Mesoamerican Ethnobotany:

How Indigenous Intellectuals Extracted from the Natural Environment to Heal and Create

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KNOWLEDGE PRODUCTION & PRESERVATION: WHO IS AN INTELLECTUAL?

We know that Mesoamerican knowledge systems were preserved and recorded by indigenous intellectuals in both sixteenth-century codices and in the heritage practices of Nahua descendants across the diaspora today. The performances of *xiuhpohualli* (alphabetic texts) are found in the daily toil of weavers, healers, curanderos, and feather-workers, among other indigenous intellectuals whose knowledge and skills are recorded in the codices; although the bulk of the codices were created under Spanish auspices, the knowledge recorded therein were nevertheless that which had been generated by indigenous people, and used by indigenous people in the centuries after the Spanish invasion.

What can we glean about the power dynamics from sixteenth-century Spanish codices and herbals? Spanish monarch Philip II named Francisco Hernández *protomédico*, the first physician of New Spain. From 1571 through 1577, Hernández composed sixteen volumes of notes, consisting of his studies of medicinal herbs of New Spain. As historian Marcy Norton explains, indigenous individuals collaborated with Hernández by conducting interviews, writing responses, and illustrating specimens. Through these interactions, Hernández declared cacao a "neutral substance" as opposed to a medicine thereby freeing the beverage from "pagan ritual" entanglements. Contemporary historians, ethnographers, and archaeologists, however, have determined that cacao was closely connected to Nahua cosmology. Norton also asserts that cacao is a cultural artifact, specifically viewed as "similar in nature to blood because both were liquids coursing with life-giving force."[1] How then did Hernández, the university educated researcher and academic, fail to recognize the significance that cacao held in

Nahua cultures? The answer may be found in Hernández's experiences with indigenous healers who helped him. He disparaged them and complained of "Indian informants' reluctance to share their knowledge [and] unwilling to tell the truth about their herbs."[2] This occurrence makes more sense when situated alongside another Mexica-Spanish collaboration. Historian Iris Montero understands the pressures that Mexica informants faced when explaining their history to Bernardino de Sahagún, the Franciscan friar whose purpose was to learn about Mexica language and culture to evangelize them. Nahua informants working on the *Historia general de las cosas de la Nueva España* (*Florentine Codex*) simultaneously covered their cosmological knowledge about hummingbirds as gods and subtly inserted their migration story as called forth by Huitzilopochtli.[3] An image in Book 11 of the *Florentine Codex* features a symbol of a broken tree that alludes to "the rise of Huitzilopochtli as the main god in the Mexica pantheon."[4] The broken tree symbol, however, is not explained or translated in the accompanying Spanish text. Similarly, the contents in Book 9 of the *Florentine Codex* that deal with featherworks are not translated. Art historian Juliana Ramírez Herrera explains that Sahagún regarded "these crafts [as] irrelevant to issues of faith and are so common in New Spain, there is no reason in making a translation, for the reader, if he/she wanted, could hear it directly from the officials and see it with his/her own eyes."[5] Again, Sahagún is misinformed about the value of feathers in religious ceremonies—was this because indigenous informants did not divulge such information? Ramírez Herrera contends that Sahagún's absent translation suggests indigenous artists' control over the production of featherworks: "the technique of the *amantecah* (or feather-workers) continued to be virtually the same as before the arrival of the Spaniards."[6] The interactions of Hernández

and Sahagún suggest not only Nahua agency in deciding just how much of their history and cosmology to reveal, but also their expansive knowledge about the natural environment and how to manufacture goods from available resources for their own ritual uses.

Iris Montero described the informants who worked with Sahagún as "indigenous intellectuals." But who counts, or should count, as an intellectual? Gabriela Ramos and Yanna Yannakakis urge historians to move beyond ideological knowledge production in discursive forms and to recognize as intellectual the pragmatic knowledge acquisition and expression evident in habits and performance.[7] If we follow the advice of Ramos and Yannakakis to include performance in our survey of intellectual history, then we find Sylvia Marcos and Camilla Townsend making related appeals. Marcos seeks to make visible and legible the feminine presences in texts and documents, and demonstrates the continuity of historical indigenous knowledge in contemporary times. Marcos accomplishes this by framing the curing methods and uses of plants and healing rituals found in Sahagún's 1547 *Historia* as early "resonances for Zapatista women *promotoras de salud*, whose grandparents had transmitted orally and were still in contemporary mountains of Chiapas."[8] The title of Marcos's monograph refers to the primary sources from where such knowledge emanates: "taken from the lips of the wise elders of the communities Sahagún researched in 1542."[9] Marcos builds on similar ideas presented by Ramos and Yannakakis to advocate for a widening of who counts as intellectual and medic. The community elders who have preserved medical knowledge systems through the generations are sources that we should consider. Camilla Townsend also joins the discourse regarding identifying indigenous people as intellectuals and presents the mostly

anonymous authors of the annals of native America as multidimensional people who "treasured books, mended quill pens, and sometimes wrote literature."[10] Townsend explores the motivations for documenting *atepetl* (community) history throughout the different eras of colonial Mexico from the early sixteenth through the seventeenth century, she argues that Nahua people prioritized humanity in their historiography and were concerned with the survival of their people, knowledge, and customs. Strategies to ensure survival fell within two categories: one, the adoption of the "new without obliterating the old," and the other, which "prized a version of their history that they deemed pure and attempted to isolate it from contaminating European influences."[11] The two strategies were implemented through the ensuing generations of Nahua descendants, which constitute modern iterations of such preserved knowledge as arguably intellectual. She likens Nahua documentarians to present day historians who "scouted for sources, read them over the course of years, and often showed a deep understanding of them [then] preserved the knowledge they had gleaned in a form other people could understand."[12] It is apparent that Townsend builds upon the works of Ramos, Yannakakis, and Marcos by surveying Nahua epistemology and the power systems that underlay such production.

As we have discussed before, the West tends to value and favor knowledge found in alphabetic texts over that which is transmitted orally or through performance. As a result, the evolution of indigenous knowledge through its relationships with the natural environment have also been overlooked. Geographer William M. Denevan tackles the "pristine myth" of the American landscape in 1492, espoused by literary figures that the landscape of the Americas was an untouched and unmarked paradise. Using field

surveys, ethnohistorical accounts, and archaeological findings, Denevan illustrates the ways that "American flora, fauna, and landscape were slowly Europeanized after 1492, but before that they had already been Indianized."[13] Denevan explains that the pristine myth first developed when early observers did not recognize subtle indigenous environmental modifications and erroneously described the landscape as untouched. Additionally, eyewitness accounts from the mid eighteenth through nineteenth centuries reveal the landscape as it was at the time, not as it was in 1492. Such romanticized observations of a pristine America likely resulted from mass decline of the indigenous population beginning in the sixteenth century. Finally, Denevan peppered data and statistics to explain that the decimation of indigenous populations in the western hemisphere resulted in abandoned fields, vanished settlements, recovered forests, and retreated savannas.[14] Denevan's point in using such data is to pose a different explanation for the pristine landscape that eyewitnesses recorded in the three centuries following European contact—namely that the landscape recovered and retreated to its pre-indigenous form as opposed to the commonly held belief that indigenous people did nothing to the environment.

RESEARCH AND OUTPUT

My contribution to the discourse on indigenous intellectuals and knowledge production is to apply the frameworks established by Ramos, Yannakakis, Marcos, and Townsend to my research on Mesoamerican ethnobotany. I include weavers, healers, and feather-workers, among indigenous intellectuals whose knowledge survived the Conquest through the preservation of heritage customs. I am interested in the daily life of people from pre-sixteenth century Central Mexico, largely because the historiography on Nahua

people emphasizes the primacy of the Conquest and military history, and pays little attention to the nuances of daily life and how these daily activities reveal the effectiveness of indigenous practices. Moreover, the daily activities themselves constituted as much intellectual history as the changes it underwent given the shifting landscape of local culture, economy, and society. In this paper I will analyze the kinds of knowledge and resources that indigenous people of Central Mexico extracted from the natural world, and the means through which they preserved these heritage customs over the course of many centuries. The pre-colonial practices of these multidimensional indigenous intellectuals have adapted to changing times through the generations yet remain recognizable today. How did indigenous people in Central Mexico make use of their natural environment? What are some of their unconventional uses of the natural environment? This project seeks to demonstrate that in all, indigenous people in Central Mexico were multi-dimensional intellectuals who observed their environment, then extracted what they needed to heal and create. Their uses of the environment are in line with scientific methods and remain in practice today through heritage customs. It would seem that what the Spaniards imagined as their conquest of Nahua society was incomplete.

To make Mesoamerican plant knowledge accessible to the public in an authentic way, I curated an online exhibit to accompany this paper.[15] The exhibit draws from the expansive Mesoamerica and Colonial Mexico Rare Book Collection at CSULA Special Collections & Archives, which includes sources on ethnology and ethnography of Mesoamerican communities from pre-Hispanic through Spanish Colonial periods, roughly sixteenth century through seventeenth century. My research and exhibit

primarily focus on Nahua people of Central Mexico. I am most interested in discovering the knowledge and customs of these groups of people as they were recorded in various sixteenth-century codices. The sections of this paper also follow those in the exhibit and focus on the traditional knowledge and customs of people's *costumbre* (customary) and *curandero* (medicinal) uses of the environment.

The *Florentine Codex, Codex Mendoza, Códice Ixtlilxochitl,* and the *De La Cruz-Badiano Aztec Herbal of 1552* are sixteenth-century documents that feature Nahua produced illustrations; some sources include commentary from leading anthropologists, historians, and art historians. The first two codices listed provide the bulk of my source material. The *Códice Ixtlilxochitl* provides source material for funerary customs, feasts, and agricultural calendars. The *De La Cruz-Badiano Aztec Herbal of 1552* is the most direct source material on Nahua medicinal uses of plants. I also use this source to fill gaps and confirm information found in the *Florentine Codex*.

COSTUMBRE (CUSTOMARY USES)

This section on customary uses of the natural environment should be read as a life cycle of sorts, split into three subsections based on life stage. The first life stage begins with midwife practices and childbirth. The next life stage focuses on the bulk of years that commoners would likely spend on refining their respective artisanal endeavors: cacao, tobacco, feather-works, and weaving textiles. The final life stage concerns funerary rites for different people and manner of death.

Ticitl (Midwifery)

The *Codex Mendoza* and *Florentine Codex* offer particular insight into the knowledge and practices of midwives. *Ticitl* is a gender-neutral title for a "medical

specialist in the general sense of healer or doctor [not limited to] medical knowledge [about] childbirth or women's health."[16] As such, midwives offered experience, wisdom, and emotional support for the expecting parents. They advised pregnant ones in myriad ways: "eat and drink well and not to fast or eat chalk or earth because the baby would absorb whatever was ingested," "not become overheated in the sun or the sweatbath because excessive heat could kill the baby," and "to avoid feeling sad, troubled, or frightened, which might cause her to miscarry."[17]

As the pregnant one approached active labor, the *ticitl* bathed the woman in the *temascalli* and massaged the abdomen. Figures 24 and 25 in Book 6 of the *Florentine Codex* depict the "midwife massag[ing] the pregnant one" to align the baby properly. The *ticitl* then gave the pregnant one herbal infusions to speed the birthing process. Historian Lisa Sousa explains that usually the herb *ciuapactli* (woman medicine) was enough, but if the labor was difficult then the *ticitl* used a different remedy. This infusion of ground opossum tail "was a more intense ejectant."[18] Other remedies for childbirth are described in *The De La Cruz-Badiano Aztec Herbal of 1552*. These include

> medicines made from the bark of the tree *quauh-alahuac* and the plant *cihua-patli*, the small stone *eztetl*, and the tail of the small animal called *tlaquitzin*. Also the hairs and bone of an ape, the wings of an eagle, the tree *a-huexotl*, the skin of a deer, the gall of a cock, also of a hare, and onions put in the sun are to be burned together; to these are to be added salt, the fruit we call *nochtli*, and the pulque we call *octli*. The above are to be heated and used for anointing.[19]

Midwives also "took a handful of tobacco and moved it across the pregnant woman's belly, urging the deities Cuato and Caxxoch to open the birth canal and let the baby pass."[20] However, if the infusions could not bring about contractions, then the *ticitl* "suspended the woman and kicked her in the back to start labor." If this still did not lead to a successful birth, then the midwife used an obsidian blade knife to "dismember the

baby and remove it from the womb" to save the mother's life.[21] Sousa notes that when maternal grandparents opposed the removal of the baby, the midwife "solemnly enclosed the suffering woman in the temascalli by herself and left her to die in peace."[22]

Midwives offered lactation support as well. To increase the flow of milk, they advised nursing mothers to

> take the plants *chichiltic xiuhtontli*, which shows acid slightly, the *tohmiyo xihuitl* and crystal, ground up in pulque and boiled [and] drink it frequently. Afterwards macerate the plant *memeya xiuhtontil* in pulque and let her also drink that juice; let her enter the bath and there have another drink, made from corn. On leaving it, let her take the viscous water drawn from the grain.[23]

Similarly, when an infant did not latch on

> give him a drink made of the herb called *te-amoxtli*, quail's blood set in the sun, and its hairs somewhat restored, which you will incinerate. Let him have a poultice carefully prepared from a weasel's brain and scorched human bone, drawing out the acid water.[24]

As healers, midwives referred to a repertoire of cures that included massage, bloodletting, purging, herbs and medicines, rubbing with ashes, setting broken bones with splints, and prognostication.[25] The Spanish invasion and ensuing ecclesiastical persecutions targeted *ticitl* as "idolatries" and largely ignored their "expertise in massage therapy, and surgical skill" as well as "traditional concepts of health, understanding of local plants and herbs, and sacred knowledge to heal and care for the people of their communities."[26] Despite such efforts, this important knowledge has survived invasion, assimilation, and decimation in other parts of the world as well.

In January 2020, Dorene Day, an Ojibwe midwife was awarded a fellowship to teach indigenous birthing practices to indigenous women in the upper Midwest and Canada; Day will also create webinars and blogs to facilitate access to her knowledge. The First Nation Development Institute and the Henry Luce Foundation established

funding for the fellowship to "honor and support intellectual leaders in Native communities who are actively working to generate, perpetuate and disseminate indigenous knowledge."[27] As reported, "native women are still likely to face barriers in carrying out their birthing wishes" in hospitals, therefore Day's teachings are of utmost importance in these communities. Many risks, structural obstacles, and personal preferences have led families to seek home birth options with the guidance of midwives.

Cacao (Chocolate)

Cacao and chocolate were significant in Mesoamerican societies: cacao beans were used as currency, achiote spiced chocolate was "shared during marriage ceremonies, and offered in sacrifice" to deities, and helped Nahuas connect with the cosmos.[28] The beverage itself, what Nahuas called *xocolatl*, was made from dried fermented seeds of the fruit grown on the (Theobroma) cacao tree. Maya first developed the process from raw cacao to chocolate that Nahuas later adopted.[29] First, remove dark seeds from the cacao pod for drying and fermentation. Next, grind and heat the seeds, also called beans. Then, combine the cacao with water and other ingredients like maize, achiote, and vanilla. To ensure the trademark foam, chocolate makers repeatedly poured the drink from one vessel way up high to another way down low. Chocolate beverage varieties include some mixed with chili to warm the throat, others with dried and ground flowers, but the most coveted for its luxurious allure was finely ground cacao mixed with tropical flowers and topped with foam.[30] These various ingredients and the process for making chocolate evoked a sensory experience.

Chocolate making was exclusively women's work, and as Norton explains, if a potential sacrifice victim proved to be a skilled chocolate maker then she might be

spared. While commoner women made the drink, it was warriors who predominantly consumed it in recognition of their virtue on the battlefield.[31] Nahuas participated in the nightfall ritual of consuming chocolate and sweetened hallucinogenic mushrooms to enter a sacred space in which celebrants experienced "union with divine forces" and visions that foretold the future. Nahuas believed that chocolate generated a mood of "stimulating pleasure thought to match the kind of consciousness enjoyed by joyful gods" that allowed them to experience the "hedonistic pleasures of the gods."[32] Commoners consumed chocolate of lesser quality only occasionally, like instances of "social consecrations, those binding men and women in betrothal, marriage, and sexuality" in which chocolate represented the blood flow between intermarried families.[33] Norton explained that the sacred energy of cacao and chocolate, or *teotl*, is found in the two's association with the heart and blood; chocolate serves as metaphor for blood.

Continuity of chocolate consumption is evident in the multitude of recipes available today. Jesse Cromwell, Colonial Latin American historian, uncovered a set of 1662 chocolate recipes recorded by Henry Stubbe from the rare book collection of the John Carter Brown Library. The recipes came from Antonio Colmenero de Ledesma, a Spanish surgeon and physician, who likely adopted the recipes from Nahua or other indigenous people in New Spain.[34] Culinary historian Maricel E. Presilla includes a recipe meant to replicate *xocolatl* consumed in pre-colonial Nahua areas. The "Age of Discovery: Vanilla-Scented Hot Chocolate" recipe calls for familiar ingredients like achiote, vanilla, and árbol or serrano chilis. Instead of grounding cacao beans, Presilla provides a substitute using modern commercial chocolate made with Venezuelan cacao beans that "most likely [would] have been used in an upscale chocolate drink such as this

in seventeenth-century Spain."[35] Presilla's recipe likely produces the trademark foam using a Mexican *molinillo* rather than pouring between vessels from varying heights; this serves as an example of how indigenous practices have modernized. These modern recipes demonstrate preservation of indigenous intellectuals' chocolate making and suggest that the process itself has adapted to use commercially available chocolate to make traditional recipes.

Picietl (Tobacco)

Nahuas recognized tobacco's healing properties and considered picietl essential to physical, social, and spiritual well-being. When shared among strangers, the plant signified an act of friendship.[36] Tobacco was a product of male skill and was available in two forms: in smoking tubes to inhale and pulverized to ingest by chewing or to apply topically. The seller of fine tobacco brings a high quality that others "rub between his hands...[and] chew it," it also "affects one; it makes one drunk, it aids one's digestion, it dispels one's fatigue."[37] Nahuas stored dried tobacco leaves in gourds called *yetecomatl* and used pipes made of long reeds to smoke tobacco.[38]

Like cacao, picietl represented and was part of ritual cosmological functions. Nahuas viewed pulverized tobacco as the act of creation itself. Along with sipping chocolate as a reward for their battlefield virtue, warriors also smoked tobacco at merchants' feasts as depicted in the "banquet scene" image in Book 9 of the *Florentine Codex*.[39] At least one practical use emerged from tobacco. Book 11 of the *Florentine Codex* features an image titled "capturing the *tecutlacocauhqui* with club and powdered tobacco." In it, a Nahua man "who wishes to take [the serpent] rubs fine tobacco in his hands; then also he throws it at [the serpent]. Especially if the fine tobacco enters its

mouth, this serpent then stretches out stupefied; it moves no more. Thus he simply takes it up with his hand. This happens with all serpents; they are stupefied by fine tobacco." The Nahua man used a willow to club the serpent then threw tobacco at it to expedite its capture. The fat of the serpent is made into an ointment to treat gout and the skin is ground in water to make a concoction for fever.[40] This use of tobacco indicates that Nahuas tested the substance on other creatures to determine if it "makes one drunk" as well. Upon testing their hypothesis, Nahuas then found that stupefying serpents with tobacco facilitated its capture and subsequent dismemberment for medicinal uses. Nahuas recorded their findings in the *Florentine Codex* and it appears that secondary literature has not yet examined this discovery.

Birds

Iris Montero provides an alternate reading of pictorial information found in Books 2 and 11 of the *Florentine Codex* to show indigenous historical agency and intellectual history regarding hummingbirds. Hummingbirds are prominent in Mexica annals, evident in naming and classification of the natural world, where "hummingbird fish" denoted a fish with pointy beak and "hummingbird stone" referred to the stone's appearance like the feathers of the hummingbird.[41] These feathers were iridescent and shimmered upon absorbing light; these qualities also reflect the cosmic etymology of naming other things after hummingbirds, specifically their descent from gods. Ramírez Herrera explains that the feathers' iridescent qualities make concrete the Nahua concept of soul, or *tonalli*: "the shimmer of feathers materialized on earth the divinity of the sun and the energy that provided life to all the Mexica."[42] Mexica intellectuals conducted empirical observations of hummingbirds that "helped embody ideas relating to the

seasonal cycles and to the longer history of the Mexica, in particular their migration from the northern land of Aztlan to Central Mexico."[43] But empirical observations of the hummingbird life cycle found in Book 11 of the *Florentine Codex* are more than casual surveys, these are also linked to Mexica cosmology and veneration of deities. The migration story describes how the Mexica moved southward from Aztlan to Central Mexico following a talking hummingbird who presented itself as "tutelary deity." Huitzilopochtli spots the sign of the broken tree and instructs the Mexica to split from the other seven tribes to continue the voyage alone; this is when the Mexica receive their bows and arrows to become warriors. Montero explains that the annals reveal Mexica knowledge about hummingbird migration cycles as well as the phenomenon of torpor: "watching hummingbirds dart and feed in sustained bursts of activity, then sleep so profoundly that they seemed dead, translated in Mexica visual narratives into an alternatively resting and fighting deity."[44]

Nahuas were not limited to the natural resources in their immediate environment; they secured goods as tributes from different regions of the empire. Quetzal birds were one such tribute from the tropical forests of southern regions like modern Guatemala. Two species of quetzal, the resplendent quetzal and golden-headed quetzal are likely some of the birds available to Nahuas in pre-colonial times because these are the two that are found in modern Central America today.[45] While the resplendent quetzal's body grows to lengths of 13 to 16 inches, its tail stretches to two feet in length.[46] "During mating season, male quetzals grow twin tail feathers that form an amazing train up to three feet long," and their blue, green, and red feathers tend to be more striking than those of their female counterparts.[47] It is this impressive tail that likely captivated the

imagination and creativity of Nahuas, particularly because the plumage flashes white when in flight and extraordinarily bright when illuminated by sunlight.

Featherwork

Featherworkers were known as *amanteca*. These skilled artisans used two methods to create feather mosaics. The first was to glue individual feathers to paper supports. The second was to sew tens of thousands of individual feathers onto cloth using cord and maguey thread. Typically red and yellow feathers were available to *amanteca*, but the "most precious colors used were blue and green, the colors of water and agriculture, fertility and creation."[48] Featherworkers designed patterns for the mosaic, then glued it onto a smooth shiny maguey leaf using a bone blade, reinforced with carded cotton, and set out to dry under the sun. Next, they added another layer of glue to make the cotton surface glossy and set out to dry again. Once dry, feather workers peeled the glue in order to paint and trace the pattern that lay underneath. After painting the pattern onto the cotton, feather workers glued the cotton onto "a piece of paper, coarse paper, so that [this] reinforced cotton was completely strengthened, so that it was given support."[49] *Amanteca* then used a metal blade to cut, trim, and even out the common feathers before setting the precious feathers on top.

Sometimes the common feathers of the heron, black bird, white bird, and duck were dyed to match or complement the precious feathers of the yellow parrot, blue cotinga, red spoonbill, parrot, eagle, quetzal, and troupial.[50] They knew how to dye common feathers to obtain the colors they wanted and without damaging them. Featherworkers constantly "took note, they tried out, they matched whatsoever kind would harmonize, would serve as the basis for the precious feathers."[51] This frequent

adjustment to achieve a precise layout, harmony, and iridescence reflects the knowledge, mastery, and intellect of featherworkers. They knew that feathers shimmered differently based on the angle at which light touched the surface and on the angle from which observers viewed the feathers. They knew to shake feathers back and forth to ensure "[they] were properly set [...] but if they were matted, tangled, they dropped down into place."[52] They knew to reinforce each layer of precious feathers by sewing them with maguey thread onto the frame. The thirty five figures and four chapters of text relating to featherworking in Book 9 of the *Florentine Codex* are further testament to the significance of the guild, even at the time of the invasion.

Juliana Ramírez Herrera describes that feathers held political, economic, and cosmological meanings for Nahuas. They expected iridescent feathers from the Guatemala region to be presented as tribute, as these were practical to transport across vast stretches of land. Ultimately, Nahuas utilized feathers to describe the relationship between birds, feathers, and the supernatural world. As Montero demonstrated, Nahuas understood, documented, and invoked the life and migration cycles of hummingbirds. The very birth of Huitzilopochtli (hummingbird on the left) depicts a renewal of life via the feathers that his mother, Coatlicue, placed under her skirt and quickly developed into the fully formed and armored deity of war. Featherworking itself was a way to adorn the shields of warriors and to dress deities, nobles, and renowned warriors in ritual ceremonies. The *Codex Mendoza* documents pre-Hispanic tributes paid to Nahuas; here we find war costumes made from feathers to resemble spotted ocelot pelts. Mundy describes these as "elaborate, extraordinary suits destined to be given to the highest ranking of the Mexica military elite, as reward and public sign of their prowess in

battle."[53] The feather costumes and ornaments were made of tens of thousands of individual feathers sewn or pasted onto cloth or paper supports. The *Codex Tlatelolco* and *Codex Osuna* also depict individual soldiers in costume.

Weaving

Nahua women of all social classes were expected to learn and refine their weaving of textiles from a young age. They "made, repaired, and decorated clothes worn for a variety of occasions by all people."[54] Descriptions of the weaver's craft are found in the *Florentine Codex*; here we learn that the use of the full body and ability to multitask were paramount. A good weaver "warps, presses the treadle with her feet, puts the weft in place, provides the heddle [...] presses down [what she weaves], beats it, picks [the thread] with a thorn; weaves loosely, weaves tightly."[55] A bad weaver, however,

> mauls [her weaving; she is] one who makes gouges in it with her thorn, cuts it in her impatience, makes it look like a corncob; who makes it loose—weaves loosely. She works nonchalantly, sullenly; she mocks one.[56]

Common women sewed and wove fine garments, maguey capes, and wrappings for mummy bundles and ordinary household items. Their main implement was the backstrap loom, which was not only simple and highly effective but still used today. As Manuel Aguilar-Moreno explains, the loom was tied to the weaver by a strap that passes around her hips. She sat or knelt on a mat to facilitate opening the sheds and to beat down the weft of the cloth with a strong stick, called a *tzotzopaztli* (batten). A crossbeam used for the finished cloth lay across her lap and was attached to the ends of the strap, and an identical beam on the upper part of the loom that held the warp in place was attached to a tree or post. Most importantly, the backloom had the advantage of

simplicity and portability, which made it ideal for most weavers who worked outside where the light was brighter.[57]

The good weaver of designs works with thread made from plant fibers and the underbelly fur of rabbits. She is adept at making "varicolored capes, an outliner of designs, a blender of colors, a joiner of pieces, a matcher of pieces, a person of good memory."[58] She knew to use shellfish and the female cochineal insect to manufacture bright dyes. She knew that flower and vegetable dyes offered a variety of fade-resistant colors. Her designs included trees and suns, and were consistently tight. The bad weaver of designs is simply untrained and unskilled, "she ruins things scandalously."[59] Most clothing however was simple patterned but brightly decorated with intricate designs. Weavers applied motifs using their looms or by stamping and dyeing other designs.

Textile production changed during the Spanish invasion. With the Spaniards' reliance on slave labor, Asian slaves "sought out apprenticeships for themselves and their children, knowing that training in a craft provided a path to social mobility" largely through manumission.[60] Artisans were open to teaching slaves their trade because they provided free labor, but weavers opposed the path slaves took to be designated as skilled weavers. This opposition was rooted in the belief that such confirmation "diminished the status of the profession as a whole."[61] Overall, the Spanish colonial government centralized textile production and desecrated the specialized profession by flooding the labor force with slave and convict labor, as well as devoiding the finished products of their connections to Nahua cosmology.

Despite the changes that the Spanish invasion ushered in, the art of weaving and dyeing remains in practice in some parts of modern Mexico. One such place is the

Zapotec community in Teotitlán del Valle in Oaxaca, Mexico, where the family of Porfirio Gutiérrez has preserved traditional weaving and dyeing practices. Gutiérrez has conserved his family's dyeing practices at the Harvard Art Museum's Forbes Pigment Collection, and shares the art of his community on a website that includes videos of the dye process. The "Natural Dyes" page of the website also lists the materials for making different dyes.[62] Family customs ensure the preservation of this knowledge, and it is "taken from the lips" of elders that future generations learn these skills as well.

Funerary

We know about Nahua handling of corpses from the documentaries of Franciscan Friar Bernardino de Sahagún and Dominican Friar Diego Durán; pictorial representations of the cosmos are found in the *Codex Vaticanus 3738A*, *Codex Vaticanus 3773B*, and *Codex Laud*. Art Historian Manuel Aguilar-Moreno provides a concise explanation of funerary customs in Nahua society, which differed based on various scenarios of death.; burial or cremation were chosen for handling deceased people based on their social status. Nahuas reserved burials for Aztecs "without rank, individuals from other territories, and those who assisted with the tasks of daily life," including youth, unmarried persons, women who died in childbirth, and those called by Tlaloc.[63] Funeral ceremonies for commoners called for masters of burial ceremonies who covered the body with cut up paper made of *amatl* (tree bark), which the soul required during their journey through Mictlan (underworld). Then, a vase of water was poured over the head of the body to simulate amniotic fluid because the deceased was returning to the womb of Coatlicue (mother earth goddess). The body was also dressed in line with their "condition, fortune, or circumstances of death." If death from excess in liquor, then the

body was dressed with symbols of the god of wine Tezcatzoncatl; if death as a warrior in battle, then the body was dressed like Huiztilopochtli. Another container of water was set near the deceased to quench their thirst through their otherworldly travels. More *amatl* paper was placed on the body to be used as a sort of currency or passport for safe passage in the journey. To also help the soul cross the deep river of the Nine Waters, Nahuas killed the Techichi dog, attached a cord around its neck, and either buried or cremated it simultaneously with the deceased. Women who died in childbirth had their bodies and hair washed then dressed in their best clothes; they were "destined to inhabit the Heaven of the Sun because of their courage in childbirth".[64] Newborns and young infants were buried in family corn receptacles because the "spirit and innocence of a small child was thereby mated to the store seed to ensure a vigorous and early sprouting of corn after the next sowing."[65]

Nahuas cremated rulers, great lords, and warriors who died in battle in order to help transform their souls and ascend to the Heaven of the Sun. Nahuas used fire as a "conduit of power and communication between living and dead" in which offerings, gifts, tears, and prayers were "immediately transmitted to the dead."[66] Along with the Techichi dog, the deceased were also cremated with an effigy made of resinous pinewood "dressed in the clothes of the deceased" and the tools of their trade.[67] The body was laid in the fetal position to again signify a return to the womb of Coatlicue. Funerals in general had mourners eat, drink, and bring gifts to the deceased; the body was laid out in a room for four days before being interred or cremated and ceremonies lasted ten days. Nahuas believed that bodies of the dead returned to the interior Mother Earth (Coatlicue) who reclaimed the bodies of the dead of any kind into her womb.

CURANDERO (MEDICINAL USES)

It is worth noting that Nahuas distinguished good physicians from bad physicians. Nahuas defined physician as a "curer of people, restorer, provider of health."[68] Book 10 of the *Florentine Codex* features two illustrations of physicians. The first is the good physician, who is a diagnostician, a "knower of herbs, stones, trees, roots; provides splints, sets bones, purges, gives potions and emetics; lances, incisions, and stitches."[69] The left panel of this image depicts the good physician picking out plants or herbs in an outdoor area. The right panel of the same image shows the good physician in conversation with a patient who appears in distress, evidenced by a downturned head held in hand. The good physician also has their medical tools within reach, which appear to be a pestle and mortar for grinding herbs.

The second image depicts a bad physician as a "fraud, a half-hearted worker, killer with medicines, giver of overdoses, increaser of sickness; pretends to be counselor, advised and chaste; really bewitches, a sorcerer, soothsayer, seduces women; a diagnostician by means of knots."[70] This image shows four figures—it is not clear which of the four is a physician because no tools of the trade are visible. Perhaps portraying four figures in one indoor space with no apparent patients reflects the characteristics of a bad physician, namely that they are known as fraudulent and that is why they have no patients. Placing the four figures indoors also signifies their disconnect from the environment, the very source of medicinal herbs and plants. Yet another interpretation of this same image might fall in line with the analysis that Iris Montero made about the broken tree omen discussed earlier. Perhaps the informants working on this image of the bad physician were concerned with the Spanish Inquisition's persecution of indigenous

healers. Read this way, not making any of the four figures particularly distinct and not including tools of the trade could have been active decisions made by Nahua informants to keep these details under wraps. Had they divulged how to identify a bad physician, could Nahua informants have inadvertently outed these individuals to Spanish authorities?

Ailments

A substantial portion of Book 10 in the *Florentine Codex* describes the human anatomy, ailments of the body, and medicines to treat or cure illnesses. The *De La Cruz-Badiano Aztec Herbal of 1552* consists of 63 folios, with thirteen chapters of text describing remedies for 101 ailments, and 185 images of plants used in such remedies. Both sources inform this section on curandero uses of the environment.

Historian Marcy Norton examines how the uses of chocolate in Amerindian societies transformed upon contact with and colonization by Europeans. Initially, Europeans accepted chocolate as a medicinal good before appropriating it into a consumable good. Francisco Hernández, the *protomédico* to New Spain in the mid-sixteenth century, drew parallels in the significance of cacao in Mesoamerica to gold in Europe.[71] Norton contends that Hernández "imported Amerindian knowledge about chocolate into a European idiom" with the appropriation of chocolate as a neutral substance rather than as a medicine despite the physiological effects and uses in treatments for fevers and dysentery.[72] Tobacco also proved "essential to physical, social, and spiritual well-being" of users, specifically helping treat wounds and infections when applied topically and to fight parasites when ingested.[73] Head abscesses were treated with a concoction of "lime with small tobacco is spread on in quantity; with this they may

abate."[74] Headaches were cured by inhaling [green] small tobacco, then "the head is to be well covered, well wrapped, and the exposing to incense [may follow]."[75]

Remedies for gastrointestinal issues are cited frequently in both the *Florentine Codex* and the *De La Cruz-Badiano Aztec Herbal*. To treat stomach pain in general

> its remedy is purging. One is to eat pine nuts; two, three of them one is to eat, to roast for himself. [The purging] is stopped by atole of ground maize, or one is to drink yellow tomato [juice] with chili, with gourd seeds, with chocolate, with small tomatoes; or one is to drink [an infusion of] *chichicquauitl* wood, or lime water. And it is necessary to give, as an enema, [the herb] named *xoxocoyoltic*, adding *xococotl*, to it. It cleans the stomach, the bowels. And later one is to drink [an infusion of the herb] named *yamanquipatli*. It will expel, alleviate the ailment. This is a complete cure for the colic, [and] for constipation.[76]

For diarrhea in children and adults,

> one is to drink the [water in which is] cooked [the herb] named *tzipipatli*. […] grown people are to drink an atole of wrinkled *chia*, [with] toasted *chia* tortillas, [and] with chili added on top. But the child is to drink [the atole] without [chili] on top, or he is to drink [an infusion of] the bark [of a tree] named *iztac quauitl*, which grows, which is produced here in Coatitlan, cooked in chocolate.[77]

Should these remedies not alleviate diarrhea, then *axin*[78] was given as an enema. Related maladies like dysentery were treated with "leaves of the herb *tlacomatl*, leaves of the *xa-xocotl*, almonds, laurel, almond husks, pine bark, the *quetzal-ylin*, the *ylin*, *capul-xihuitl* and alectorium, deer's horn burned to ashes, greens and grain ground up in hot water. The liquor is then to be taken into the rear parts by injection."[79] Sufferers of dyspepsia, or difficult digestion, who overindulged and became constipated were given a concoction of crushed "cypress nuts, laurel leaves, the root of the plant *zaca-matlalin*, the bark of the blackberry bush, the cherry and the *ylin* tree, with the root of the *tontiuh-yxiuh* [...] together in acid water let them be boiled with honey; the liquor drunk aids wonderfully in clearing the bowels."[80]

The above is only a sampling of medicinal uses of the environment and invites a few questions and possibilities. Why was this particular knowledge recorded in the first

place? Perhaps Spanish colonists in Central Mexico struggled to acclimate to their new surroundings and searched for some relief. When we consider food psychology, we find Gary Paul Nabhan discussing

> metabolic preferences that each of us has for certain cuisines: *we are what our ancestors drank and ate*. The longer the chain of ancestors who lived in one place—exposed to the same set of food choices, diseases, and environmental stresses for centuries—the greater the probability that selection was both for a diet and for genes that worked well in that landscape.[81]

Nabhan argues that food preferences, palatability as much as aversion dwell in our genes as a result of our ancestors' diets. Similarly, food and cultural historian Rebecca Earle explains that Spaniards searched for foods in the New World that resembled those familiar to them in the Old World. Earle maintains that, "bread, wine, oil, and meat provided proper nourishment for the [Spanish] body, and were the basis of health" as these were "essentially the same foods that the inhabitants of the Iberian Peninsula had aspired to eat in the first century [CE]."[82] Taken together with Nabhan's thesis about food genes, it is plausible that newly arrived invaders struggled with gastrointestinal issues, that they were in such pain and discomfort that they were desperate for relief. Perhaps indigenous informants were simply having fun at the expense of Spaniards' maladies, tempting them to try outrageous concoctions just to laugh at their pain. However, contemporary findings support the notion that these were tried and true remedies in use prior to the Spanish invasion that remain recognizable today. I conducted a social media poll that asked self-described descendants of Mexico's indigenous people to describe the remedies their families have used. Although one remedy described in the poll was a special tea made of chamomile and laurel leaves to

treat colic in young children, the use of laurel leaves parallels that found in Book 10 of the *Florentine Codex*. To treat

> dyspepsia […] give him cypress nuts, laurel leaves, the root of the plant *zaca-matlalin*, the bark of the blackberry bush, the cherry and the *ylin* tree, with the root of the *tontiuh-yxiuh*, which is red as bright gold. Then crushed together in acid water let them be boiled with honey; the liquor drunk aids wonderfully in clearing the bowels.[83]

Conceivably, Sahagún documented medicinal uses of the natural environment to help aid his fellow invaders as they settled in the New World. Regardless of intent in reproducing indigenous pharmacological knowledge, sixteenth-century and contemporary findings support the proposal that pre-Hispanic indigenous people of Central Mexico were by all means physicians, healers, and intellectuals.

CONCLUSION

Camilla Townsend posits an important question: "if we face the painful truth that much of the knowledge that the native historians in the generations after the conquest wished to preserve was in fact later lost for many generation, are we saying that their descendants were somehow less indigenous?"[84] More pointedly, Townsend asks, "could the knowledge of the ancestors have lasted forever in the new worlds in which the descendants lived?"[85] As demonstrated in this paper, the performances of alphabetic texts are found in the daily toil of healers, curanderos, featherworkers, whose knowledge and skills were recorded in the codices. By all accounts, indigenous people of Central Mexico at the time of the Spanish invasion ought to be regarded as intellectuals who actively interacted with their natural environment in order to create an existence that balanced their earthly lives with divinity and prepared them for their long journey into the afterlife.

NOTES

[1] Marcy Norton, *Sacred Gifts, Profane Pleasures: A History of Tobacco and Chocolate in the Atlantic World* (Ithaca: Cornell University Press, 2008), 2.
[2] Norton, 123-6.
[3] Iris Montero Sobrevilla, "Indigenous Naturalists" in *Worlds of Natural History*, ed. Helen Anne Curry, Nicholas Jardine, James Andrew Secord, and Emma C. Spary (Cambridge University Press, 2018), 120-125. See more about the Nahua migration story in the section "Birds" in this paper.
[4] Montero, 122.
[5] Juliana Ramírez Herrera, "Conversion and Conservation: Mexica Featherwork, the Miraculous, and Early Modern European Practices of Collecting," *Estudios de Cultura Nahuatl* 53 (Jan.-Jun. 2017): 207.
[6] Ramírez Herrera, 208.
[7] Gabriela Ramos and Yanna Yannakakis, *Indigenous Intellectuals: Knowledge, Power, and Colonial Culture in Mexico and the Andes* (Durham: Duke University Press, 2014), 1.
[8] Sylvia Marcos, *Taken from the Lips: Gender and Eros in Mesoamerican Religions* (Leiden: Brill Academic Publishers, 2006), 123.
[9] Marcos, xxiii.
[10] Camilla Townsend, *Annals of Native America: How the Nahuas of Colonial Mexico Kept Their History Alive* (Oxford University Press: 2016), 9.
[11] Townsend, 10.
[12] Townsend, 10.
[13] William M. Denevan, "The Pristine Myth: The Landscape of the Americas in 1492," *Annals of the Association of American Geographers* vol. 82, no. 3 (September 1992): 381.
[14] Denevan, 379.
[15] Rebecca Duran-Perez, *Mesoamerican Ethnobotany Exhibit*, https://mesoamericanethnobotany.wordpress.com/
[16] Lisa Sousa, *The Woman Who Turned into a Jaguar, and Other Narratives of Native Women in Archives in Colonial Mexico* (Stanford: Stanford University Press, 2017), 193.
[17] Sousa, 193-194.
[18] Sousa, 195.
[19] *The De La Cruz-Badiano Aztec Herbal of 1552*, trans. William Gates (Baltimore: The Maya Society, 1939), 106.
[20] Sousa, 196.
[21] Sousa, 195.
[22] Sousa, 195. Figure 26 in Book 6 of the *Florentine Codex* depicts "the enclosing of the woman who dies in childbirth" in a *temascalli*.
[23] *The De La Cruz-Badiano Aztec Herbal of 1552*, 111.
[24] *The De La Cruz-Badiano Aztec Herbal of 1552*, 114.
[25] Sousa, 198-199.
[26] Sousa, 202, 204.
[27] Max Nesterak, "Minnesotan win national fellowship to teach Indigenous birthing practices," *Minnesota Reformer*, January 22, 2020, https://minnesotareformer.com/briefs/minnesotan-wins-national-fellowship-to-teach-indigenous-birthing-practices/.
[28] Norton, 1.
[29] Norton, 7.
[30] Norton, 18.
[31] Norton, 22.
[32] Norton, 24, 33.

[33] Norton, 30.
[34] Jesse Cromwell, "I Found it at the John Carter Brown Library: An Obscenely Delicious Seventeenth-Century Hot Chocolate Recipe," *The John Carter Brown Library*, 2010, https://www.brown.edu/Facilities/John_Carter_Brown_Library/exhibitions/I%20found%20it%20JCB/holiday2010.html
[35] Maricel E. Presilla, *The New Taste of Chocolate: A Cultural and Natural History of Cacao with Recipes* (Berkeley: Ten Speed Press, 2009), 187.
[36] Norton, 11.
[37] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 10-The People*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1961), 94.
[38] Norton, 20.
[39] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 9—The Merchants*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1959), figure 28.
[40] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 11-Earthly Things*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1963), 75-76, figure 247.
[41] Montero Sobrevilla, 114.
[42] Ramírez Herrera, 212.
[43] Montero, 120.
[44] Montero, 124.
[45] John P. Rafferty, "Quetzal" *Encyclopedia Britannica*, last modified December 13, 2019, https://www.britannica.com/animal/quetzal.
[46] "Resplendent Quetzal," *National Geographic*, accessed April 6, 2020, https://www.nationalgeographic.com/animals/birds/r/resplendent-quetzal/.
[47] "Resplendent Quetzal."
[48] Manuel Aguilar-Moreno, "Funerary Beliefs and Customs" in *Handbook to Life in the Aztec World* (New York: Facts on File, Inc., 2006), 211.
[49] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 9--The Merchants*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1959), 93-94.
[50] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 9--The Merchants*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1959), 89, 94.
[51] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 9--The Merchants*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1959), 94.
[52] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 9--The Merchants*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1959), 97.
[53] Barbara E. Mundy, "Indigenous Dances in Early Colonial Mexico City" in *Festivals & Daily Life in the Arts of Colonial Latin America, 1492-1850*, ed. Donna Pierce (Denver: Denver Art Museum, 2014), 23.
[54] Aguilar-Moreno, 335.
[55] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain--Book 10: The People*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1961), 36.

[56] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain--Book 10: The People*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1961), 36.
[57] Aguilar-Moreno, 336.
[58] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain--Book 10: The People*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1961), 51.
[59] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain--Book 10: The People*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1961), 52.
[60] Tatiana Seijas, *Asian Slaves in Colonial Mexico: From Chinos to Indians* (New York: Cambridge University Press, 2014), 129.
[61] Seijas, 133.
[62] Porfirio Gutiérrez, "Natural Dyes," *Porfirio Gutiérrez: Textile Artist in the Zapotec Tradition*, http://porfiriogutierrez.com/artwork/creative-process/natural-dyes/.
[63] Manuel Aguilar-Moreno, *Handbook to Life in the Aztec World* (New York: Facts on File, Inc., 2006), 166.
[64] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 6--Rhetoric and Moral Philosophy*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1969), 161.
[65] Aguilar-Moreno, 169.
[66] Aguilar-Moreno, 167.
[67] Aguilar-Moreno, 168.
[68] Fray Bernardino de Sahagún, *Florentine Codex: General History of the Things of New Spain Book 10-The People*, trans. Charles E. Dibble and Arthur J. O. Anderson (Salt Lake City: The University of Utah, 1961), 30.
[69] Dibble and Anderson, 30.
[70] Dibble and Anderson, 53. "By means of knots" refers to reading fate with cords, which Nahuas believed to be fraudulent.
[71] Norton, 123.
[72] Norton, 125-126.
[73] Norton, 1.
[74] "Twenty-eighth Chapter, first paragraph," *Florentine Codex--Book 10: The People*, 140.
[75] "Twenty-eighth Chapter, first paragraph," *Florentine Codex--Book 10: The People*, 140.
[76] "Twenty-eighth Chapter, fourth and fifth paragraph," *Florentine Codex--Book 10: The People*, 155. Since chocolate served as a surrogate for blood, this helps us understand why Nahua health professionals "prescribed chocolate for those who lost blood, whether through hemorrhage, cough, or urine." The idea, as Norton explains, was that if the redness of chocolate resembled blood and blood gave life to humans, then chocolate was also a life-giving force. (Norton, 35.)
[77] "Twenty-eighth Chapter, fourth and fifth paragraph," *Florentine Codex--Book 10: The People*, 158.
[78] The fly-like insect that eats the leaves of the *axquauitl* tree is called *axin*. This is used in various treatments, but the remedy is the same. Enlarged and rounded *axin* eggs are boiled in an olla. Once cooked, the shells are broken open to reveal something like wool, like flour, which is then wrapped in maize husks. ("Twenty-fourth Chapter," *Florentine Codex--Book 10: The People*, 90.)
[79] *The De La Cruz-Badiano Aztec Herbal of 1552*, trans. William Gates (Baltimore: The Maya Society, 1939), 53.
[80] *The De La Cruz-Badiano Aztec Herbal of 1552*, trans. William Gates (Baltimore: The Maya Society, 1939), 89.

[81] Gary Paul Nabhan, *Food, Genes, and Culture : Eating Right for Your Origins* (Washington, DC: Island Press, 2013), 30.
[82] Rebecca Earle, *The Body of the Conquistador: Food, Race, and the Colonial Experience in Spanish America, 1492-1700* (Cambridge: Cambridge University Press, 2012), 55-56.
[83] *The De La Cruz-Badiano Aztec Herbal of 1552,* trans. William Gates (Baltimore: The Maya Society, 1939), 89.
[84] Townsend, 223.
[85] Townsend, 224-225.