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An Ethnobotanical Analysis of Forests and Woodworking in the Florentine Codex

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ABSTRACT

This study explores the representation of the natural environment, specifically forests and silviculture, within the 16th-century Florentine Codex (General History of the Things of New Spain) compiled by the Franciscan friar Bernardino de Sahagún and his indigenous collaborators. Although Sahagún's encyclopedic work is primarily recognized for its ethnographical and religious insights, Book 11 offers a profound scientific treatise on the flora and fauna of the Aztec Empire. The present research analyzes Chapter 6 of this volume, focusing on the morphological descriptions of tree species, their classification in the Nahuatl language, and their diverse practical applications. The findings demonstrate that the Aztecs possessed a sophisticated understanding of timber, utilizing specific wood types for architecture, navigation, medicinal purposes, and ritual ceremonies. Furthermore, the paper highlights how the indigenous naming conventions reflected the functional utility of plants. By examining these historical records, the study contributes to the fields of landscape history and ethnobotany, underscoring the systematic nature of Aztec environmental management and the enduring value of Sahagún's documentation in understanding Mesoamerican natural heritage.

Keywords: Florentine Codex, Bernardino de Sahagún, Aztecs, Ethnobotany, Wood utilization, Environmental history, Nahuatl.

INTRODUCTION

Over the past centuries, numerous works have been published on the history of the Aztecs and their encounter with European (Spanish) conquerors. According to the majority of these accounts, the Aztecs migrated south from the area of present-day Utah, near the Great Salt Lake. During their gradual migration, they first settled in what is now New Mexico, before reaching the Mexican plateau through further expansions (see Gaibrois – León-Portilla, 1985). As the Aztec civilization began to flourish, other indigenous cultures in Central America (such as the Maya and Toltec empires) were in decline. Consequently, from the 1100s onwards, Aztec conquests unfolded on an ever-increasing scale. In the 1300s, on the waters of Lake Texcoco, the Aztecs reclaimed approximately 10 km2 of land to found the city of Tenochtitlan, which served as the center of the thriving Aztec Empire until 1521. The territory under Aztec suzerainty, stretching from the Atlantic to the Pacific Ocean, experienced immense prosperity: temples and roads were constructed, aqueducts were established, and Nahuatl-speaking peoples, identifying themselves as „Mexica," „Tenochca," „Azteca," and other names, lived in flourishing city-states. They ruled over millions of taxpayers within their territories. Their daily lives were permeated by constant military readiness and combat; even the birth of a child was conceptualized as a battle (Soustelle, 1955; Anker et al., 1993). The Spanish conquerors, led by Hernán Cortés, landed at Veracruz on April 22, 1519, and first beheld the Aztec capital, Tenochtitlan, in November of that year. This encounter, followed by the subsequent conflicts and the epidemics that decimated the Aztec population, was recorded by both the Spaniards and the Aztecs. Later, numerous works by Spanish authors were written regarding the indigenous culture, the natural environment, and

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the social and religious conditions of the region (Benyhe, 1977). Among these authors, the Franciscan friar Bernardino de Sahagún stands out. In his works, he not only approached the indigenous people with understanding and genuine intellectual curiosity but was also capable of applying scientific methods in his research into Aztec culture and history. The friar, who lived for more than ninety years, was born between 1498 and 1500 in Sahagún, a village in the Spanish province of León, as Bernardino de Ribeira. Between 1512 and 1514, he studied at the University of Salamanca, where he was significantly influenced by the ideals of the humanists teaching there. Nor was he left untouched by church reform movements; he subsequently joined the Franciscan Order and taught within the order for two years starting in 1516. In 1529, he left his homeland and traveled to New Spain with 12 fellow friars for missionary purposes, never to return to the Iberian Peninsula during the remaining 60 years of his life (León-Portilla, 1999, p. 62). According to source data published by Roith, he was the 43rd registered missionary in the territory; thus, eight years after Cortés's landing, missionary work there was still in its infancy (Roith, 2017, p. 5).

Sahagún integrated quickly into his new home, learning the Nahuatl language within a short time. In 1536, he became a professor of Latin at the Imperial Colegio de Santa Cruz in Tlatelolco, an institution opened by his order (Ballán, n.d.). After 1540, he set out to collect data on the ancient history, customs, and natural environment of the Aztecs across various locations. For nearly three decades, he sought answers to more than 200 questions he had formulated, eventually synthesizing the data and organizing it into a codex with his students. He spent the final stage of his life in Tlatelolco, where he died in 1590 within the walls of the Monastery of Saint Francis. The true rediscovery of his works did not occur until the 19th century, although by then part of his oeuvre had been lost. A copy of his historical records kept in Tolosa was edited and published in three volumes by Carlos María de Bustamante in Mexico (1825–39), and a five-volume edition by Joaquín Ramírez Cabañas in the early 20th century (1938). The significant Spanish edition (in four volumes) was compiled by Ángel María Garibay K. in 1956. Another significant edition is the 1989 Mexican two-volume work edited by López Austin and García Quintana, which published the complete Spanish text of the Florentine Codex for the first time.

The source of the research: The Florentine Codex

Sahagún's immensely comprehensive and data-rich 12-volume work, commonly referred to as the Florentine Codex, is preserved in the manuscript collection of the Biblioteca Medicea Laurenziana in Florence (shelfmark Palat. 218-220). It was compiled over approximately thirty years in Nahuatl and Spanish versions, enriched with magnificent illustrations, sources, and annotations. (The original title of the work is *Historia general de las cosas de Nueva España* /General History of the Things of New Spain/). For our research, we utilized the digital version freely available on the Library of Congress website (https://www.loc.gov/item/2021667837/). Across 2,446 pages, the codex presents the history, daily customs, natural and social conditions, scientific knowledge, and worldview of the people of Central Mexico. The work is akin to the great classical and medieval European encyclopedias: among its predecessors, for example, Pliny the Elder (23–79 AD) or the Visigothic bishop Isidore of Seville (556–636) undertook the preparation of similar syntheses. Sahagún, the eminent European scholar, structured his work into three major thematic sections based on Aristotelian principles: the first unit (five books) discusses the divine world and Aztec religion; the next five books focus on humanity; the third thematic part (Book 11) pertains to nature; and the concluding (supplementary) section covers the history of the conquest of Mexico.

The 2,468 color illustrations in the codex are each richly detailed, aesthetically and meticulously crafted images that simultaneously reflect Mesoamerican pictorial writing and the European tradition of encyclopedic documentation (Figure 2). The artists who created the images, presumably under Sahagún's guidance, performed particularly meticulous work in the depiction of medicinal plants.

RESULTS

In the 11th volume of his work, Sahagún, the indefatigable and long-lived Franciscan friar, wrote in detail about the landscapes of the Aztec Empire (New Spain in his time), as well as the characteristics of its flora and fauna. This book is the longest part of the codex and is, in fact, a comprehensive natural history treatise. It follows the traditional division of knowledge characteristic of European encyclopedic works; thus, the volume deals with „all divine (or rather idolatrous), human, and natural things of New Spain." Accordingly, after discussing higher beings and humanity, Sahagún turned to the presentation of animals, plants, and minerals. This 11th book is an especially vital source for understanding how the inhabitants of the region utilized their available natural resources prior to the arrival of Europeans. Shortly before the Spanish conquest, the Aztecs, „like other ethnic groups in the Basin of Mexico, carried out significant transformations of the natural environment to erect their city, primarily during the 15th century when they asserted their military, political, and religious dominance over the lordships of the basin and beyond." (Miranda Pacheco, n.d.). They conducted massive water management and drainage works,

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conquering the marshy and swampy areas of the western region and developing the system of *chinampas* (floating islands excellently suited for agriculture) which sustained their imperial growth and expansion.

According to the testimony of the Florentine Codex, many animals bred in Europe, such as cows, pigs, chickens, and horses, were unknown to Mesoamerican peoples. Instead, they raised rabbits, *xoloitzcuintli* (a hairless dog breed), birds, and turkeys. Their diet was supplemented with wild boar, deer, tapirs, birds, frogs, ants, crickets, and snakes. Other animals, such as jaguars and other felines, were hunted primarily for their skins or feathers. Book 11 contains numerous illustrations of animals, including mammals (jaguar and armadillo), birds, reptiles, amphibians, fish, and insects. Comprehensive studies on the animals depicted in the codex were produced by Ilaria Palmeri Capesciotti in 2001, and specifically on birds by the Mexican scholar Miguel Angel Márquez in 1995.

As part of his presentation of the natural environment and flora, Sahagún prepared a multi-page summary of forests and trees in Chapter 6, divided into nine parts, utilizing his European knowledge and experience. In this chapter, he characterized various tree species based on their morphological properties (height, color and size of leaves and trunks, bark thickness, shape of branches and foliage, inflorescence, fruit, scent, etc.). He briefly described the forests and recorded the names of the main parts of trees. He dedicated a separate section to the presentation of fruit trees, prickly pear cacti, and edible or medicinal tree roots. In this chapter of the codex, he described wood utilization and woodworking methods in detail. He collected and published a wide variety of specific names for wooden utensils. In several paragraphs, he discussed which social classes utilized which types of wood. In cases where he could not identify trees found in the New World with plants known in Europe, he recorded the names of the species only in Nahuatl, while the Spanish and Latin botanical names were absent. However, literal Spanish translations of compound expressions used by the Aztecs appeared frequently in the text, such as „bitter medicine" or „good dye," indicating that the Aztec naming of tree species was, in part, based on their practical application.

At the very beginning of the 6th section of Book 11, high mountains are described as terrifying and bleak. From the second part onwards, the description of tree species follows: first, the evergreens, with conifers in the primary position. Regarding these, Sahagún wrote that he saw tall, thick pines and observed that these trees were highly esteemed by the Aztecs. In their daily lives, they made extensive use of pine timber, as well as cones, seeds, and resin. As he described, among the evergreens, he also saw cypress and cedar species, noting their greenery and fragrance (Sahagún, 1981, p. 230). He then reported on oak forests, explaining that the Aztecs used oak bark for tanning and dyeing prepared animal hides. He also wrote about two types of taller, more robust willows (*uexotl*, *ahuexotl*) and smaller ones with straight branches and bright green leaves (*quetzaluexotli*), as well as palm varieties. Regarding the latter, specifically those called *coyatl* (snake), he noted that in terms of height and trunk thickness, they were largely similar to the palm trees of Spain, and their fruit was sweet and edible, like dates. He also mentioned copal trees (*copalquahuitl*), whose whitish resin was stuffed into reeds and ignited; the Aztecs inhaled the resulting smoke (Sahagún, 1981, p. 232). The indigenous people also used this white resin in their temple censers during sacrifices to their gods. According to Sahagún, this smoke had many uses, and its healing power was invoked in numerous provinces to treat various ailments, such as rheumatism, toothache, and diarrhea. Similarly, medicinal properties were attributed to the *olquahuitl* tree (similar to the alder), which yielded a black resin called *olli*. According to the author, this was also used to treat many diseases, particularly eye ailments. The Aztecs regularly drank this resin mixed with cocoa, as it was believed to be beneficial for the stomach and intestines. Regarding this material, Sahagún wrote that its consistency was so elastic that the indigenous people even made balls from it; according to the Franciscan friar, these resin balls bounced better and higher than air-filled balls (Sahagún, 1981, p. 233).

Sahagún presented several tree species for which he knew no Spanish equivalent. For example, he described a species called *bauelo*, whose root was so fragrant when burned that it could only be used by Aztec noble families in their homes; its use was forbidden to others. He introduced the silk-cotton tree called *pochotl*, which was very tall with rounded foliage, wide leaves, and provided ample shade. Furthermore, he wrote about the aforementioned *coatli* tree, used by the indigenous people as a raw material for basket weaving, and he highlighted the medicinal effects of this species as well (Sahagún, 1981, p. 231). He noted that when thrown into water, it turns the liquid bluish, and consuming the resulting fluid is very beneficial for the bladder. Regarding the *topozan* tree, described as malodorous with green and whitish leaves, he wrote similar accounts: he emphasized that the root of this plant is boiled in water, and the resulting herbal tea cleanses the urine and improves digestion. He noted that there are trees called „bitter medicine" in Nahuatl (such as *chichiquahuitl* or *chichippatli*). The Aztecs consumed the crushed, powdered bark of these trees mixed with water as a medicinal drink, primarily to aid digestion and cleanse the intestines (Sahagún, 1981, p. 231). He also provided lengthier descriptions of trees (such as the *tlahcuilolohquahuitl*, a plant with reddish leaves and black veins) from which the indigenous people obtained dyes or manufactured musical instruments and other utilitarian objects.

The 7th unit of Book 11, Chapter 6, dealt with fruit trees: alongside plum, guava, and cherry trees, apple trees, cocoa trees, and plants bearing nut-like fruits are also included in this part of the codex. Sahagún provided evocative descriptions of various trees, their fruits, and seeds, illustrated with colorful drawings, and also discussed how the

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Aztecs consumed each fruit, what medicinal powers were attributed to them, and which ones required caution in consumption to avoid digestive complaints, constipation, or diarrhea. He detailed certain plum varieties at particular length, describing how he saw and tasted reddish, yellowish, smaller, and larger fruits. These were consumed by the Aztecs raw, cooked, or mashed, and some had a very sweet taste („more intoxicating than honey," as the author wrote). Regarding the consumption of cocoa beans harvested from the *cacahoaquahuitl* tree, he noted that if the bean is still tender and the drink brewed from it is very fresh, consuming large quantities leads to intoxication. However, if consumed warm and in moderation, it refreshes and warms the body. He also mentioned that the Aztecs flavored the cocoa drink with a tasty yellow flower (vanilla). He described various types of cherries with smaller or larger fruits, noting that the seeds of some tree fruits were roasted and consumed, and the pressed juice of the cherries was used to treat eye diseases.

He prepared a separate presentation of the parts of trees, generally describing leaves, branches, trunks, and root systems as the main components, characterizing them with the help of illustrations. He collected how the Aztecs named trees according to their age and stage of development: *quahuitl* was a small tree grown from seed, while a sapling was *quauhconetl* or *quahuzelic*. A flourishing, mature tree was also collectively called *quahuitl*. A fallen, dried tree was referred to as *quahumaitl*, and a decayed tree as *quappalan*. Sections 8 (on the prickly pear) and 9 (on edible tree roots) also contain interesting descriptions, primarily from gastro-historical and medicinal perspectives (Kéri, 2006).

Sahagún divided forests into two major groups: dense forests were referred to by the indigenous people as *quappochtli*, which in the author's translation means „many thick trees together," and he also wrote about sparse forests dotted with clearings: their Nahuatl name was *quahucayactli*, meaning „a group of sparse trees."

The utilization and processing of timber in the Aztec Empire before the arrival of the Spanish conquerors were similar to what Sahagún later described. Trees and their parts were present in architecture, navigation, tools, weapons, ritual objects, masks, and during cultic activities, as well as in musical instruments and daily utensils, vessels, storage baskets, and maize granaries.

Pacheco's research on Tenochtitlan points to information, supported by numerous details in Sahagún's codex, that „stone, sand, timber, plants, grasses, herbs, trees, and animals were resources constantly and systematically exploited for the construction and expansion of the city Among these materials, wood was considered of paramount importance during the massive expansion of the capital over approximately 200 years; „The Mexica obtained it primarily from the cold and temperate forests in the vicinity of the basin, pine, cedar, cypress, spruce, oak, and laurel, though they also utilized wood from tropical and subtropical species provided by their tributaries" (Pacheco, n.d.). Timber arrived at the central parts of the empire, the capital, from distant areas, such as the regions of present-day Puebla, Guerrero, and Oaxaca. Regarding large-scale logging, Pacheco also pointed out that this extensive deforestation caused the siltation of lakes and canals, which the Aztecs could only keep somewhat clean with great effort.

Naturally, the indigenous people used timber not only for construction but also to manufacture numerous daily objects, as well as ritual tools used in their religious ceremonies. Sahagún's work does not depict this, but the Codex Mendoza illustrates how carpenters (*quauhxinqui* or *tlaxinqui*) worked; their craft was passed from father to son, and they used copper axes, wooden mallets, and obsidian and flint knives as tools. Craftsmen considered two aspects when choosing appropriate timber: first, the physical characteristics of the wood, selecting by color, resistance, scent, or place of origin. Second, they paid special attention to the symbolic meaning and value of the wood: certain tree species, for instance, were associated with specific deities; an example of this is that the image of the god Huitzilopochtli was made exclusively from mesquite branches.

Sahagún provided a description richly illustrated with images of various materials made of wood: he recorded several names for planks, depending on their thickness and length; one such name was *huapalli*. The Aztecs also had multiple ways to name beams, depending on their intended use in construction. *Quauhcatl* was one of the most general names. The name for thick stakes was *tlaxichtli*, but Sahagún provides the names of many objects, from wooden pillars to arrow components, not even omitting wood shavings (*quauhtexcalli*) produced during woodworking.

CONCLUSIONS

In his mid-16th-century work, created alongside his Aztec students and collaborators and commonly referred to as the Florentine Codex, the former Franciscan friar Bernardino de Sahagún provided an exhaustive description of Aztec civilization. Further interpretation of the details of his work from botanical, medicinal, ethnographic, and other perspectives still holds numerous tasks, and it is also important to compare the contents of the codex with other sources to weigh the veracity of the information, data, and illustrations contained within. The texts of the Florentine Codex reflect the extensive knowledge the Aztecs possessed regarding trees and the selection and professional processing of timber, not only for the creation of ritual objects but also for daily use. Until now, the

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Franciscan friar's work has primarily been studied by researchers to understand medicinal and pharmaceutical knowledge, as well as the Aztec belief system and calendrical system; however, the present work is undoubtedly significant for specialists dealing with landscape history, forestry, and wood processing.

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