

Introduction: Knowledge of Birds and Feathers in the Ancient and Colonial Mesoamerican World

Lisa Sousa, *Occidental College*

Allison Caplan, *University of California, Santa Barbara*

Abstract. Birds and their feathers have long occupied a unique place in the social, cultural, and intellectual life of the Americas. This was particularly so in Mesoamerica, where ancient civilizations and colonial societies developed extensive knowledge of birds, their behaviors and habitats, and their vibrant plumage. This special issue brings together scholars from a variety of disciplines, including art history, history, and biology, to promote discussion among the arts, social sciences, and natural sciences on the role of birds and feathers in Mesoamerica. This introductory essay first provides a discussion of the major trends in the scholarship on birds and feathers in ancient and colonial Mesoamerica. It then highlights the contributions of the articles in the special issue to our understanding of the multifaceted roles that both symbolic and real birds and their feathers played in indigenous and transatlantic knowledge systems and societies.

Keywords. birds, feathers, Mesoamerica, interdisciplinary

“You are an eagle, you are a jaguar; you are a roseate spoonbill, a *zaquan* . . . ”
—From a Nahua midwife’s speech to a newborn baby boy, book 6 of the Florentine Codex

“The tabernacles are adorned within and without very gracefully with splendid gold and feather-work, of which in this land there are many first-class experts, so skillful that they would be considered very superior by the people in Spain and Italy who would gaze at them with open mouth, as do those who newly come here.”

—Fray Toribio de Benavente Motolinia, *History of the Indians of New Spain*

Birds and their feathers have long occupied a unique place in the social, cultural, and intellectual life of the Americas. This was particularly so in Mesoamerica, where ancient civilizations and colonial societies developed extensive knowledge of birds, their behaviors, and their habitats. In ancient Mesoamerica, birds inhabited cosmology and sacred ideology as creatures that could transcend the different levels of the sky, earth, and water realms. Feathers were also highly valued, perhaps even more so than other esteemed materials, such as greenstone, turquoise, or gold. Nahuatl-language metaphors, such as those used in the midwife's speech quoted above, linked the beauty and preciousness of birds and feathers to a newborn child and to nobility. As tribute and long-distance trade items, birds and feathers were an important part of local and imperial economies. The peoples of Mesoamerica used birds and feathers in ceremonies in a variety of ways, including as offerings and as adornments in ritual regalia. They also developed elaborate and technically complex featherworking traditions, producing works that were so magnificent that fray Toribio de Benavente Motolinia, writing in the early colonial period, was certain that Spaniards and Italians of his day would be astounded by the superior skill they demonstrated. In the sixteenth century, pictorial and written documents reflected the resiliency of indigenous knowledge about birds under colonization. As Mesoamerica became integrated into colonial-era networks that spanned the Atlantic, the shipment of indigenous featherworks and actual birds—both living and stuffed—brought American birds and indigenous knowledge of them into contact with Europe and its systems of imperial collecting. In these different ways, birds and their feathers played integral roles in Mesoamerican knowledge of the natural world, philosophy and religion, society and economics, and artistic practice.

This special issue brings together scholars from a variety of disciplines, including art history, history, and biology, to promote discussion among the arts, social sciences, and natural sciences on the study of birds and feathers in Mesoamerica. The articles draw on the approaches and methodologies of new philology,¹ ecology and biology, animal-centered histories, and religious and material culture studies to advance understanding of the place of birds and feathers within knowledge systems centered in Mesoamerica.² By foregrounding indigenous knowledge and value systems, several articles in the special issue reveal the use and symbolic significance of feathers in a variety of cultural forms, including the construction of social difference, the formation of empire, sacred beliefs and practices, artistic production, and social memory. Other contributions to this special issue consider birds as historical players on their own terms and in interactions with humans both

in Mesoamerica and in the global networks into which the region was integrated during the colonial period.³

Previous scholarship on Mesoamerican birds and feathers has frequently privileged metaphoric animals of the pre-Columbian period, giving limited attention either to real animals or to indigenous knowledge of birds in the colonial period, and has treated feathers as a separate domain of study.⁴ Broad studies by Eduard Seler ([1910] 1996), Jeannette Peterson (1983), and Elizabeth Benson (1997) surveyed animals in Mesoamerican codices and in ancient Latin America and provided overviews of species' symbolic and mythological dimensions. Related studies have identified significant birds for Mixtec, Maya, and Quechua peoples (López Castro and Pulido 1984; de la Garza 1995; Urton 1981). Studies of real animals have been more limited and largely comprise zooarchaeological studies that have sought to identify the remains of birds found in pre-Columbian offerings and interpret their meanings. Key interpretative works include Leonardo López Luján et al.'s (2014) analysis of animal offerings at the Templo Mayor and Guilhem Olivier and López Luján's (2017) study of the symbolism of the roseate spoonbill.⁵ For the colonial period, studies grounded in the European history of science have largely examined the role of writings on birds in New Spain as part of a novel practice of natural history (Corona Martínez 2002; Norton 2019).

Feathers have largely been the subject of a discrete body of scholarship interested in feathers as objects of exchange, religious and social status symbols, and the prime material for the art of featherworking. In several groundbreaking articles, Frances Berdan (1992, 2006, 2016) demonstrated the importance of feathers in regional economies and tribute networks under the Aztec Empire. Other studies have examined tribute of quetzal feathers (Peterson and Peterson 1992). In studies of Nahua ritual regalia, Alessandra Russo (2002) analyzed feathers as material components of sacrificial rites, while Justyna Olko (2014) discussed the use of feathers to demonstrate rank. These works shed light on exchanges of feathers through trade, tribute, and gifting as well as their economic and symbolic value for Nahuas.

Meanwhile, studies of featherworks have drawn from the disciplines of art history and material science to understand the facture and social context of surviving examples of feather art. Early studies by Zelia Nuttall (1892, [1888] 1904), Eduard Seler ([1892] 1996, [1908] 1996), Ferdinand von Hochstetter (1884), and Marshall Saville (unpublished, cited in García Granados 1939) examined surviving examples of Mexican featherwork. Later studies provided broader accounts of featherworking in its social and historical contexts, particularly Teresa Castelló Yturbide's (1993) *El arte*

plumaria en México and *Images Take Flight: Feather Art in Mexico and Europe, 1400–1700*, edited by Alessandra Russo, Gerhard Wolf, and Diana Fane (2016) and published in conjunction with a major 2011 exhibition at the Museo Nacional de Arte (MUNAL) in Mexico City.⁶ Brendan McMahon (2017) explored the role of feathers' iridescence in Early Modern intellectual history, following these works as they traveled from central Mexico across the Atlantic. Additionally, a growing number of technical studies have examined the facture and materials of individual works, including the so-called Moteucçoma's headdress, precontact *chimalli* (shields), spun feather textiles, and sixteenth-century Catholic feather paintings (Erlande-Brandenburg 2004; Filloy Nadal, Solís Olguín, and Navarajo 2007; Filloy Nadal and Olvido Moreno Guzmán 2017; Haag et al. 2012; Riedler 2009, 2016; Román Torres and García-Alonso Alba 2014).

Building on these important contributions to our knowledge of Mesoamerican birds and feathers, this special issue reconstructs the multifaceted roles that both symbolic and real birds and their feathers played in indigenous Mesoamerican societies and knowledge systems. These studies in particular draw attention to the view of birds as active social participants with ties to both the human and divine realms, and of feathers as a medium that crossed such fields as material culture, religion, and social memory. Across these studies, the fluidity of Mesoamerican categories of bird, human, and god becomes apparent. Simultaneously, these studies demonstrate the importance of indigenous knowledge of bird species, populations, and behaviors in shaping interactions with birds and in the production and semiotics of featherworks.

Methodologically, the articles in this special issue also model how exchanges between history, natural history, art history, linguistics, and biology provide a clearer understanding of past interactions between humans and birds.⁷ In this way, the articles in this special issue advance a methodological approach that engages with the strengths of traditional ethnohistory, while also broadening its interdisciplinary grounding to new disciplines, in particular the physical sciences. Originally formulated as a methodology combining the analytical techniques of anthropology with the sources used by historians, ethnohistory presented a new manner of working across disciplines that was tailored to the study of indigenous peoples of the Americas (Krech 1991; Chaves 2008; Harkin 2010). Several articles in this special issue work within that tradition of ethnohistoric scholarship to recover indigenous knowledge through a close reading of textual and pictorial sources, including native-language texts, Spanish archival documents, and colonial sources attributed to Spaniards but created with indigenous collaborators or based on native sources. A close and

creative reading of these sources offers new insights into indigenous beliefs, practices, and value systems and, at other times, demonstrates how sources developed by humans can nonetheless be used to shed light on the experiences and subjectivities of animals as historical actors.

Still other articles in the special issue expand the interdisciplinary approach of ethnohistory to disciplines beyond anthropology and history. Incorporating art history, philology, and biology, the scholarship in this special issue draws creatively on the broad range of sources available to students of human-bird interactions, including not only pictorial sources, native-language sources, archival documents, chronicles, and ethno-linguistic documentation but also modern bird populations and specimens in natural history collections. In the past, many ethnohistorical studies have drawn from archaeology, art history, and linguistics as well as history and anthropology; however, with important exceptions, few have engaged with the physical sciences. Several of the articles in this special issue show how biological study of birds and their behavior can offer new insights into indigenous knowledge, beliefs, and practices that may not be readily apparent in more traditional sources (see Caplan, Maley, and McCormack; Caplan; Montero Sobrevilla; García Garagarza). Though there are obvious challenges in collaborating across disciplinary fields—including different skill sets, analytical approaches, forms of expertise, and publication norms—the special issue demonstrates the value and potential for collaborations of this type to advance understanding of natural history, medicine and healing, agriculture, religion, and material culture.

The articles in this special issue were first developed as conference papers for a multipanel session at the 2015 annual meeting of the American Society for Ethnohistory in Las Vegas, Nevada. A central goal of the session (and of this special issue) was to generate a conversation between ethnohistorians of Mesoamerica and biologists from the Moore Laboratory of Zoology at Occidental College, home to one of the largest collections of Mexican birds in the United States, to consider potential for future interdisciplinary collaborations. In their article, Allison Caplan, James Maley, and John McCormack discuss some of the promise for ethnohistoric research using natural history collections and consider the ways that deeper collaborations between ethnohistorians and biologists can illuminate indigenous knowledge and artistic practices. They provide descriptions and identifications of some of the main types of birds that are mentioned in Nahua ethnohistorical sources and propose ways in which engagement with biological studies of feather coloration, anatomical variation, geographic distribution and habitat, and bird behavior can generate new insights into Nahua culture and art.

Articles by Caplan and Lisa Sousa examine featherworks as artistic productions and historical objects with integral ties to Nahua religion, metaphysics, and social memory. Caplan reveals the importance of *tonalli*, a solar-derived life force, to the commercial and artistic production of featherworks. She uses philological evidence to shed light on distinctions Nahuas made between precious, *tonalli*-bearing feathers and ordinary feathers, a distinction that fundamentally structured artists' handling and techniques in creating glued feather mosaics. Sousa examines how feather regalia acquired through gift exchange, trade, conquest, and tribute conveyed histories of ethnic origins, individual feats, and imperial expansion, furthering our understanding of the semiotics of feathers in works of costumery.

The articles by Iris Montero Sobrevilla, León García Garagarza, and Martha Few bring into focus the active religious and social roles played by birds, which could manifest divinities through their behaviors and both speak with and form close bonds with human interlocutors. Montero Sobrevilla examines the long-standing question of why the Mexica patron god Huitzilopochtli ("Hummingbird of the Left") was associated with the hummingbird, finding that Nahuas understood the god to exhibit characteristic behaviors of the hummingbird, as is especially evident in the practices and timing of the god's festivals. Her article demonstrates the close correspondence between religious practice and natural history in the contributions of Nahua collaborators on the Florentine Codex and highlights the central importance of indigenous knowledge to the codex's book 11.1. García Garagarza examines owls as *tetzahuitl*, or ominous signs, to reveal the fundamental role of these birds in linking the divine and earthly realms. Through his analysis of colonial Spanish writings based on Nahuatl sources, he explores the interspecies dialogues that allowed owls to convey warnings to humans and humans to reject their perilous predictions by trading words with their avian interlocutors. Examining the legacies of these issues, Martha Few considers the complex relationships that developed between birds and their human handlers on the transatlantic voyages that took Mesoamerican animals to Europe, as objects of imperial collecting. In her careful reading of Spanish archival sources, Few offers new insights both into the ways in which historians can reconstruct animals as historical actors and the processes by which bird species and associated indigenous knowledge of them began to circulate beyond the confines of Mesoamerica in the latter half of the colonial period.

Together, the articles in this special issue reveal the promise of new approaches to the interdisciplinary study of indigenous knowledge of and

European interest in birds and feathers in the ancient and colonial Mesoamerican world.

Notes

- 1 *New philology* is a term coined by James Lockhart that refers to the philological analysis of indigenous-language archival documents and formal alphabetic texts from Mesoamerica that shed light on indigenous societies, politics, and culture as well as the influence of Spanish culture during the colonial period.
- 2 Complementary publications that principally address birds and feathers as exotica or their reception in Europe include Bleichmar and Mancall 2011; Feest 1990, 1995; Gerbi 1975; Alves 2011; and de Asúa and French 2005.
- 3 This vantage is informed by key works on centering animals, particularly Few and Tortorici 2013; Norton 2013; Shapiro 2008; Fudge 2002; Derby 2011; and Pearson and Weismantel 2010.
- 4 We borrow this conceptually productive terminology from Tortorici and Few 2013.
- 5 Studies on birds represent only part of a much larger corpus on the zooarchaeology of ancient Nahuas. See especially Polaco 1991; and Corona-M. and Arroyo-Cabrales 2002.
- 6 Volumes focused on South American featherworking include Reina and Kensing 1991; and King 2012.
- 7 This approach builds on previous scholarship that proposes using interdisciplinary strategies to overcome the methodological difficulties of studying animal-human interactions using sources created by humans, especially Pearson and Weismantel 2010 and Tortorici and Few 2013.

References

- Alves, Abel A. 2011. *The Animals of Spain: An Introduction to Imperial Perceptions and Human Interactions with Other Animals, 1492–1862*. Leiden, the Netherlands: Brill.
- Benson, Elizabeth P. 1997. *Birds and Beasts of Ancient Latin America*. Gainesville: University Press of Florida.
- Berdan, Frances F. 1992. “Economic Dimensions of Precious Metals, Stones, and Feathers: The Aztec State Society.” *Estudios de cultura náhuatl* 22: 291–323.
- Berdan, Frances. 2006. “Circulation of Feathers in Mesoamerica.” *Nuevo Mundo, Mundos Nuevos*, 21 January. journals.openedition.org/nuevomundo/1387.
- Berdan, Frances. 2016. “Featherworking in the Provinces: A Dispersed Luxury Craft under Aztec Hegemony.” *Ancient Mesoamerica* 27, no. 1: 209–19.
- Bleichmar, Daniela, and Peter C. Mancall, eds. 2011. *Collecting across Cultures: Material Exchanges in the Early Modern Atlantic World*. Philadelphia: University of Pennsylvania Press.
- Castelló Yturbide, Teresa, ed. 1993. *El arte plumaria en México*. Mexico City: Fomento Cultural Banamex.
- Corona-M., Eduardo, and Joaquín Arroyo-Cabrales, eds. 2002. *Relaciones hombre-fauna: Una zona interdisciplinaria de estudio*. Mexico City: Consejo

- Nacional para la Cultura y las Artes, Instituto Nacional de Antropología e Historia.
- Corona Martínez, Eduardo. 2002. *Las aves en la historia natural novohispana*. Mexico City: Instituto Nacional de Antropología e Historia.
- Chaves, Kelly K. 2008. "Ethnohistory: From Inception to Postmodernism and Beyond." *Historian* 70, no. 3: 486–513.
- de Asúa, Miguel, and Roger French. 2005. *A New World of Animals: Early Modern Europeans on the Creatures of Iberian America*. Burlington, VT: Ashgate.
- de la Garza, Mercedes. 1995. *Aves sagradas de los Mayas*. Mexico City: Centro de Estudios Mayas del Instituto de Investigaciones Filológicas, Universidad Nacional Autónoma de México.
- Derby, Lauren. 2011. "Bringing the Animals Back In: Writing Quadrupeds into Caribbean History." *History Compass* 9, no. 8: 602–21.
- Erlande-Brandenburg, Alain. 2004. *Le triptyque aztèque de la crucifixion*. Paris: Réunion des musées nationaux, Musée national de la Renaissance, Union latine.
- Feest, Christian. 1990. "Vienna's Mexican Treasures: Aztec, Mixtec, and Tarascan Works from 16th Century Austrian Collections." *Archiv für Völkerkunde* 44: 1–64.
- Feest, Christian. 1995. "The Collecting of American Indian Artifacts in Europe, 1493–1750." In *America in European Consciousness*, edited by Karen Ordahl Kupperman, 324–60. Chapel Hill: University of North Carolina Press.
- Few, Martha, and Zeb Tortorici, eds. 2013. *Centering Animals in Latin American History*. Durham, NC: Duke University Press.
- Filloy Nadal, Laura, Felipe Solís Olguín, and Lourdes Navarrijo. 2007. "Un excepcional mosaico de plumaria azteca: El *tapacáliz* del Museo Nacional de Antropología." *Estudios de cultura náhuatl* 38: 85–100.
- Filloy Nadal, Laura, and María Olvido Moreno Guzmán. 2017. "Precious Feathers and Fancy Fifteenth-Century Feathered Shields." In *Rethinking the Aztec Economy*, edited by Deborah L. Nichols, Frances Berdan, and Michael Smith, 156–94. Tucson: University of Arizona Press.
- Fudge, Erica. 2002. "A Left-Handed Blow: Writing the History of Animals." In *Representing Animals*, edited by Nigel Rothfels, 3–18. Bloomington: Indiana University Press.
- García Granados, Rafael. 1939. "Mexican Feather Mosaics." *Mexican Art and Life* 5: 1–4.
- Gerbi, Antonello. 1975. *Nature in the New World: From Christopher Columbus to Gonzalo Fernández de Oviedo*, translated by Jeremy Moyle. Pittsburgh: University of Pittsburgh Press.
- Haag, Sabine, Alfonso de María y Campos, Lilia Rivero Weber, and Christian Feest, eds. 2012. *El penacho del México antiguo*. Vienna: ZKF Publishers.
- Harkin, Michael E. 2010. "Ethnohistory's Ethnohistory: Creating a Discipline from the Ground Up." *Social Science History* 34, no. 2: 113–28.
- King, Heidi. 2012. *Peruvian Featherworks: Art of the Precolumbian Era*. New York: Metropolitan Museum of Art.
- Krech, Shepard. 1991. "The State of Ethnohistory." *Annual Review of Anthropology* 20: 345–75.
- López Castro, Rafael, and Marco Antonio Pulido. 1984. *Antiguas aves de la mixteca*. Mexico City: Secretaría de Educación Pública/Cultura, Ediciones del Ermitaño.

- López Luján, Leonardo, Ximena Chávez Balderas, Belem Zúñiga-Arellano, Alejandra Aguirre Molina, and Norma Valentín Maldonado. 2014. "Entering the Underworld: Animal Offerings at the Foot of the Great Temple of Tenochtitlan." In *Animals and Inequality in the Ancient World*, edited by Benjamin S. Arbuckle and Sue Ann McCarty, 33–61. Boulder: University Press of Colorado.
- McMahon, Brendan. 2017. "Iridescence, Vision, and Belief in the Early Modern Hispanic World." PhD diss., University of Southern California.
- Norton, Marcy. 2013. "Going to the Birds: Birds as Things and Beings in Early Modernity." In *Early Modern Things: Objects and Their Histories, 1500–1800*, edited by Paula Findlen, 53–83. London: Routledge.
- Norton, Marcy. 2019. "The Quetzal Takes Flight: Microhistory, Mesoamerican Knowledge, and Early Modern Natural History." In *Translating Nature: Cross-Cultural Histories of Early Modern Science*, edited by Jaime Marroquín Arredondo and Ralph Bauer, 119–47. Philadelphia: University of Pennsylvania Press.
- Nuttall, Zelia. 1892. *On Ancient Mexican Shields: An Essay*. Leiden, the Netherlands: P. W. M. Trap.
- Nuttall, Zelia. (1888) 1904. "Standard or Headdress." In *Peabody Museum of American Archaeology and Ethnology, Harvard University Papers*, vol. 1, 5–52. Cambridge, MA: Peabody Museum.
- Olivier, Guilhem, and Leonardo López Luján. 2017. "De ancestros, guerreros y reyes muertos: El simbolismo de la espátula rosada (*Platalea ajaja*) entre los antiguos nahuas." In *Del saber ha hecho su razón de ser . . . : Homenaje a Alfredo López Austin*, vol. 1, edited by Eduardo Matos Moctezuma and Ángela Ochoa, 159–94. Mexico City: Secretaría de Cultura, Instituto Nacional de Antropología e Historia, Instituto de Investigaciones Antropológicas, Universidad Nacional Autónoma de México.
- Olko, Justyna. 2014. *Insignia of Rank in the Nahua World: From the Fifteenth to the Seventeenth Century*. Boulder: University Press of Colorado.
- Pearson, Susan J., and Mary Weismantel. 2010. "Does 'the Animal' Exist? Toward a Theory of Social Life with Animals." In *Bestly Natures: Animals, Humans, and the Study of History*, edited by Dorothee Brantz, 17–37. Charlottesville: University of Virginia Press.
- Peterson, Amy A., and A. Townsend Peterson. 1992. "Aztec Exploitation of Cloud Forests: Tributes of Liquidambar Resin and Quetzal Feathers." *Global Ecology and Biogeography Letters* 2, no. 5: 165–73.
- Peterson, Jeanette Favrot, ed. 1983. *Flora and Fauna Imagery in Precolumbian Cultures: Iconography and Function (Imágenes de flora y fauna en culturas Precolumbinas: Iconografía y función)*. Oxford: BAR Publishing.
- Polaco, Oscar J. 1991. *La fauna en el Templo Mayor*. Mexico City: Instituto Nacional de Antropología e Historia, Proyecto Templo Mayor.
- Reina, Ruben E., and Kenneth M. Kensington, eds. 1991. *The Gift of Birds: Featherwork of Native South American Peoples*. Philadelphia: University Museum of Archaeology and Anthropology, University of Pennsylvania.
- Riedler, Renée. 2009. "Ein Monster aus Gold und Federn': Materialtechnische Untersuchungen und Konservatorische/Restauratorische Massnahmen am Aztekischen Federschild in Wien." *Technologische Studien* 6: 46–81.
- Riedler, Renée. 2016. "Materials and Techniques of the Feather Shield Preserved in Vienna." In *Images Take Flight: Feather Art in Mexico and Europe, 1400–*

- 1700, edited by Alessandra Russo, Gerhard Wolf, and Diane Fane, 330–41. Munich: Hirmer.
- Román Torres, Rosa Lorena, and Lilian García-Alonso Alba, eds. 2014. *Conservación de arte plumario*. Mexico City: Escuela Nacional de Conservación, Restauración y Museografía, Instituto Nacional de Antropología e Historia.
- Russo, Alessandra. 2002. “Plumes of Sacrifice: Transformations in Sixteenth-Century Mexican Feather Art.” *RES: Anthropology and Aesthetics* 42: 225–50.
- Russo, Alessandra, Gerhard Wolf, and Diana Fane, eds. 2016. *Images Take Flight: Feather Art in Mexico and Europe, 1400–1700*. Munich: Hirmer.
- Seler, Eduard. (1892) 1996. “Ancient Mexican Shields.” In *Collected Works in Mesoamerican Linguistics and Archaeology*, vol. 2, edited by Frank E. Comparato, 296–98. Culver City, CA: Labyrinthos.
- Seler, Eduard. (1908) 1996. “The Ancient Mexican Feather Ornament in the Royal Natural History Museum, with Remarks on the Feathers Used in Making this Specimen by Dr. Ludwig von Lorenz-Liburnau, Vienna.” In *Collected Works in Mesoamerican Linguistics and Archaeology*, vol. 6, edited by Frank E. Comparato, 27–30. Culver City, CA: Labyrinthos.
- Seler, Eduard. (1910) 1996. “The Animal Pictures of the Mexican and Maya Manuscripts.” In *Collected Works in Mesoamerican Linguistics and Archaeology*, vol. 5, edited by Frank E. Comparato, 167–340. Culver City, CA: Labyrinthos.
- Shapiro, Kenneth. 2008. *Human-Animal Studies: Growing the Field, Applying the Field*. Ann Arbor, MI: Animals and Society Institute.
- Tortorici, Zeb, and Martha Few. 2013. “Introduction: Writing Animal Histories.” In *Centering Animals in Latin American History*, edited by Martha Few and Zeb Tortorici, 1–27. Durham, NC: Duke University Press.
- Urton, Gary. 1981. “Animals and Astronomy in the Quechua Universe.” *Proceedings of the American Philosophical Society* 125, no. 2: 110–27.
- von Hochstetter, Ferdinand. 1884. *Über mexikanische Reliquien aus der Zeit Montezuma's in der k.k. Ambraser Sammlung*. Vienna: Carl Gerold's Sohn.