.
- Blair, Robert, and Refugio Vermont-Salas. 1965. *Spoken Yucatec Maya I*. Chicago: University of Chicago Library.
- Boone, Elizabeth H. 2011. "This New World Now Revealed: Hernán Cortés and the Presentation of Mexico to Europe." *Word and Image* 27 (1): 31–46.
- Brown, Linda A., and Kitty F. Emery. 2008. "Negotiations with the Animate Forest: Hunting Shrines in the Guatemalan Highlands." *Journal of Archaeological Method and Theory* 15:300–337.
- Clottes, Jean. 2003. *Chauvet Cave: The Art of Earliest Times*. Salt Lake City: University of Utah Press.
- Coggins, Clemency. 2015. "The North Celestial Pole in Ancient Mesoamerica." In *Cosmology, Calendars, and Horizon-based Astronomy in Ancient Mesoamerica*, edited by Anne S. Dowd and Susan Milbrath, 101–138. Boulder: University Press of Colorado.
- Fields, Virginia M., and Dorie Reents-Budet. 2005. *Lords of Creation: The Origins of Sacred Maya Kingship*. Los Angeles: Los Angeles County Museum of Art, and London: Scala Publishing.
- González Torres, Yolotl (ed.). 2001. *Animales y plantas en la cosmovisión mesoamericana*. Mexico City: Conaculta-INAH.

- Grove, David C. 1984. *Chalcatzingo: Excavations on the Olmec Frontier*. New York and London: Thames and Hudson.
- Guernsey, Julia. 2006. *Ritual and Power in Stone: The Performance of Rulership in Mesoamerican Izapan Style Art*. Austin: University of Texas Press.
- Harrison, Peter D. 1999. *The Lords of Tikal: Rulers of an Ancient Maya City*. New York and London: Thames and Hudson.
- Heyden, Doris. 1989. *The Eagle, the Cactus, and the Rock: The Roots of Mexico-Tenochtitlan's Foundation Myth and Symbol*. BAR International Series 484. Oxford: British Archaeological Reports.
- Hoopes, John W., and David Mora-Marín. 2009. "Violent Acts of Curing: Pre-Columbian Metaphors of Birth and Sacrifice in the Diagnosis and Treatment of Disease 'Writ Large.'" In *Blood and Beauty: Organized Violence in the Art and Archaeology of Mesoamerica and Central America*, edited by Heather Orr and Rex Koontz, 291–330. Los Angeles: Cotsen Institute of Archaeology Press.
- Houston, Stephen D., and David Stuart. 1989. *The Way Glyph: Evidence for "Co-essences" among the Classic Maya*. Research Reports on Ancient Maya Writing, no. 30. Washington, DC: Center for Maya Research.
- Hunt, Eva. 1977. *The Transformation of the Hummingbird: Cultural Roots of a Zinacantan Mythical Poem*. Ithaca, NY: Cornell University Press.
- Jones, Christopher. 1977. "Inauguration Dates of Three Late Classic Maya Rulers of Tikal, Guatemala." *American Antiquity* 42 (1): 28–60.
- Jung, Carl G., M. L. von Franz, Joseph L. Henderson, Jolande Jacobi, and Aniela Jaffé. 1964. *Man and His Symbols*. New York: Dell Publishing.
- Looper, Matthew. 2009. *To Be Like Gods: Dance in Ancient Maya Civilization*. Austin: University of Texas Press.
- López Austin, Alfredo. 1990. *Los mitos del tlacuache: Caminos de la mitología mesoamericana*. Mexico City: Alianza Editorial Mexicana/Editorial Patria.
- López Austin, Alfredo. 1993. *The Myths of the Opossum: Pathways of Mesoamerican Mythology*, translated by Bernard R. Ortiz de Montellano and Thelma Ortiz de Montellano. Albuquerque: University of New Mexico Press.
- López Luján, Leonardo. 1996. *Las ofrendas del Templo Mayor de Tenochtitlan*. Mexico City: INAH.
- Milbrath, Susan. 1999. *Star Gods of the Maya: Astronomy in Art, Folklore, and Calendars*. Austin: University of Texas Press.
- Milbrath, Susan. 1979. *A Study of Olmec Sculptural Chronology*. Studies in Pre-Columbian Art and Archaeology, no. 23. Washington, DC: Dumbarton Oaks.
- Miller, Mary, and Simon Martin. 2004. *Courtly Art of the Ancient Maya*. San Francisco: Fine Arts Museum of San Francisco.
- Mundy, Barbara E. 1998. "Mapping the Aztec Capital: The 1524 Nuremberg Map of Tenochtitlan, Its Sources and Meanings." *Imago Mundi* 50:11–33.

- Olivier, Guilhem. 2015. *Cacería, sacrificio y el poder en Mesoamérica: Tras las huellas de Mixcóatl, "serpiente de nube."* Mexico City: Fondo de Cultura Económica, Instituto de Investigaciones Históricas, Universidad Nacional Autónoma de México.
- Packer, Craig, and Jean Clottes, 2000. "When Lions Ruled France." *Natural History* 109:52–57.
- Palmeri Capesciotti, Ilaria. 2001. "La fauna del Libro XI del 'Codice Florentino' de fray Bernardino de Sahagún: Dos sistemas taxonómicos frente a frente." *Estudios de Cultura Náhuatl* 32:189–221.
- Peterson, Jeanette F. 1983. *Flora and Fauna Imagery in Precolumbian Cultures: Iconography and Function*. BAR International Series 171. Oxford: British Archaeological Reports.
- Peterson, Jeanette F. 1990. *Precolumbian Flora and Fauna: Continuity of Plant and Animal Themes in Mesoamerica Art*. San Diego, CA: Mingei International Museum.
- Quiñones Keber, Eloise (ed.). 2000. *Chipping Away on Earth: Studies in Prehispanic and Colonial Mexico in Honor of Arthur J. O. Anderson and Charles E. Dibble*. Lancaster, CA: Labyrinthos.
- Sahagún, Fray Bernardino de. 1950–1982. *Florentine Codex: General History of the Things of New Spain*. 12 vols. Translated by Charles E. Dibble and Arthur J. O. Anderson. Santa Fe: School for American Research.
- Saunders, Nicholas J. 1989. *People of the Jaguar: The Living Spirit in Ancient America*. London: Souvenir Press.
- Schele, Linda, and Mary Miller. 1986. *The Blood of Kings: Dynasty and Ritual in Maya Art*. Fort Worth, TX: Kimbell Art Museum.
- Stone, Andrea. 1995. *Images from the Underworld: Naj Tunich and the Tradition of Maya Cave Painting*. Austin: University of Texas Press.
- Stone, Andrea, and Marc Zender. 2011. *Reading Maya Art: A Hieroglyphic Guide to Ancient Maya Painting and Sculpture*. New York and London: Thames and Hudson.
- Stuart, David. 2005. *The Inscriptions from Temple XIX at Palenque*. San Francisco: Precolumbian Art Research Institute.
- Taggart, James A. 1983. *Nahuatl Myth and Social Structure*. Austin: University of Texas Press.
- Tate, Carolyn. 2012. *Reconsidering Olmec Visual Culture: The Unborn, Women, and Creation*. Austin: University of Texas Press.
- Vail, Gabrielle. 1997. "The Deer-trapping Almanacs in the Madrid Codex." In *Papers on the Madrid Codex*, edited by Victoria R. Bricker and Gabrielle Vail, 73–110. Middle American Research Institute Publication 64. New Orleans: Tulane University.
- Vail, Gabrielle. 2013. *Códice de Madrid*. Guatemala City: Universidad Mesoamericana.