4.2 PLANTS OF CENTRAL AMERICA

4.2.1 A Short Essay on Ethnobotany in Mexico and Central America

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Abstract

This paper deals with a brief historical sketch of ethnobotany and the use of some medicinal plants in Mexico, and in a broader sense, in so-called Mesoamerica and some areas of Central America (especially Guatemala and Belize). Particular attention is paid to the fact that ethnobotany is not only part of ethnoscience, but also of ecological anthropology and political economy, and it is also associated with multispecies ethnography, in which plants and other organisms (e.g. mushrooms) become equal subjects of anthropological research, like animals in human animal studies. The paper focuses primarily on Mexico, where ethnobotanical research has its roots in early colonial times. It outlines some aspects of similarly-focused researchers in Guatemala and Belize, which is primarily bound with different Mayan groups. In conclusion, it concentrates on a particular perspective that ethnobotanical and ethnopharmacological research offers in this area.

Keywords: Mexico, Mesoamerica, multispecies ethnography, peyote, mobile medicine

Introduction

The goals of ethnobotanical research vary in different national contexts (McClung de Tapia, 1990: 141). However, ethnobotanical studies undoubtedly occupy an important place in Mexican science (Gómez-Pompa, 1993: 87; García de Miguel, 2000; González Costilla, 1991, etc.). Ethnobotanical studies have also been more connected with *multispecies ethnography* in recent years, and have become part of it. If we accept the Tsing's notion that "human nature is an interspecies relationship", thus "plants must be key players, too", because "a new generation of ethnobotanists sees plants as social beings with agentive efficacy" (Kirksey & Helmreich, 2010: 553).

As plants are increasingly used in the pharmaceutical industry, genetics and other fields, some authors bring ethnobotany into the territory of political economy and political ecology (e.g. Hayden, 2003, in her study of bioprospecting in Mexico, or Escobar, 1999, in his study of techno-nature on the Colombian coast). Many Latin American countries such as Mexico, Guatemala, Peru, Bolivia, and Colombia are in this sense an ethnobotanical paradise, or laboratory, and some of them can be considered to be a sort of cradle of like-minded researchers.

Mexico

The origins of "ethnobotany"[26] and "scientific" interest in the plant kingdom are to be found in Mesoamerica (especially in central Mexico among the Nahua/Aztec-speaking

26 The North American botanist John William Harshberger (1869–1929) coined the term *ethnobotany* in 1895 to mean "the study of plants used by primitive people" (Balick & Cox, 1996).

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population) in association with the institution of the *tlamatine*[27], the scholar-philosopher, who on the basis of experiments examined the organic and inorganic natural world, i.e. rocks, trees, herbs, roots, etc (León-Portilla, 2002: 88).

We owe the first published scientific account of American plants to the Sevillian physician, botanist and father of the pharmacology Nicolás Monardes (1493–1588) who wrote the first treatise on medicinal plants of New Spain in three parts called *Medical study of the products imported from our West Indian possessions*[28] in 1564, 1569 and 1574. His work is notable for the fact that he did not go to New Spain (today's Mexico). He described the plants that came into his hands, and which he grew in a botanical garden, founded for this purpose. This work gave the first time description of allspice (*Pimenta officinalis*), sassafras (*Sassafras albidum*), and salsify (*Tragopogon porrifolius*), but probably the most famous plants described by Monardes are tobacco (*Nicotiana*), pineapple (*Ananas comosus*), guayaba (*Psidium guajava spp.*), and coca (*Erythroxylum coca*). Due to his excellent description of these new plant drugs, Monardes is considered to be one of the most famous pioneers of American pharmacognosy (Gómez-Pompa, 1993: 90).

Before Monardes, a scientific treatise appeared that way perhaps even more important and that dealt with the flora of the New World, especially Mexican. Its authors were two native (Mexican) *tlacuils*[29]: the native physician Martín de la Cruz and the translator Juan Badiano (1484–1560) and their joint Latin work called The *Libellus de Medicinalibus Indorum Herbis* ("Little Book of the Medicinal Herbs of the Indians"), which was published in 1552 and is now better known as the *Badianus manuscript* (or the *Codex Cruz-Badiano*, or the *Codex Barberini*[30]). The work of these scholars educated in the Real Colegio de la Santa Cruz de Tlatelolco[31] forever changed the world of pharmacy because it contained descriptions of 185 different American plants and of their therapeutic uses. The *Libellus* documents the encounter between indigenous Mesoamerican and European medicine. Although this pioneering work remained hidden in private European libraries into the 20th century[32], today it is the basis for the study of Mexican medicinal plants of the distant past and of the present as well. Contemporary medicine uses, for example, the plant called *cihuapahtli* (from *cihuatl* – woman, and *pahtli* – medicine), now known as *zoapatle*, which de la Cruz cites and mentions its effects of facilitating labour. A recent study conducted by Dr. José Luis Mateos from the Mexican Social Security Institute revealed that *zoapatle* contains a powerful oxytocic, which induces the contraction of the uterus. But it can be said that all the Mesoamerican wisdom contained in this codex was and is inherited by the Mexican organic chemists of this century, who have excelled in the international arena with their research on natural products.

In this historical review, I necessarily have to be mention one more important work, written by the famous Franciscan missionary Bernardino de Sahagún (1499–1590). In

27 Etymologically speaking, this is a derivative of the word *tlaiximatini*, which is a composite term meaning "one who knows right" (*-imatini*), face or nature (*ix-*), things (*tla-*). The opposite of this character is a fake doctor, magician (*nahual*) who deceives people and knows the harmful herbs, is a sorcerer divining from strings. (León-Portilla, 2002: 88–89) Thus the beginnings of the ethnobotany are linked with the duality of differentiating between knowledge based on experiment and method, and knowledge based on magic and spells.

28 The Spanish original *Historia medicinal de las cosas que se traen de nuestras Indias Occidentales*.

29 This word is derived from Nahuatl *tlacuihcuilō* or *tlahcuilō* meaning originally the "styling stone or wood" and later came to refer to what we now call the scribe, painter, writer or scholar.

30 This name comes from the Italian cardinal Francesco Barberini (1597–1679), who owned of the manuscript in the early 17th century.

31 This educational institute was founded by the learned Franciscan missionaries in 1533, and their pupils were mainly descendants of pre-colonial Aztec nobility.

32 This book, with highly developed artwork, appeared in the Vatican Library in 1925.

a twelve-volume monumental work known today as the *Florentine codex*[33] we also find a number of records on agriculture and botany of pre-Hispanic native cultures, although this work is aimed at a complete description of Aztec history and life (religion, philosophy, folklore, trade, etc.).

It is likely that these works influenced Emperor Felipe II to finance one of the most important botanical expeditions of the era: the expedition of Francisco Hernández de Toledo (1514–1587), a general protophysician of the Indies, Islands, Mainland and the Ocean. The expedition began in 1571, and its main objective was to write a natural history of New Spain and study indigenous medicine in all its aspects, and describe Hispanic culture, history and political conditions in the new territories (Somolinos, 1971; Lozoya, 1982). Hernández traveled for seven years collecting and classifying specimens, interviewing indigenous people through translators and conducting medical studies in many parts of Mexico, and he collected much ethnobotanical information. The final product of his work consisted of 22 beautiful hardcover books (Gómez Pompa, 1993: 91).[34]

The decline of the Spanish empire, which began in the 17th century, caused the next important stage in the evolution of Mexican botany in the late 19th century (1890), when the National Health Institute (*Instituto Médico Nacional*) was founded in order to study medicinal plants scientifically. The National Medical Institute started a herbarium that is the precursor of the current National Herbarium of Mexico. During its existence, the Institute was one of the most renowned scientific centers and one of the most notable biologists in the history of Mexico worked there. Alfonso Luis Herrera (1868–1942) published the *Latin American pharmacopoeia* (*Farmacopea latino-americana*) in 1921 containing all known information about medicinal plants, their use, chemical composition, dosage, etc.

Monardes' *Historia medicinal* and the *Libellus* are also ethnobotanical treasures with which today's professional scientists work intensively. However, until the 1970s, the botanical as well as anthropological literatures generally lack discussions concerning the definition and application of specific concepts of ethnobotany.[35] The strongest development of Mexican ethnobotany probably began with the publication of the *Exploración etnobotánica y su metodología* by Efraím Hernández Xolocotzi (1970). Although this work does not bring anything new in terms of defining ethnobotany, it differs from the previous ones. In order to introduce the reader to the use of plants for local farmers, the author tells a series of anecdotes collected at various locations in the Latin America. Unlike his predecessors, who tend to submit long lists of plants, Hernández's work is based on in-depth field research on the interaction between the local population and local plants.

Hernández X. is considered today as the founder of modern Mexican ethnobotany, which has its origin in the Commission for the Study of Dioscorea (*Comisión de Estudios sobre Dioscoreas*), whose administrator was Hernández X. The work of the Commission of Dioscorea has its most important antecedent in the book called *Southeast natural resources and their utilization* sponsored by the IMERNAR publisher under the supervision of Enrique Beltrán (Beltrán, 1959). In this work, Hernández X. describes the slash-and-burn system

33 The Florentine Codex was a 16th-century ethnographic research project in Mesoamerica by Franciscan friar Bernardino de Sahagún. Sahagún originally titled it: *La historia universal de las cosas de Nueva España* (The universal history of the things of New Spain). The final version of the Florentine Codex was completed in 1569 and this work is one of the most monumental works dealing with Indian culture. Sahagún is also considered by some authors as the pioneer of American anthropology (León-Portilla, 1999).

34 Parts of Francisco Hernández's extensive descriptions of his findings were published in a translated collection entitled *Plantas y animales de la Nueva España, y sus virtudes por Francisco Hernández, y de Latín en romance por Fr. Francisco Ximenez* (México, 1615). More details about the history of Hernández's works see Gómez Pompa (1993: 91–92).

35 One exception is Manuel Maldonado-Koerdell (1940), "who explicitly stressed the need for ethnobiological studies, which go beyond the classification of data in terms of western botanical or zoological nomenclature, to study biological elements as a function of human groups" (McClung de Tapia 1990: 142–143).

and considerable knowledge of Mayan peasants. This work laid the foundations of Mexico's current ethnobotanical and ethnoecological school.

Generally speaking, the growth of interest in ethnobotany coincides with the impact of ethnoscience[36], even though the ethnoscientific approach has never been popular among the Mexican scientists. Development of ethnobotany in the 70s was related to the general development of former Mexican society, which was based on social inequality. Thus, ethnobotanical researchers joined in the majority of current left-wing oriented politics of the *indigenism* (*indigenismo*) based mainly on the National Indigenous Institute (*Instituto Nacional Indigenista*, INI). Many anthropologists and sociologists carried out long-term field research for the INI, which enabled them to explore traditional native knowledge in its own cultural and historical context. This implies an emic approach which transcends the observation of biological phenomena, to include relevant aspects of social organization, socio-economic and political variables, belief systems and the articulation of the local population with national level society, among others (McClung de Tapia, 1990: 143–144).

If one of the objectives of ethnobotany is the research of plants for medicinal purposes, let's look briefly at the diseases from which Mexican Indians suffered. The sources I mentioned above contain information on these diseases: e.g., fevers, pulmonary tuberculosis, diarrhea, intestinal parasites, hemorrhoids, rheumatism, diseases of bones and joints (arthritis and gout), cough, hepatitis, deafness, skin problems (scabies, boils) and eye diseases (glaucoma, conjunctivitis and cataracts) seem to be the most frequently suffered ailments among the Aztecs. However, there is no record of devastating epidemic foci until the sixteenth century, when smallpox, measles, leprosy and typhus produce high mortality among Indians, as syphilis did among Europeans. Thus was forged the myth of genocide in Central Mexico, which evokes an indigenous expulsion from "Eden", coinciding with Spanish colonization (Treviño, 2000; Madaleno, 2007: 65; Carsi, 2008).

Regarding native (central Mexican) medicinal plants, some wild plants were used in both past and present, and are found in some ethnobotanical fieldworks, such as the *axihuitl* (*Eupatorium aschembornianum*) and *tequequetzal* (*Selaginella lepidophylla*) for treating urinary tract infections. The *axihuitl* is a traditional plant of Tepoztlan that is used to heal wounds of all kinds. It indicates that *axihuitl* is also used in gastrointestinal problems such as peptic ulcers, etc. (Madaleno, 2007, Miranda Lara, 2008). The *tequequetzal* has also been used as an herbal medicine. An infusion (tea) is made by steeping a tablespoon of dried material in hot water, and the tea is used as an antimicrobial in cases of colds and sore throat (Curtin & Moore, 1997).

A separate chapter of Mexican and Mesoamerican ethnobotany is the research on sacred hallucinogenic mushrooms, which in Mexico is associated primarily with the Mazatec Indians in Oaxaca. In 1936, North American linguist Robert J. Weitlaner (1883–1968) encountered magic mushrooms for the first time in the country of the Mazatecs in Oaxaca. "Papa Weitlaner" with his daughter Irmgard and his future son-in-law John Bassett Johnson (1915–1944) "became the first outsiders permitted to attend—though not participate in—an all-night curing ritual in which mushrooms were eaten" (Furst, 1976: 75). After returning from the field, only Johnson published a detailed study in 1939 for the Gothenburg Ethnographical Museum called *The elements of Mazatec witchcraft*. He "discovered" the practices of shamans or curers, who use mushrooms primarily for the purpose of divining the cause of an illness, and also confirmed that not just one but several kinds of intoxicating mushrooms were known to the Mazatecs (Johnson, 1939: 119–149).

In August 1938, a month after the Weitlaner-Johnson experience at Huautla de Jiménez, Richard Evans Schultes (1915–2001), considered the father of modern ethnobotany, and his

36 The basic objective of ethnoscience is to understand how people develop with different forms of knowledge and beliefs, and it focused on the ecological and historical contributions of people have been given. It is based on increased collaboration between social sciences and humanities (e.g., anthropology, sociology, psychology, and philosophy) with natural sciences such as biology, ecology, or medicine (Ingold 2000).

colleague Blas Pablo Reko received from Indian informants in the same village specimens of three different species they were told were revered by the people for their visionary properties. Schultes took careful notes of their morphology and in 1939 published the first scientific description of these mushrooms. In 1956, a distinguished French mycologist, Roger Heim, director of the Museum d'Histoire Naturelle in Paris, identified one as *Psilocybe caerulescens*, another was identified by Harvard mycologist Dr. David Under as *Panaeolus campanulatus*, subsequently redefined as *P. sphinctrinus*, and the third by Dr. Rolf Singer as *Stropharia (Psilocybe) cubensis*. Furst (1976: 76) stressed the most significant "psychotropic" impact for its relative cultivation on the domestic front.[37]

A wide range of ethnobotanical and ethnopharmacological research has long been carried out in northern Mexico and in the southwest of the United States. The studies have focused on at least two species or organisms, which have much broader geographic and "ethnocultural" overlap. Somehow, the native "king" among native cactuses in northwestern Mexico is undoubtedly peyote (from the Náhuatl *peyotl*), which is a small, spineless cactus (*Lophophora Williamsii*), which grows wild in the Rio Grande Valley, in the Chihuahuan desert and southward. From earliest recorded time, peyote/peyotl has been used by indigenous people, such as the North American Tonkawa, the Mescalero and Lipan Apache, who were the source or first practitioners of the peyote religion in the regions north of present-day Mexico (Opler, 1938; La Barre, 1960). They were also the principal group to introduce peyote to newly-arrived migrants, such as the Comanche and Kiowa from the Northern Plains. The religious, ceremonial, and healing uses of peyote may date back 2,000 years (Schultes 1938). The use of peyote for religious purposes is probably associated today with the Yutonahua Huichols who also associate with micro-cactus with their famous story of creation. However, they do not think that something is given once and for all, but view it as a process that must be continually renewed. The Huichols therefore set out each year for a journey to the mythical land, Wiricuta, lying in the desert region of San Luis Potosí in Central Mexico, where they enter through the gate to the sacred place where peyote grows more (Pinkson, 1998). As one Huichol *mara'akame*[38] says: "Peyote is everything, it is the crossing of the souls, it is everything. Without peyote nothing would exist" (Schaefer & Furst, 1997: 52–53).

The second organism that is in the environment of northern Mexican Indians and that is associated with shamanic ecstasy, is the fly agaric (*Amanita muscaria*), which occurs in the vast territory from Siberia[39] to Australia, New Zealand, South Africa, South America, etc. One of the cardinal questions of Mesoamerican ethnobotany remains whether the fly agaric was a sacred mushroom for the Maya people. It seems that the K'iche'-Maya of the Guatemalan highlands are evidently well aware that *A. muscaria* is no ordinary mushroom, as it relates to the supernatural, given that they named it *cakuljd ikox* (*cakuljd* = lightning, *ikox* = mushroom) (Lowy, 1974: 188–191). *A. muscaria* is thus related to the K'iche'-Maya Lord of Lightning, *Rajaw Cakuljd*, who also directs the dwarflike rain bringers, formerly called chacs, but now Christianized as *angelitos*, little angels (Furst, 1976: 74).

37 In the Czech Republic this mushroom, which is also found in some areas of Amazonia, is known as the *lysohlávka kubánská* or also the *límcovka kubánská* and its cultivation is still illegal. More details about the ethnobotany of the Mazatecs, see chapter 4.2.2.

38 The Huichol term for shaman meaning both curing, singing shaman and sacrificing priest (Furst 1976: 100).

39 *Amanita muscaria* was widely used as an entheogen ("generating the divine within") by many of the indigenous people of Siberia. In western Siberia, the use of *A. muscaria* was restricted to shamans, who used it as an alternative method of achieving a trance state. In eastern Siberia, *A. muscaria* was used by both shamans and laypeople alike, and was used recreationally as well as religiously(Nyberg, 1992: 71–80).

Central America

To investigate the biological and cultural diversity of Central American countries (Guatemala, Belize, Honduras, El Salvador, Nicaragua and Costa Rica), ethnobotanical surveys were conducted, e.g. in Guatemala detecting about 700 plants of medicinal use. Although, there have been several initiatives to systematize the ethnobotanical knowledge of Guatemala in the past, only the Centro Mesoamericano de Estudios sobre Tecnología Apropiada (CEMAT) carried out an extensive project from 1976 to 1988 to study the systematic use of medicinal plants for agricultural and therapeutic purposes (Cáceres & Girón, 2002: 42). Mayan regions of highland Guatemala are a great place for ethnographic research for mobile medicine. Maya mobile medicine occupies an interstitial space; opposite (or beside) "traditional" indigenous Maya healing and "modern" Western biomedicine, where it neither seeks authorization nor legitimacy from either, but has fashioned a space between them. The mobile medical illustrations analyzed in this investigation show a remarkably consistent structure (vis-a-vis constituent parts) across disparate health care salespeople, languages, products, and contexts. All events begin with a quiz, whereby the health care salesperson holds up each local plant on display and asks onlookers for its name and natural habitat. In addition to engaging the audience, this affirms onlookers' own Maya botanical and pharmacological knowledge, locating the source of natural medicines within the "local" and the "known". Following these engaging exchanges, a metonymic device is introduced, which will stand in during the medical demonstration as a metaphorical surrogate for the human body (Harvey, 2011: 51–58).

As in Guatemala, ethnobotanical research in neighboring Belize is mainly connected with the knowledge of the Mayan Indians. However, unlike Guatemala, we have at our disposal archaeological rather than ethnographic data – e.g. a diversity of tree species used for daily household needs was found in the archaeological reserve El Pilar in "forest gardens" in northeast Belize, etc. (Ross, 2011: 75).

The region known today as Mesoamerica or part of Central America (which includes Central and Southern Mexico, Guatemala, Belize, El Salvador, Honduras, northern Nicaragua and north-western Costa Rica), has been the source of genetic resources in modern agriculture for many fruits and vegetables (Hoyt 1992). Seeds have been found for many species of squash and pumpkins 6,000 years BC in ancient settlements of Mesoamerica. These seeds provide a somewhat conserved history of agriculture and the development of cultures in the New World (Cutler & Whitaker, 1967). For example, research shows that seeds of *Cucurbita pepo* (Cucurbitaceae) were consumed with sugar obtained from the action of an enzyme. The food called "Fricassee" is still consumed by natives in Mexico and Guatemala, with the only difference that sugar is now obtained from sugar cane (*Saccharum officinarum*), a well-known plant, which was introduced from New Guinea (Davidse *et al.*, 1994), by the Spanish colonizers (MacVean & Pöll, 2002: 225–226).

Conclusion

Ethnobotanical research is now an integral part of a series of ethnographic researches and has a broad social and cultural outreach. In this brief conclusion, I will focus on at least two of them: firstly, the use of plants may be of considerable emancipative importance in some areas of Latin America (Southern Mexico, Mayan areas of Guatemala, native areas of Ecuador, Peru or Bolivia, etc.); and secondly, cognitive research studies once again are at the foreground, for example, the relationship between individual tastes, cognition and illness experience.

The knowledge of the properties of herbs and of ancestral indigenous medicinal practices was more common in antiquity, and today are the privilege of women therapists. It seems that the study of the relationship between man and plants offers a wide scope, especially in Mexico, and perhaps even more so in Guatemala in areas with denser Mayan settlement. Harvey's recent study about mobile medicine in the highlands of Guatemala (2011) opened

the way for future research. This can be viewed not only as an attempt to draw attention to "the existence of 'other' public health modalities, suggesting that not only in Guatemala but globally what is needed is a reconsideration of the very nature of what constitutes public health, access to health care, and who gets to define them", but also as a certain contribution to the study of women's ethno-emancipation movements in part of the Latin American subcontinent. Hovewer, this was not the primary intention of Harvey, to get the knowledge of the native medicine ("ethnobotany", "ethnopharmacology", etc.) to outsiders often through aboriginal women who are becoming more of a part of official medicine.[40]

With respect to research on human cognition, taste and experience with illness, David Casagrande examined these issues among the Chiapas Tzeltals in Southern Mexico. Casagrande focused primarily on bitterness and found that this "was probably not correlated with any particular class of illnesses because there is not enough resolution in human taste to discriminate the diversity of chemicals that taste bitter". Casagrande's hypothesis is based on the *prototype theory*[41] which verifies that the role of taste is more likely mnemonic and that this theory "may offer a way to understand how human cognition and communication function in attempts to reduce informational complexity and reconcile the very different domains of plant classification and illness experiences." (Casagrande, 2000: 66) However, as was already stated above, the greatest prospect of future researches will be multispecies ethnography oriented research.

Summary

Firstly, this article engages in a brief outline of ethnobotanical studies, including the current context of multispecies ethnography. It mostly deals with the historical development of this research in Mexico starting from the institution of the *tlamatine*, then through the research of scholars of the 16th century (Monardes, Hernández de Toledo, and the others) up to the modern ethnobotanists (e.g., Opler, Schultes, Furst, Pinkson, etc.). The next section is devoted selectively to certain aspects of ethnobotany and ethnopharmacology, especially in Guatemala and Belize. In conclusion, I point out some future research prospects in the field of ethnobotany, focusing among others on emancipation movements in the context of gender studies and on the use of some cognitive methods.

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40 In my latest field research in Guatemala in 2005, I visited several times the pharmacy with many native remedies, owned by the winner of the Nobel Peace Prize (the K'iche' Indian woman Rigoberta Menchú Tum) which is located on a busy square of the Guatemalan capital (Ciudad de Guatemala). Besides this official pharmacy, Mayan women sell their products made from plants to markets (*tianguis*) in many Guatemalan and Southern Mexican towns and villages.

41 Prototype theory is a mode of graded categorization in cognitive science, where some members of a category are more central than others (Rosch, 1973).

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