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Chocolate: Modern Science Investigates an Ancient Medicine

Food of the Gods: Cure for Humanity? A Cultural History of the Medicinal and Ritual Use of Chocolate[1]

Teresa L. Dillinger,* Patricia Barriga,† Sylvia Escárcega,** Martha Jimenez,‡ Diana Salazar Lowe†† and Louis E. Grivetti*[2]

*Department of Nutrition, University of California, Davis CA 95616; †Independent archivist, Mexico City, D.F.; **Department of Anthropology, University of California, Davis; ‡Department of Genetics, University of California, Davis and ††Independent scholar-translator, Davis, CA

ABSTRACT The medicinal use of cacao, or chocolate, both as a primary remedy and as a vehicle to deliver other medicines, originated in the New World and diffused to Europe in the mid 1500s. These practices originated among the Olmec, Maya and Mexica (Aztec). The word *cacao* is derived from Olmec and the subsequent Mayan languages (kakaw); the chocolate-related term *cacahuatl* is Nahuatl (Aztec language), derived from Olmec/Mayan etymology. Early colonial era documents included instructions for the medicinal use of cacao. The Badianus Codex (1552) noted the use of cacao flowers to treat fatigue, whereas the Florentine Codex (1590) offered a prescription of cacao beans, maize and the herb *tlacoxochitl* (*Calliandra anomala*) to alleviate fever and panting of breath and to treat the faint of heart. Subsequent 16th to early 20th century manuscripts produced in Europe and New Spain revealed >100 medicinal uses for cacao/chocolate. Three consistent roles can be identified: *1*) to treat emaciated patients to gain weight; *2*) to stimulate nervous systems of apathetic, exhausted or feeble patients; and *3*) to improve digestion and elimination where cacao/chocolate countered the effects of stagnant or weak stomachs, stimulated kidneys and improved bowel function. Additional medical complaints treated with chocolate/cacao have included anemia, poor appetite, mental fatigue, poor breast milk production, consumption/tuberculosis, fever, gout, kidney stones, reduced longevity and poor sexual appetite/low virility. Chocolate paste was a medium used to administer drugs and to counter the taste of bitter pharmacological additives. In addition to cacao beans, preparations of cacao bark, oil (cacao butter), leaves and flowers have been used to treat burns, bowel dysfunction, cuts and skin irritations. J. Nutr. 130: 2057S—2072S, 2000.

KEY WORDS: • *cacao* • *chocolate* • *history of chocolate* • *history of medicine* • *medical geography* • *nutritional anthropology* • *nutritional geography*

And so they were happy over the provisions of the good mountain, filled with sweet things, . . . thick with pataxte and cacao. . . the rich foods filling up the citadel named Broken Place, Bitter Water Place.

From the Popol Vuh, sacred book of the Maya (Tedlock 1985, p 163)

To trace and describe the use of cacao in medicine is to embark on an exploration through time and geographical space. One of the first documents to mention cacao, or chocolate, in a Western language was penned by Hernando Cortés in his second dispatch to the Emperor of Spain in a letter dated October 30, 1520. However, indigenous peoples of the New World passed on the knowledge of cacao through oral histories, stonework, pottery and the creation of intricate, multicolored documents (codices) that extolled cacao and documented its use in everyday life and ritual centuries before the arrival of the Spanish. In the centuries after initial contact between the Spaniards and indigenous peoples of the New World, hundreds of descriptive accounts, monographs and treatises were published that contained information on the agricultural, botanical, economic, geographical, historical, medical and nutritional aspects of cacao/chocolate. This rich body of literature is reflected in numerous languages and includes English, French, German, Latin, Spanish and Swedish accounts that extend into the late 19th century. Several learned theses/dissertations produced during the 20th century have examined the general history of cacao/chocolate as well as some of its cultural uses (Bergmann 1959, Millon 1955, Quintero Sanchez 1998). In addition, a broad range of popular trade books and articles on chocolate and chocolate history have been produced during the past 15 y, but most provide only brief comment on the dietary/medical aspects of cacao/chocolate in Central America during the early Colonial Period

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[2] To whom reprint requests should be addressed.

TABLE 1

Selected Mesoamerican terms for cacao/chocolate[1]

Language: language family	Cacao	Chocolate
Nahuatl	Cacahuatl	Cacahuatl, Xoxocoatl
Maya		
Ch'ol	Cacao, Kököw, Kuku	
Chontal	Ka:ka:w	
Mopan	Cücüj	Cücüj
Oaxaca Mixean		
Lowland Mixe	Cïgaa	Cï-gaamëy
North Highland Mixe	Cacu	
Popoluca	Caca'u, Cágau	ChicúlAt
Yukatek	B'alamte', Kakaw	
Oto-Mangean		
Zapotec		Chiculajd
Gulf Zoquean		
Chimalapa Zoque	Kakawa	
Northern Chiapas Zoque		
Cacva		
Zoque	Cakawa	

[1] Selected from a compilation of cacao-related terminology prepared by Dr. Martha Macri and Diane Barker, Department of Native American Studies, University of California, Davis.

and instead concentrate on technological and cultural associations of cacao/chocolate use in Europe during the 18th through early 20th centuries (Bailleux et al. 1995, Benítez 1998, Bloom 1998, Coe and Coe 1996, Garcia Curado 1996, Harwich 1992, Lees 1988, Minifie 1989, Reyes Vayssade 1992, Young 1994). In addition, Graziano (1998) examined the pharmacological history of cacao and chocolate use. Although all of these works include some cultural/dietary/medical aspects of cacao use, none have provided an in-depth exploration of the cultural/medical uses of this unique food.

Chocolate is food; chocolate is medicine. Culinary and ritual preparations from the "beans" (actually seeds) of *Theobroma cacao* can be traced historically as well as archaeologically. Cacao, native to the Americas, was used in both Mesoamerica and South America. Cultivation, cultural elaboration and use of cacao were more extensive in Mesoamerica, but it remains unclear which geographical location was the center for domestication. The difficulty in identifying the wild ancestors to modern cacao plays a role in this controversy. Although some have argued for a South American center of domestication (Cheesman 1944, Stone 1984), other scholars have noted insufficient evidence to support this thesis because the wild ancestors of cacao found in Mexico are genetically distinct from both current cultivars and South American wild cacao plants (De la Cruz et al. 1995, Gómez-Pompa et al. 1990).

The word *cacao* likely originated with the Olmec peoples who occupied the lowland regions of the eastern Mexican gulf coast (Coe and Coe 1996). Cacao-related terms were subsequently adopted and expanded by adjacent Mayan people, who even in the early 21st century exhibit a diversified, extensive cacao-related vocabulary (Coe and Coe 1996, Macri and Barker, personal communication 1999) (**Table 1**). In addition, actual remains of cacao residues have been preserved at archaeological sites, where chocolate beverages were offered to the deceased (Bañales 1999, Hall et al. 1990, Hurst et al. 1989). The Mexica, or Aztecs, who were relatively late arrivals in the central valley of Mexico, adopted/assimilated cacao as a food/medicine (Coe and Coe 1996). Indeed, the Nahuatl (i.e., Mexica or Aztec language) term *cacahuatl* for cacao was concocted from the Mayan word for cacao (Cuatrecasas 1964, Davila Garibi 1939, Thompson 1956).

According to the Mayan and Mexica religions, cacao had divine origins. Cacao was discovered by the gods in a mountain that also contained other delectable foods to be used by the Maya. The god Sovereign Plumed Serpent gave cacao to the Maya after humans were created from maize by divine grandmother goddess Xmucane (Bogin 1997, Coe and Coe 1996, Montejo 1999, Tedlock 1985). The Maya celebrated an annual festival in April to honor their cacao god, Ek Chuah, an event that included the sacrifice of a dog with cacao-colored markings; additional animal sacrifices; offerings of cacao, feathers and incense; and an exchange of gifts (Aguilera 1985, Thompson 1956).

In a similar creation story, the Mexica (Aztec) god Quetzalcoatl (also called Plumed or Feathered Serpent) discovered cacao in a mountain filled with other plant foods (Coe and Coe 1996, Townsend 1992). Cacao was offered regularly to a pantheon of Mexica deities and the Madrid Codex depicts priests lancing their ear lobes and covering the cacao with blood as a suitable sacrifice to the gods (Madrid Codex, p. 95, panel A). Other rituals honored the patron deity of traders, Yacatecuhtli (Coe and Coe 1996, Townsend 1992). During the month of "raising of the banners," or *Panquetzaliztli* (November 21 to December 10), the Mexica celebrated an annual festival primarily to honor Huitzilopochtli (god of war and the sun) but also to prepare sacrifices to Yacatecuhtli. On the festival eve, cacao beverages were served to the individuals slated to be killed as sacrifices to the god to "comfort them" (Townsend 1992, Vaillant 1941).

Before initial European–Mexica contact in 1519, cacao was prepared only as a beverage and was a food reserved for adult males, specifically, priests, highest government officials, military officers, distinguished warriors and occasionally sacrificial victims for ritual purposes. This age/gender/status differentiation was imposed because the Mexica perceived cacao to be an intoxicating food, and therefore unsuitable for women and children, as well as a very valuable and prestigious food, and thus reserved for nobility (Coe and Coe 1996, Townsend 1992).

The first Europeans to encounter cacao were Columbus and his crew in 1502, when they captured a canoe at Guanaja that contained a quantity of mysterious-looking "almonds," later identified as a source of currency in Mesoamerica. These "almonds" were cacao beans, and Columbus remained unaware of their preparation as a beverage and of their importance in Mesoamerica (Coe and Coe 1996).

After Hernando Cortéz (Cortés) landed on the east coast of Mexico near modern Veracruz, events moved rapidly. Cortéz burned his fleet to prevent mutiny and then led his troops inland toward the Mexica capital, Tenochtitlan, where the Spaniards were received by King Moctezuma. Cortéz and another literate officer, Bernal Díaz del Castillo, wrote accounts of their march to Tenochtitlan and documented subsequent events of the Mexica conquest. Both manuscripts provide descriptions of cacao (Cortés 1519, Díaz del Castillo 1560). Presented here is the account by Díaz del Castillo:

"[From time to time the men of Montezuma's guard] brought him, in cups of pure gold a drink made from the cocoa-plant, which they said he took before visiting his wives. We did not take much notice of this at the time, though I saw them bring in a good fifty large jugs of chocolate, all frothed up, of which he would drink a little. As soon as the great Montezuma had dined, all the guards and many more of his

household servants ate in their turn. I think more than a thousand plates of food must have been brought in for them, and more than two thousand jugs of chocolate frothed up in the Mexican style" (Díaz del Castillo 1560, pp. 226–227).

Bernal Díaz del Castillo also described the sale of cacao beans in the market place of Tlatelolco, today a northern suburb of Mexico City:

"On reaching the market-place [at Tlatelolco]. . . we were astounded at the great number of people and the quantities of merchandise, and at the orderliness and good arrangements that prevailed, for we had never seen such a thing before. . . . Let us begin with the dealers in gold, silver, and precious stones, feathers, cloaks, and embroidered goods, and male and female slaves. . . there were those who sold coarser cloth, and cotton goods and fabrics made of twisted thread, and there were chocolate merchants with the chocolate. In this way you could see every kind of merchandise to be found anywhere in New Spain" (Díaz del Castillo 1560, p. 232).

Despite these compelling accounts from Díaz del Castillo, which many have suggested represent Cortéz' first contact with cacao, other evidence may be presented to support the contention that the Spaniards already knew of cacao. López-Gómara, Cortéz' personal secretary, also wrote an account of the conquest where he clearly stated that cacao was a familiar commodity to the men. Like both Cortéz and Díaz del Castillo, López-Gómara described the marketplace at Tlatelolco and commented on the goods for sale: "The most important of all, which is used for money, is one that resembles the almond, which they call *cacahuatl*, and we *cacao*, as we knew it in the islands of Cuba and Haiti" (López-Gómara 1552, p. 162). Preference for use of the more familiar Mayan term, coupled with the López-Gómara account, suggests Spanish familiarity with cacao beans. It is probable, however, that it was at Moctezuma's court where Cortéz and his men first observed preparation and consumption of the chocolate beverage.

Chocolate, prepared as a beverage, was introduced to the Spanish court in 1544 by Kekchi Maya nobles brought from the New World to Spain by Dominican friars to meet Prince Philip (Coe and Coe 1996). Within a century, the culinary and medical uses of chocolate had spread to France, England and elsewhere in Western Europe. Demand for this beverage led the French to establish cacao plantations in the Caribbean, while Spain subsequently developed their cacao plantations in their Philippine colony (Bloom 1998, Coe and Coe 1996, Knapp 1930). The Mayan word *cacao* entered scientific nomenclature in 1753 after the Swedish naturalist Linnaeus published his taxonomic binomial system and coined the genus and species *Theobroma cacao* (food of the gods), a combination that blended Greek with Mayan etymology (Coe and Coe 1996, Linné, 1741–1778). Cacao subsequently flourished in the 1880s after introduction as a commercial crop to the English Gold Coast colony in West Africa (Bloom 1998, Knapp 1920 and 1930).

Although the confectionery history of chocolate is well known and has been the subject of numerous monographs, the medicinal and health-related uses of cacao have received less attention, and it is to this rich historical literature that we now turn.

New World and Old World medicine in the 16th century: A clash of concepts

Because most original 16th to 19th century medical texts that contain information on the properties and uses of chocolate appear in European languages, it is appropriate here to briefly consider the similarities and differences between Mexica and European perspectives on illness and healing methods. Perhaps the most intriguing historical point from the perspective of prescientific nutrition and dietetics is that both Mexica and European healing systems were based on a "hot/cold" system. The Mexica healing system blended religion, where the earth was perceived as a plane with four cardinal directions. At the central point of the plane lay the Mexica empire. The five localities were assigned characteristic colors and attributes used by practitioners during the healing process (López Austin 1988, p. 59):

WEST: white, female, house
EAST: red, male, reed
CENTER: green, order, equilibrium-balance
NORTH: black, death, flint
SOUTH: blue, life, rabbit

The Mexica medical world was based on paired terms, such as "hot/cold," "dark/light," "humidity/drought" and "weakness/strength" (López Austin 1988, pp. 53–59; Ortiz de Montellano 1990, p. 37). A pantheon of seven deities dominated the precontact indigenous medical-dietary system: Tzapotlatenan (creator goddess of the earth and sky), Xipe Totec (god of maize and human sacrifice), Ixtilton or Tlaltecuin (god of medicine and protector of children), Centeotl or Tonantzin (goddess of medicinal herbs and midwives), Cihuacoatl or Macuilxochilquetzali (goddess of pregnancy), Quetzalcoatl (god of air, wind and medicine, responsible for female sterility and wind-related diseases such as rheumatism) and Tlaloc (god of rain, responsible for the distribution of disease). In Mexica tradition, health was perceived as "balance," whereas illness and disease were "imbalance." Balance, however, was influenced by season and varied by age, gender, personality and exposure to environmental temperature extremes. A central medical-related theme held that balance was effected favorably or adversely by diet (De la Cruz 1940, pp. 42–44, Ortiz de Montellano 1990, pp. 132–142, Vargas 1984, Viesca 1986).

Spanish medicine and concepts related to healing also focused on "balance," especially "hot/cold" and "wet/dry." The Spanish system of medicine had evolved from earlier Greek-Roman, Christian-Jewish-Muslim concepts of "hot/cold" and "wet/dry" in which all diseases were perceived as either hot or cold, wet or dry and all available foods and medicines were perceived as either hot or cold, wet or dry. Hot diseases were treated using cold foods/medicines; dry diseases were treated using wet foods/medicines. This healing system, called allopathy, was not dissimilar to that encountered by the Spanish in Mexica territory in Mesoamerica at the time of conquest (Grivetti 1992).

In successive decades after the Mexica conquest, Spanish administrators and physicians founded medical schools where European concepts of allopathy and diet were taught. In 1570, Francisco Bravo wrote the first medical book to be published in the New World, Opera Medicinalia, a text that consisted of four essays: a discussion of typhus and typhoid fever (European diseases introduced after Spanish contact), how to bleed patients (venesection), a review of the ancient Greek Hippocratic doctrine of critical days and a discussion of the classification and treatment of fever and an essay on the medical properties and allopathic nature of sarsaparilla (*Smilax officinalis*), a New World plant used by the Spanish to treat fever and syphilis, that he designated "hot/dry." Bravo commented, too, that Spanish colonists living in the former Mexica capital Tenochtitlan (modern Mexico City) were vulnerable to disease because the surrounding mountains prevented the removal of "foul air" (Bravo 1570, Jarcho 1957).

Francisco Hernández documented Mexica medical practices and noted parallels with Mediterranean, Spanish medical

systems. In his 1577 text, De Antiquitatibus Novae Hispaniae, Hernández identified the useful medical plants from New Spain, and his was one of the first botanical manuscripts to specifically comment on the use of cacao beans as a form of currency (Hernández 1577, Peredo 1985):

The seed *cacahoatl* served as coin, and it was used to purchase, when necessary, the principal things, a custom that lasts to this day in some places. . . The markets were full of this same seed that was used in commerce, and via the seed, merchandise passed to distant owners. They also made a beverage with it (Hernández 1577, p. 303).

Agustin Farfan published his Tractado Breve de Medicina in 1592 in which he identified and recommended local Mexica herbs and their properties and medical uses. Farfan observed that chili peppers, rhubarb and vanilla were commonly used by the Mexica as purgatives and that chocolate brewed as a thermally hot beverage was used, traditionally, as a laxative. He described a suitable method used by the Mexica to counter colic: maize tortillas were heated and then applied directly onto the patients' abdomen to reduce pain (Risse 1987, pp. 48–49).

Chocolate in Mexica medicine: The primary documents

Evidence for the use of cacao/chocolate for medicinal purposes can be traced to ancient Mexica (Aztecs) sources. Several documents, among them the Badianus Manuscript, Florentine Codex and Princeton Codex (Ritual of the Bacabs) provide a baseline for subsequent Colonial Era inquiries on the medical uses of cacao (**Table 2**). Of these early surviving texts, the Florentine Codex (dated to 1590) is perhaps the most important; it contains a massive compilation and examination of Mexica culture and everyday life. The text was compiled by the priest Bernardino de Sahagún, who departed Spain for New Spain in 1529 and for the next 60 years collected extensive information on Mexica agriculture, botany, cultural practices, dietary patterns and health and medical practices (D'Owler 1987). The Florentine Codex described in detail the preparation of various cacao decoctions and identified the illnesses appropriate for treatment using cacao. Sahagún's informants cautioned against the excessive use of green cacao but extolled the same when used in moderation:

"[Green cacao] makes one drunk, takes effect on one, makes one dizzy, confuses one, makes one sick, deranges one. When an ordinary amount is drunk, it gladdens one, refreshes one, consoles one, invigorates one. Thus it is said: 'I take cacao. I wet my lips. I refresh myself' " (Sahagún 1590, Part 12: 119–120).

Chocolate was drunk by the Mexica to treat stomach and intestinal complaints, and when the cacao was combined with liquid from the bark of the silk cotton tree (*Castilla elastica*), it was said to cure infections (Sahagún 1590, 12: 112). Childhood diarrhea was treated with a prescription that used five cacao beans. These were ground and blended with the root of *tlayapoloni xiuitl* (unknown plant) and then drunk (Sahagún 1590, 12: 170). To relieve fever and faintness the prescription called for 8–10 cacao beans to be ground with dried maize kernels and blended with *tlacoxochitl* (*Calliandra anomala*); then, the mixture was drunk (Sahagún 1590, 12: 176). Sahagún also noted that patients stricken with cough who expressed phlegm should drink an infusion prepared from opossum tail, followed by a medicinal chocolate beverage into which had been mixed three herbs: *mecaxochitl* (*Piper sanctum*), *uey nacaztli* (*Chiranthodendron pentadactylon*) and *tlilixochitl* (*Vanilla planifolia*) (Castillo Ledon 1917, Coe and Coe 1996, Sahagún 1590, Part 12: 12, Durand-Forest 1967, Gauge 1648).

In other instances, cacao was added to improve the flavor of Mexica medicinals. Preparations of *tlatlapaltic* root (unknown plant) to control fever, for example, were made more palatable when mixed with cacao (Sahagún 1590, Part 12: 178). Chocolate as a beverage also served as a vehicle to deliver other medicines, including them *quinametli*, described as "the bones of the ancient people called giants" (vertebrate fossils?), which was used to treat patients who passed blood or "from whose rectum comes a flux, who cannot find a remedy" (Sahagún 1590, Part 12: 189).

A second primary source for information on Mexica medicinal use of cacao is the Badianus Manuscript (dated to 1552), which contains striking paintings of medicinal plants and an expansive text that provided a critical understanding of Mexica disease, nutritional problems and healing techniques. A beautiful colored painting of the cacao tree, perhaps the first to be published, is found on plate 70 of the manuscript.

The author of the Badianus Manuscript was a Mexica teacher at the College of Santa Cruz founded by the Spanish around 1536 in Mexico City. The document is bilingual, written in Nahuatl (Mexica language) and Latin. The manuscript presents Mexica disease concepts and outlines the healing properties of local animal, vegetal and mineral medicines (Badianus Manuscript 1552, pp. 3–51).

Excerpts from the manuscript reveal that food was an important component to healing and that cacao was occasionally used as a medicine in treatment. Among the treatments prescribed was the use of cacao flowers as an ingredient in a perfumed bath, prepared to cure fatigue, especially in men who administered the government and held public office (Badianus Manuscript 1552, plate 70). Approximately 10% of the medical conditions identified in the manuscript are nutrition-related and include reference to angina, constipation, dental problems (tartar removal), dysentery, dyspepsia/indigestion, fatigue, gout, the heart (overheated), hemorrhoids and lactation difficulties. No references appear that correspond to nutrition-related problems of beriberi, pellagra, rickets or scurvy or to medical/nutrition-related conditions such as cancer, diabetes or stroke (Grivetti 1992).

The Ritual of the Bacabs (Princeton Codex), a Mayan-language codex discovered in 1914 in Yucatán, contained a suite of medical incantations used to treat medical complaints. Chants/incantations were spoken over patients who suffered from various skin eruptions, fever and seizures. The various illnesses were provided names and causal origins presumed, sometimes attributed to the body/spirit of birds (i.e., the red *mo-macaw*) associated with specific trees. At the conclusion of chants to cure skin eruptions, fever and seizures, a bowl of *chacah* (i.e., medicinal chocolate) that contained two peppers, honey and tobacco juice was drunk by the patients (Princeton Codex 1965, Incantation XIV, pp. 35–37).

Chocolate in European and colonial medicinal accounts

Numerous English, French and Spanish accounts of the 17th to 19th centuries relate the presumed merits and medicinal properties of cacao and chocolate. Given the recent 20th and 21st century interest in pharmacological properties and phytochemicals contained in cacao and their potential physiological impact on human health, a sampling of these in early modern medical texts is enlightening, and it is to this vast literature that we now turn.

The first text cited here is attributed to Friar Agustín Dávila Padilla (date uncertain; 2nd half of the 16th century), who produced a written account of how another missionary, Friar Jordán de Santa Catalina, was treated for kidney disease:

"At the end of his days, his urine was afflicted, and the

TABLE 2

Cacao/chocolate in medical treatment: An historical summary of positive claims and uses

Cacao bean/nut/seed prepared as chocolate
Agitation: lessens/reduces (Quélus 1730, p. 51)
Anemia: improves (Villanueva y Francesconi 1890, p. 329)
Angina/heart pain: reduces (Lavedan 1796)
Aphrodisiac properties (see Sexual appetite)
Appetite: awakens/improves (Lavedan 1796)
Asthma: reduces (Hughes 1672, pp. 153–154, Graham 1828, p. 231)
Belching: controls/lessens (Lardizabal 1788, pp. 16–18)
Blood: generates/produces (Hughes 1672, pp. 153–154, Lavedan 1796; Stubbe 1662, pp. 68–69)
Body: fortifies/invigorates/nourishing to/refreshes/repairs: (Brillat-Savarin 1825, p. 95, Florentine Codex 1590, Part 12: 119–120, de Quélus 1730, p. 46, Hughes 1672, pp. 153–154, Lavedan 1796, Linné [Linnaeus] 1741)
Brain: strengthens (Stubbe 1662, pp. 53–54)
Breast milk production/lactation: increases quantity (Debay 1864, pp. 101–108, Stubbe 1662, pp. 58–60)
Breath: amends/sweetens (Colmenero de Ledesma 1631, p. A4, Stubbe 1662, p. 67)
Breath: reduces shortness of (Gage 1648, p. 108)
Calming (see Nerves)
Cancer: reduces (Villanueva y Francesconi 1890, p. 329)
Catarrh: reduces (Acosta 1604, p. 271, Hughes 1672, pp. 146, 153–154)
Chest ailments (dryness or undefined): reduces (Blégny 1687, pp. 282–285, Valverde Turices 1624)
Childbirth (see Labor)
Chlorosis (see Greensickness)
Colds: reduces (Stubbe 1662, p. 67)
Colic: reduces (Lavedan 1796)
Conception: improves probability of (Colmenero de Ledesma 1631, p. A4)
Consumption/tuberculosis: reduces (Colmenero de Ledesma 1631, p. A4, Donzelli 1686, pp. 284–287, Hughes 1672, pp. 146, 153–154, Lavedan 1796)
Cough: reduces (Blégny 1687, pp. 282–285, Colmenero de Ledesma 1631, p. A4, Florentine Codex 1590, Part 12: 12, Stubbe 1662, p. 11)
Countenance: preserves the (Hughes 1672, pp. 153–154)
Debilitation (general): improves (Debay 1864, pp. 101–108)
Delivery (see Labor)
Diarrhea/belly fluxes/dysentery/griping of the guts: reduces (Blégny 1687, pp. 282–285, Donzelli 1686, pp. 284–287, Dufour 1685, p. 77, Florentine Codex 1590, Part 12: 170, Hernández 1577, p. 305, Lavedan 1796, Stubbe 1662, pp. 58–60, Villanueva y Francesconi 1890, p. 333)
Digestion: improves/promotes (Brillat-Savarin 1825, pp. 95–96, Colmenero de Ledesma 1631, p. A4, Quélus 1730, pp. 44, 50, Hurtado 1645, Vol. 1, 2:13, Panadés y Poblet 1878, p. 191, Rengade 1886, p. 91, Saint-Arroman 1846, p. 86, Savarin 1825, pp. 95–96)
Digestion (laxative effect): produces (Farfan 1592)
Disposition: consoles/improves (Colmenero de Ledesma 1631, p. A4, Florentine Codex 1590, Part 12: 119–120)
Distempers: reduces (Stubbe 1662, p. 67)
Dysentery (see Diarrhea)
Dyspepsia (see Stomach)
Emaciation/thinness/wasting: reduces (Debay 1864, pp. 101–108, Donzelli 1686, pp. 284–287, Hernández 1577, p. 305, Hughes 1672, p. 146, Linné [Linnaeus] 1741, Saint-Arroman 1846, p. 85)
Energy: improves (Stubbe 1662, p. 3)
Exhaustion: relieves/repairs (Brillat-Savarin 1825, pp. 95–96, Debay 1864, pp. 101–108, Quélus 1730, p. 45)
Ergot poisoning (see St. Anthony's Fire)
Exercise: nourishing to body after (Hughes 1672, p. 145)
Exhaustion: reduces (Donzelli 1686, pp. 284–287)
Fainting: relieves (Buchan 1792, p. 224, Quélus 1730, p. 51, Florentine Codex 1590, Part 12, 176, Hughes 1672, pp. 153–154, Princeton Codex 1965, Incantation XIV, pp. 35–37)
Fatigue: reduces (Brillat-Savarin 1825, pp. 95–96, Debay 1864, pp. 101–108, Blégny 1687, pp. 282–285, Stubbe 1662, p. 3)
Female complaints (general): reduces (Saint-Arroman 1846, p. 86)
Fever: reduces/relieves/ (Blégny 1687, pp. 282–285, Donzelli 1686, pp. 182, 284–287, Dufour 1685, p. 77, Florentine Codex 1590, Part 12: 176, 178, Hernández 1577, p. 305, Hughes 1672, pp. 153–154, Princeton Codex 1965, Incantation XIV, pp. 35–37, Stubbe 1662, p. 79)
Flatus/flatulence/wind: controls/dissipates/reduces (Lavedan 1796, Lardizabal 1788, pp. 16–18, Stubbe 1662, pp. 53–54)
Galactagogue properties (see Breast milk)
Gout/podagra: reduces (Lavedan 1796)
Green sicknesses/chlorosis: reduces (Colmenero de Ledesma 1631, p. A4, Saint-Arroman 1846, p. 86, Villanueva y Francesconi 1890, p. 329)
Gums: strengthens (Stubbe 1662, pp. 53–54)
Hair (white hair): delays growth of (Lavedan 1796)
Hangover: reduces effects of (Brillat-Savarin 1825, p. 97)
Hemorrhoids/piles: reduces (Linné [Linnaeus] 1741, Ponce 1902, p. 123)
Health: essential to/preserves (Hughes 1672, p. 124, Quélus 1730, pp. 44–45, Lavedan 1796)
Heart: corroborates/strengthens/vivifies (Dufour 1685, pp. 90–91, Lavedan 1796, Stubbe 1662, pp. 53–54, 68–69)
Heart pain (see Angina)
Heart palpitations: relieves (Blégny 1687, pp. 282–285)
Hoarseness: relieves (Quélus 1730, pp. 76–77)
Hypochondria: reduces (Linné [Linnaeus] 1741)
Indigestion (see Stomach)
Infection (general): reduces (Colmenero de Ledesma 1631, p. A4, Florentine Codex 1590, Part 12: 112)
Inflammation (general): reduces (Colmenero de Ledesma 1631, p. A4, Stubbe 1662, p. 43)
Insomnia (see Sleep)
Intestinal complaints (general distress): reduces (Colmenero de Ledesma 1631, p. A4, Debay 1864, pp. 60, 101–108, Florentine Codex 1590, Part 12: 112)

(*continued*)

TABLE 2 (*continued*)

Cacao/chocolate in medical treatment: An historical summary of positive claims and uses

Irritation (mental); reduces (Brillat-Savarin 1825, p. 100)
Itch: reduces (Stubbe 1662, pp. 58–60)
Jaundice: reduces (Colmenero de Ledesma 1631, p. A4)
Kidney complaints (general): reduces (Dufour 1685, pp. 75–76, Gage 1648, p. 108, Friar Agustín Dávila padilla cited by Torres 1997, p. 244)
Kidney stone/gravel: cures/expels (Colmenero de Ledesma 1631, p. A4, Hughes 1672, p. 153–154)
Labor/childbirth/delivery: facilitates (Buchan 1792, p. 224, Colmenero de Ledesma 1631, p. A4)
Leukorea/"whites": reduces (Quélus 1730, p. 44)
Life: improves (Debay 1864, pp. 101–108)
Life-span (see Longevity)
Limbs: strengthens (Dufour 1685, pp. 75–76)
Liver complaints/distempers: reduces (Donzelli 1686, p. 182, Dufour 1685, pp. 111–113, Gage 1648, pp. 107–108, Hernández 1577, p. 305, Stubbe 1662, p. 3)
Longevity: improves/lengthens/prolongs (Quélus 1730, pp. 45, 58, Lavedan 1796, Stubbe 1662, pp. 84–86)
Lung inflammation/irritation: reduces (Blégny 1687, pp. 282–285, Quélus 1730, pp. 76–77)
Matrice (see Womb)
Menstrual flow: provokes (Stubbe 1662, pp. 53–54, 68–69)
Moral nature: improves (Saint-Arroman 1846, p. 86)
Nerves (delicate)/nervous distress: calms/improves (Brillat-Savarin 1825, p. 100, Debay 1864, pp. 60, 101–108, Rengade 1886, p. 91)
Nutrition/nutritious: improves (Villanueva y Francesconi 1897, p. 23)
Obesity (see Weight gain)
Obstructions (general): reduces/opens (Colmenero de Ledesma 1631, p. A4, Stubbe 1662, p. 67)
Pain (general): eases (Quélus 1730, pp. 76–77)
Pain (abdominal): eases (Aguilera 1985, p. 119)
Piles (see Hemorrhoids)
Podagra (see Gout)
Poison: antidote/counters/expels (Aguilera 1985, p. 119, Colmenero de Ledesma 1631, p. A4, Quélus 1730, pp. 76–77, Dufour 1685, pp. 90–91)
Pregnancy: nourishes embryo (Hughes 1672, pp. 153–154)
Rectal bleeding/bloody flux: reduces (Florentine Codex 1590, Part 12: 189, Hughes 1672, p. 124, Stubbe 1662, pp. 3, 53–54)
Rheumatism: reduces (Blégny 1687, pp. 282–285, Hughes 1672, p. 146)
Scurvy [?]: reduces (Hughes 1672, p. 144)
Seizures: reduces (Princeton Codex 1965, Incantation XIV, pp. 35–37)
Sexual appetite/aphrodisiac properties/desire/pleasure: increases (Hernández 1577, p. 305, Colmenero de Ledesma 1631, p. A4, Linné [Linnaeus] 1741, Monlau 1881, p. 238, Aguilera 1985, p. 119)
Skin eruptions: reduces (Princeton Codex 1965, Incantation XIV, pp. 35–37)
Sleep: encourages (Blégny 1687, pp. 282–285, Quélus 1730, p. 46)
Sleep: prevents (Colmenero de Ledesma 1631, p. A4)
Snake bite: talisman against (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Spirit: gladdens/invigorates/revives (Florentine Codex 1590, Part 12: 119–120, Hughes 1672, pp. 153–154, Stubbe 1662, pp. 68–69)
Spleen: deadens (Blégny 1687, pp. 282–285)
St. Anthony's fire: reduces (Stubbe 1662, p. 43)
Stomach (dyspepsia/(general complaints)/indigestion/weak/windy): corroborates/helps/reduces (Acosta 1604, p. 271, Brillat-Savarin 1825, pp. 95–96, Debay 1864, p. 60, Blégny 1687, pp. 282–285, Dufour 1685, pp. 90–91, Florentine Codex 1590, Part 12: 112, Graham 1828, pp. 412–413, Hughes 1672, p. 124, Hurtado 1645, Vol. 1, 1:1, 3:21, Lavedan 1796, Panadés y Poblet 1878, p. 192, Stubbe 1662, pp. 11, 58–60, 67–69, Valverde Turices 1624)
Strength: recovers/repairs (Quélus 1730, pp. 45, 51)
Sweat: provokes/increases (Hughes 1672, pp. 124, 153–154, Stubbe 1662, pp. 84–86)
Syphilis: reduces (Debay 1864, p. 91)
Teeth: cleans (Colmenero de Ledesma 1631, p. A4)
Thinking (tormented): soothes (Brillat-Savarin 1825, p. 97)
Thirst: quenches (Quélus 1730, p. 46, Stubbe 1662, pp. 58–60)
Throat (infected/inflamed): reduces (Blégny 1687, pp. 282–285, Dufour 1685, pp. 75–76)
Toothache: reduces (Stubbe 1662, pp. 53–54)
Tuberculosis (see Consumption)
Tumors/swellings/pustules: reduces (Hughes 1672, p. 144, Stubbe 1662, pp. 53–54)
Ulcers: reduces (Stubbe 1662, pp. 58–60)
Urine flow: increases/provokes (Colmenero de Ledesma 1631, p. A4, Gage 1648, p. 108, Hughes 1672, pp. 153–154, Stubbe 1662, pp. 53–54, 58–60, 84–86)
Vermifuge/antihelminthic: effective as a (Debay 1864, p. 90)
Virility: increases (Lavedan 1796)
Vitals: strengthens (Hughes 1672, pp. 153–154)
Violence: reduces (Debay 1864, pp. 101–108)
Vomiting: controls/reduces (Blégny 1687, pp. 282–285, Lardizabal 1788, pp. 16–18, Lavedan 1796)
Wasting (see Emaciation)
Warmth: increases (Lavedan 1796)
Weakness: relieves (Debay 1864, pp. 101–108, Hernández 1577, p. 305, Saint-Arroman 1846, p. 85)
Weight gain/obesity/putting on fat: leads to increased (Cárdenas 1591, Colmenero de Ledesma 1631, p. A4, Dufour 1685, pp. 99, 115–116, Gage 1648, p. 110, Hernández 1577, p. 305, Stubbe 1662, p. 30)
"Whites" (see Leukorea)
Wind (see Flatus; stomach)
Womb/matrice: comforts/strengthens (Dufour 1685, pp. 75–76, Stubbe 1662, pp. 53–54)
Worms (see Vermifuge)

(*continued*)

TABLE 2 (*continued*)

Cacao/chocolate in medical treatment: An historical summary of positive claims and uses

Cacao bark (internal: consumption)
Abdominal pain: reduces (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Diarrhea (bloody): reduces (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Cacao butter/fat/oil (external/internal: direct application, consumption)
Bronchitis: soothes (Anonymous 1906, p. 338)
Burns: soothes (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Cuts (skin): disinfects (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Cancer (stomach): reduces (Milne Edwards and Vavasseur 1835, pp. 339–340)
Catarrh: soothes (Anonymous 1906, p. 338)
Gout: reduces (Quélus 1730, p. 78)
Hemorrhoids/piles: reduces (Quélus 1730, p. 78, Manual del Farmaceutico 1881 and 1882, pp. 354–356, Milne Edwards and Vavasseur, 1835, pp. 339–340, Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Indigestion: reduces (Milne Edwards and Vavasseur 1835, pp. 339–340)
Lips (chapped/cracked): soothes (Anonymous 1906, p. 338, Milne Edwards and Vavasseur 1835, pp. 339–340)
Liver disorders (general): reduces (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Lung disorders (general): reduces (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Mouth (burning): relieves (Ximénez 1722, p. 250)
Nipples (cracked): soothes (Bardina 1905, p. 307, Milne Edwards and Vavasseur 1835, pp. 339–340, Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Piles (see Hemorrhoids)
Respiratory (general distress): reduces (Milne Edwards and Vavasseur 1835, pp. 339–340)
Skin: clears/lubricates/softens (Anonymous 1906, p. 338, Quélus 1730, pp. 77–78, Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Urinary (general distress): reduces (Milne Edwards and Vavasseur 1835, pp. 339–340)
Vaginal (irritation): reduces (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Wounds: soothes (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Cacao flower (external: baths, infusions, applied directly)
Apathy: reduces (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Cuts (on feet): soothes (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Fatigue: reduces (Badianus Manuscript 1552)
Timidity: reduces (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Toothache: reduces pain of (Rodríguez Rouanet 1971, pp. 99–100)
Cacao fruit pulp (internal: eaten)
Childbirth/delivery: facilitates (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Cacao leaf (external: applied directly)
Bleeding: stanches excessive (Morton 1981, pp. 556–557, Thompson 1956, p. 106)
Wound: applied as antiseptic (Morton 1981, pp. 556–557, Thompson 1956, p. 106)

doctors ordered him to use a drink that in the Indies they call chocolate. It is a little bit of hot water in which they dissolve something like almonds that they call cacaos, and it is made with some spices and sugar. . . and when in his illness he found himself well with the drink, he said that God [had punished him], because he had not been penitent in his early years" (Padilla, cited in Torres 1997, p. 244).

Francisco Hernández wrote his botanical text Historia de las Plantas de la Nueva España in 1577. His manuscript is the first detailed description of the natural history of the cacao tree, and he provided as well a broad range of cultural, dietary and medical information on the various attributes of drinking chocolate:

"The *cacahoaquahuitl* is a tree of a size and leaves like the citron-tree, but the leaves are much bigger and wider, with an oblong fruit similar to a large melon, but striated and of a red color, called *cacahoacentli*, which is full of the seed *cacahoatl*, which, as we have said, served the Mexicans as coin and to make a very agreeable beverage. It is formed of a blackish substance divided into unequal particles, but very tightly fit among themselves, tender, of much nutrition, somewhat bitter, a bit sweet and of a temperate nature or a bit cold and humid" (Hernández 1577, p. 304).

Hernández identified the varieties of cacao trees and the types of cacao beans that were differentiated by the Mexica for use as currency or for beverages:

"There are, that I am aware of, four varieties of this tree: the first, called *quauhcacahoatl*, is the biggest of all and gives the biggest fruits; the second is *mecacacahoatl*, that is of a medium size, extended and with a fruit that follows in size the former; the third, called *xochicacahoatl*, is smaller, and gives a smaller fruit, and a seed that is reddish on the outside and like the rest on the inside; the fourth, which is the smallest of all and, for this reason, is called *tlalcacahoatl* or small, gives a fruit that is smaller than the others but of the same color. All the varieties are of the same nature and serve for the same uses, although the latter serves more for beverages while the others are more appropriate for coins" (Hernández 1577, p. 304).

Hernández then turned his attention to the medical attributes of cacao and its use in treating specific medical complaints. He mentioned that a simple preparation of cacao, not mixed with other ingredients, was administered to patients suffering from fever and infirmities of the liver. Hernández then noted that if four cacao beans and a quantity of gum (*holli*) were toasted, ground and mixed, the preparation "contained dysentery." He described a medicine called *atextli*, identified as a thin paste made of cacao beans and maize, that could be "compounded" by adding *mecaxochitl* (*Piper sanctum*) and *tlilxochitl* fruits (*Vanilla planifolia*), which was used to excite the "venereal appetite" (Hernández 1577, p. 305). Hernández concluded his description of cacao by identifying a beverage called *chocolatl*, made by mixing grains of *pochotl* and *cacahoatl* in equal quantities, that had the properties of making the consumer "extraordinarily fat" if used frequently; therefore, it was prescribed to "thin and weak" patients (Hernández 1577, p. 305).

Toward the end of the 16th century in 1591, the physician Juan de Cárdenas completed his Problemas y Secretos Maravillosos de las Indias. His treatise included an extensive review

of chocolate in which he examined its effects and discussed the importance of balancing "hot/cold" properties of ingredients added to medicinal chocolate preparations. Cárdenas wrote that basic, untoasted cacao without other ingredients produced a constipating effect on the stomach, drained menstruation, closed the urinary tracts, blocked the liver and spleen, reduced facial color, weakened digestion within the stomach, caused shortness of breath and led to fatigue and fainting (Cárdenas 1591). In contrast, he concluded that if cacao was toasted, ground and mixed with *atole* (ground maize and water), it caused weight gain in consumers, sustained men and provided a healthy, laudable substance (Cárdenas 1591).

José de Acosta prepared his treatise, The Naturall and Morall Historie of the East and West Indies, in 1604. He provided a commentary on chocolate use and concluded:

"The Spaniards, both men and women, that are accustomed to the country, are very greedy of this chocolaté. They say they make diverse sortes of it, some hote, some colde, and some temperate, and put therein much of that chili; yea they make paste thereof, the which they say is good for the stomacke, and against the catarre" (Acosta 1604, p. 271).

Santiago de Valverde Turices wrote an extensive treatise entitled Un Discurso del Chocolate in 1624 and argued that cacao was "cold" by nature, whereas chocolate prepared from beans was "hot" and "dry" and therefore suitable to prescribe to those suffering from "cold" or "wet" illnesses. Valverde Turices argued that chocolate should be called a medicine, because it changed the patient's constitution. He concluded that chocolate was beneficial for the ailments of the chest when drunk in great quantities and was good for the stomach if drunk in small quantities. In respect to healthy persons, Valverde Turices argued that chocolate should be permitted, so long as it was mixed with "cold" ingredients to balance its nature. He also stated that chocolate created "thick and sticky humors" that would be harmful to those with melancholic or phlegmatic dispositions (Valverde Turices 1624, pp. D1–2).

Antonio Colmenero de Ledesma wrote his treatise on chocolate, Curioso Tratado de la Naturaleza in 1631. He mentioned that cacao preserved health and made consumers fat, corpulent, faire and amiable. Colmenero de Ledesma stated that chocolate:

". . . vehemently incites to Venus, and causeth conception in women, hastens and facilitates their delivery; it is an excellent help to digestion, it cures consumptions, and the cough of the lungs, the New Disease, or plague of the guts, and other fluxes, the green sicknesse, jaundice, and all manner of inflammations and obstructions. It quite takes away the morpheus, cleaneth the teeth, and sweetneth the breath, provokes urine, cures the stone, and expels poison, and preserves from all infectious diseases" (Colmenero de Ledesma 1631, p. A4).

Tomas Hurtado wrote an ecclesiastical treatise on chocolate and tobacco in 1645 entitled Chocolate y Tabaco Ayuno Eclesiastico y Natural. In this work, he explored the issue of whether drinking chocolate was permitted during Christian fasting periods. He concluded that basic chocolate would not break the fast if consumed as a drink, but if the paste was mixed with milk and eggs, which he considered foods, then the faithful should abstain (Hurtado 1645, Vol. 1, 1:1, 1:6, 1:7). Hurtado further noted that cacao was an important remedy commonly used to treat "illness or thinness of [the] stomach" (Hurtado 1645, Vol. 1, 1:1, 3:21). In his opinion, the basic chocolate drink did not sustain the body or "take away hunger" but that when drunk, it "gives comfort, burns up undigested foods and helps digestion" (Hurtado 1645, Vol. 1, 2:13).

Thomas Gage wrote his classic travel account The English-American: His Travail by Sea in 1648. He devoted Chapter XVI to the description of two beverages used in the New World: *atole* and chocolate. At the time of his visit, chocolate was commonly drunk throughout the West Indies, as well as in Flanders, Italy and Spain. Gage was aware of Colmenero de Ledesma's text published in 1631 and included mention and notations to Colmenero's work. Gage described a form of medicinal chocolate blended with black pepper that was administered to patients with "cold livers" (Gage 1648, pp. 107–108). He reported that medicinal chocolate mixed with cinnamon promoted urine flow and was administered to patients suffering from kidney disorders and to others "troubled with cold diseases" (Gage 1648, p. 108). Gage noted that *achiote* (*Bixa orellana*) was sometimes added to chocolate to provide an "attenuating quality" and then was administered to patients who suffered from shortness of breath and reduced urine flow (Gage 1648, p. 108). He also wrote that persons who drank chocolate grew fat and corpulent (Gage 1648, p. 110).

Henry Stubbe wrote his monograph The Indian Nectar, or, a Discourse Concerning Chocolata [sic] in 1662 to advise his readers on chocolate-related misconceptions. He cited the works of numerous authors, botanists, physicians and travelers and thus provided 20th and 21st century readers with a wealth of chocolate-related authorship. He first noted that in the Indies, chocolate was drunk on the advice of physicians once or twice each day and was especially helpful to restore energy if "one is tired through business, and wants speedy refreshment" (Stubbe 1662, p. 3). Stubbe wrote of chocolate use in Mexico that "in acute diseases [associated with] heat and fervour, and in hot distempers of the liver, [they] give the cacao nut, punned [?] and dissolved in water, without any other mixture. In case of the bloody flux, they mixed the said nuts with a guman called *olli*, and so cured [them] miraculously" (Stubbe 1662, p. 8). Elsewhere, he stated that the flower *xochinacaztli* (*Cymbopetalum penduliflorum*) was added to chocolate and used to treat weak, "phlegmatique and windy stomachs"; *tlilxochitl* (vanilla) was added and the mixture was drunk to strengthen the brain and womb; *achiotl* (*achiote*) was added to strengthen a debilitated stomach and to reduce diarrhea; and *tepeyantli* (unknown plant) was added to treat cough (Durand-Forest 1967, Stubbe 1662, p. 11). Stubbe provided a basic recipe for the preparation of medicinal chocolate:

"To every hundred nuts of cacao. . . put two cods of *chile* called long red pepper, one handful of anise-seeds, and *orichelas* [*orejaelas*], and two of the flowers called *mecasuchill*, one vaynilla [sic] or instead thereof fix Alexandrian roses beaten to powder, two drams of cinnamon, twelve almonds, and as many hasel-nuts [sic] half a pound of sugar, and as much *achiote* as would color it" (Stubbe 1662, p. 13).

Stubbe summarized several statements from sources identified as Indian writers, who reported "this cacao nut is very nourishing. . . it is *multi nutrimenti*. . . it doth fatten. . . by frequent using it" (Stubbe 1662, p. 30). He reported that English soldiers stationed in or about Jamaica lived on cacao nut paste mixed with sugar that the troops dissolved in water, that the soldiers sustained themselves for long seasons eating only this food and that Indian women ate chocolate often, so much so that they scarcely consumed any solid meat yet did not exhibit a decline in strength (Stubbe 1662, p. 31). Stubbe offered the insight that the constituent parts of the cacao seed had curative functions: "[if the butyrous and oily part of the cacao nut is removed. . . the remainder is] a great remedy against inflammations, and particularly [the] fire of St. Anthony [i.e., ergot poisoning]" (Stubbe 1662, p. 43). He continued that chocolate mixed with Jamaica pepper provoked urine and menstrual flow, strengthened the brain, comforted the womb and dissipated excessive "winde," or flatus, whereas

vanilla added to chocolate strengthened the heart, "beget strong spirits" and promoted digestion in the stomach (Stubbe 1662, pp. 53–54). Elsewhere, Stubbe wrote that *achiote* mixed with chocolate not only added color to the product, but when drunk:

". . . allays feverish distempers, it helpeth the bloody-flux, and repels praeternatural tumors. . . it is mixed with chocolata [sic]. . . to. . . helpeth the tooth-ach arising from hot causes, it strengthens the gums, it provokes urine, it quencheth thirst. . . and being mixed with rosin, it cureth the itch and ulcers; it strengthens the stomach, stoppeth the fluxes of the belly, it encreaseth milk" (Stubbe 1662, pp. 58–60).

Elaborating further on medicinal forms of chocolate, he wrote that different varieties of peppers, specifically *mecaxochitl* or *piso*, when mixed with cacao paste: "opens obstructions, cures colds, and distempers arising from cold causes; it attenuates gross humors, it strengthens the stomach, and it amends the breath" (Stubbe 1662, p. 67). Several varieties of ear flowers (*xochinacaztlis* or *orichelas*) (*Cymbopetalum penduliflorum*) when mixed with chocolate provided a quality scent and taste to the medicine that was used to strengthen the stomach, revive the spirit, "beget good blood" and to "provoke monthly evacuations in women." The same mixture was thought by other physicians, however, to be a stronger medicine and thus was used with caution to strengthen the heart and vital parts (Stubbe 1662, pp. 68–69).

Stubbe also provided general observations on the effects of chocolate. He wrote that "the Indians used [chocolate] as food, and daily aliment; upon occasion of fevers and other hot distempers, they made some little alteration of it" (Stubbe 1662, p. 79). Perhaps his most telling observation, however, was his citation from Dr. Franciscae Ferdinandez, the Principal Physician in Colonial Mexico during the reign of Philip II, who wrote the following:

"[Chocolate] is one of the most wholesome and pretious [sic] drinks, that have been discovered to this day: because in the whole drink there is not one ingredient put in, which is either hurtful in it self, or by commixtion; but all are cordial, and very beneficial to our bodies, whether we be old, or young, great with child, or others acustomed to a sedentary life. And we aught not to drink or eat after the taking chocolata [sic]; no, nor to use any exercise after it: but to rest for a while after it without stiring. It must be taken very hot" (Stubbe 1662, pp. 83–84).

Elsewhere, Stubbe cited several prominent Spanish physicians. The first, Dr. Juanes de Barrios, argued that chocolate was all that was necessary for breakfast because after eating chocolate, one needed no further meat, bread or drink. The second, Dr. Juanes de Cardenas, concluded that chocolate lengthened life for the reason that the beverage "yields good nourishment to the body, it helps to digest ill humors, voiding the excrements by sweat, and urine" and because the heat of the West Indies created medical problems to those stationed or living there, drinking chocolate removed phlegm and superfluous moisture from the body by converting it into "good blood". . . an effect that went well beyond that attributed at the time to drinking wine (Stubbe 1662, pp. 84–86).

Stubbe presented an account by an unnamed Spanish physician from Seville who compared wine and chocolate and noted that "none hath been known to live above seven dayes by drinking wine alone, [however] one may live moneths, and years using nothing but chocolate" (Stubbe 1662, pp. 97–98). He quoted the same Spanish physician who testified that he, himself, "saw a childe weaned, which could not be brought by any artifice to take any food, and for four moneths space he was preserved alive by giving him *chocolata* only, mixing now and then some crumbs of bread therewith" (Stubbe 1662, p. 98).

William Hughes published his monograph on the ethnobotany of plants growing in English plantations in America in 1672. Appended to his general text was a specific account entitled Discourse of the Cacao-Nut-Tree, and the Use of Its Fruit: With All the Ways of Making of Chocolate: The Like Never Extant Before. Hughes described the preparation of chocolate paste and complicated recipes and suggested that it was only after the arrival of the Spanish that various ingredients were added to chocolate. He wrote. "the Native Indians seldom or never use any compounds, desiring rather to preserve their healths, then to gratifie and please their palates, until the Spaniards coming among them, made several mixtures and compounds, which instead of making the former better. . . have made it much worse" (Hughes 1672, p. 119). Hughes identified the ingredients of several medicinal forms of chocolate and their respective uses:

"To strengthen the stomack much debilitated, there is put in *achiote*, or rather saffron: [to treat] fluxes, cinamon, nutmegs, or a little steel-powder: for coughs, almonds, and the oyl of almonds, sugar, or sugar candied: for a phlegmatick stomack, they put in pepper, cloves, etc." (Hughes 1672, p. 124).

Having identified the ingredients of so-called medicinal chocolates, Hughes then elaborated on the use of chocolate in medical care:

"Chocolate is most excellent, it nourishing and preserving health entire, purging by expectorations, and especially the sweat-vents of the body, preventing unnatural fumes ascending to the head, yet causing a pleasant and natural sleep and rest. . . eaten twice a day, a man may very well [may] subsist therewith, not taking any thing else at all" (Hughes 1672, p. 143–144).

Most interesting from a nutritional perspective, however, is Hughes' view that chocolate could cure the "pustules, tumors, or swellings" experienced by "hardy sea-men long kept from a fresh diet" (scurvy?). He wrote that once ashore, sailors should drink chocolate because it "is excellent to drive forth such offensive humors, opening the pores, and causing moderate sweats" (Hughes 1672, p. 144).

Hughes also wrote that chocolate was nourishing to consumers who required "speedy refreshment after travel, hard labor, or violent exercise" that it was "exhilerating and corroborating [to] all parts and faculties of the body" (Hughes 1672, p. 145). Hughes urged readers living in England to drink chocolate, especially persons with "weak constitutions, and have thin attenuate bodies, or are troubled with sharp rheums, catarrhs, and such as consumption. . . and all aged people may safely take it, especially in the heat of summer, when the skin and pores are relaxed by great expence of spirit, causing a faintness" (Hughes 1672, p. 146). He also offered a ringing endorsement to the medical merits of chocolate:

"Chocolate is the only drink in the Indies, and I am fully perswaded is instrumental to the preservation and prolonging of many an Europeans life that travels there. . . for my own part, I think I was never fatter in all my life, then when I was in that praise-worthy Island of Jamaica, partily by the frequent use there-of, neither had I one sick day during the time I was there, which was more than half a year" (Hughes 1672, pp. 147–148).

Hughes cited two physicians, identified only as Drs. Juanes and Ferdinandez, on other medical aspects of chocolate and reported:

"It is the most wholesome and most excellent drink that is yet found out. . . it is good alone to make up a breakfast, needing no other food, either bread or drink, is beneficial to

the body, and without exception, may be drunk by people of all ages, young as well as old, of what sex or what constitution so ever and is very good for women with childe, nourishing the embryo, and preventing fainting fits, which some breeding women are subject unto: it helpeth nature to concoct phlegme and superfluous moisture in the stomack; it voideth the excrements by urine and sweat abundantly, and breedeth store of very good blood, thereby supplying the expence of spirits, it expels gravel, and keepth the body fat and plump, and also preserveth the countenance fresh and fair: it strengthens the vitals, and is good against fevers, cattarrhs, asthmaes, and consumptions of all sorts" (Hughes 1672, pp. 153–154).

Sylvestre Dufour published his monograph, The Manner of Making of Coffee, Tea, and Chocolate, in 1685. One value of the Dufour text, however, lies in his acknowledgment and credit that the material on chocolate had been previously published by the Spanish physician Antonio Colmenere de Ledesma of Ecija in Andaluzia. After reviewing the debate on whether chocolate was "hot" or "cold," a recipe for medicinal cacao was presented:

"Take 700 cacao nuts and a pound and a half of white sugar, two ounces of cinnamon, fourteen grains of Mexican pepper called chile or pimiento, half an ounce of cloves, three little straws of vanilla de Campeche [or substitute anise-seed], [add] *achiot*[e] a small quantity as big as a filbert, which may be sufficient only to give it a color; some add thereto almonds, filberts, and the water of orange flowers" (Dufour 1685, pp. 72–73).

Elsewhere in the Dufour text is the notation that medical chocolate usually contained anise-seed, because its inclusion neutralized the presumed "coldness" of the cacao nut/seed. When the two components were mixed, the prescription was given to those suffering from "diseased and infected kidneys, the throat, the bladder, the matrice [womb], the members brought under and weakened with diverse diseases, so great is the force and power of that little inconsiderable seed" (Dufour 1685, pp. 75–76). A mixture of *achiote* (*Bixa orellana*) and chocolate reportedly applied to the "outward parts" was effective because it "allays the ardour and burning of the feaver, [and] hinders the dysenterie or griping of the guts" (Dufour 1685, p. 77). The herb *mecaxuchil* (*Vanilla* sp.) mixed with chocolate was identified as an effective medicine that "corroborates the heart and the stomach, attenuates the thick and slow humors, and is an excellent medicine and antidote against poison" (Dufour 1685, pp. 90–91). Elsewhere in the text is the passage that "nothing fattens more than chocolate" (Dufour 1685, p. 99).

The fourth and last section of the Dufour text treated additional aspects of the medicinal use of chocolate. The author considered climate, season and timing of drinking chocolate. In winter time, for example, one might drink chocolate mixed with endive water; if suffering from hot distempers of the liver, patients should take chocolate prepared with rhubarb water; and chocolate should not be drunk during the Dog Days (hottest part of summer) unless one already was accustomed to do so (Dufour 1685, pp. 111–113).

In the final pages of the text, the author debated the limited use of chocolate in the morning versus consumption all day and then expanded on an interesting debate over the issue of why chocolate fattens those who drink it. One argument proposed was that the ingredients in medicinal cacao, because of their "hot/cold" valence, should normally make the body lean. Others, however, looked to something inherent within cacao itself, specifically, the fatty oils contained in both medicinal and everyday preparations. It is enlightening from the perspective of the late 20th and early 21st century to review this argument advanced by prominent 17th century physicians who answered the question (to their satisfaction) why chocolate drinkers became fat:

"[It is due to the] buttery parts [of the cacao]. . . which fatten [because] the "hot ingredients" of medicinal chocolate serve as a type of pipe or conduit. . . and make it pass by the liver, and the other parts till they arrive at the fleshy parts, where finding a substance which is like and confortable to them, to wit 'hot and moist'. . . convert themselves into the substance of the subject they augment and fatten it" (Dufour 1685, pp. 115–116).

Nicolas de Blégny published his treatise in 1687 entitled, Le Bon Usage du thé, du Caffé, et du Chocolat pour la Preservation & pour la Guerison des Maladies. The third part of his interesting text considered chocolate, its preparation, composition and various properties:

"Taken with the vanilla syrup at different times of the day and especially in the evening, at least two doses, it [chocolate] has an effect equally. . . to suspend the violent cause of rheumatoids and inflammation of the lungs, and to dull the irritation and ferocity which incites cough [and] to put out the inflammations of the throat and lungs [*pleure*], to calm the different courses of insomnia and to restore the fatigue of preachers and other persons who frequently engage in public activities. Prepared the same way, it is a great help to deaden the spleen overflow [bile] which provokes vomiting and which makes the stomach bilious, [leading to] death-producing diarrhea and dysentery [*le colera morbus*]. It is also a very effective remedy [to reduce] ethic fever [*éthique fiévre*], and I want to say [it is effective in relieving] dryness of the chest which leads to pulmonary disease, which we can [use chocolate] to stop the advancement to soften the infirmity, especially in the place of water we prepare [the chocolate] with milk which we must skim before boiling. If we prepare it with the 'syrup of coins' [*sirop de coins*] to which we have added some drops of tincture of gold, or oil of amber, it [becomes a] very efficient [medicine] to relieve] indigestion and heart palpitations so well that in need, it might serve all together as a sufficient nourishment and as a remedy in [treating] more familiar illnesses" (Blégny 1687, pp. 282–285).

In his The Natural History of Chocolate (1719), D. de Quélus considered that chocolate was a temperate food, nourishing, easy to digest and essential to good health. He noted that women living in the Americas, subject to "the whites" (i.e., leukorea) were "cured of this distemper, by eating a dozen cocao [sic] kernels for breakfast every morning (Quélus 1719, p. 44). Quélus remarked that drinking chocolate repaired "exhausted spirits" and "decayed strength" and that the beverage preserved health and prolonged the lives of old men (Quélus 1719, p. 45). He noted that drinking cacao quenched thirst and was refreshing and "feeding" and that it procured "easy quiet sleep" (Quélus 1719, p. 46). Quélus described the case of an unfortunate woman who after an accident to her jaw could not chew and therefore "did not know how to subsist." She was encouraged by her physician to take:

". . . three dishes of chocolate, prepared after the manner of the country, one in the morning, one at noon, and one at night. . . [only] cocao [sic] kernels dissolved in hot water, with sugar, and seasoned with a bit of cinnamon. . . [and] lived a long while since, more lively and robust than before [her] accident" (Quélus 1719, p. 46).

Elsewhere, he wrote that an ounce of chocolate "contained as much nourishment as a pound of beef" (Quélus 1719, p. 48). Quélus summarized the prevailing controversy regarding the digestibility of chocolate and concluded:

"Digestion of chocolate is soon brought about without trouble,

without difficulty, and without any sensible rising of the pulse; the stomach very far from making use of its strength, acquires new force. . . I have seen several persons who had but weak digestion, if not quite spoiled, who have been entirely recovered by the frequent use of chocolate" (Quélus 1719, p. 50).

He mentioned that should agitated persons consume chocolate, they would perceive an effect nearly instantly, that faintness would cease and strength be recovered before digestion had begun (Quélus 1719, p. 51). Waxing enthusiastic about the positive medical properties of chocolate, Quélus wrote:

"Before chocolate was known in Europe, good old wine was called the milk of old men; but this title is now applied with greater reason to chocolate, hence its use has become so common that it has been perceived that chocolate is with respect to them, what milk is to infants" (Quélus 1719, p. 56).

Expanding on a popular view that chocolate could be a "sole" food, Quélus provided testimonial evidence that chocolate was more than beneficial for health and that its use extended longevity:

"There lately died at Martinico a councilor about a hundred years old, who, for thirty years past, lived on nothing but chocolate and biscuit. He sometimes, indeed, had a little soup at dinner, but never any fish, flesh, or other victuals: he was, nevertheless, so vigorous and nimble, that at fourscore and five, he could get on horseback without stirrups" (Quélus 1719, p. 58).

Quélus concluded his medical observations on chocolate with a phrase that has rung down through the centuries: *In multis eseis erit infirmitas, propter crapulam multi obierunt: Qui autem abstinens est, adjieit vitam* [Plentiful feeding brings diseases, and excesses has killed numbers; but the temperate person prolongs his days] (Quélus 1719, p. 59). But lest one consider Quélus to be a seer, a prophet of medical/nutritional theory, it should be noted that he also concluded that chocolate could be used as a vehicle when it became necessary to cure patients with "powders of millipedes, earthworms, vipers, and the livers and galls of eels" (Quélus 1719, p. 73). He also noted an instance when during Lent, there was insufficient availability of olive oil, whereupon chocolate "oil" was substituted and was well received (Quélus 1719, p. 76). Quélus noted further that "chocolate oil" served as:

"[an] easer of pain, it is excellent, taken inwardly, to cure hoarsenes, and to blunt the sharpness of the salts that irritate the lungs. . . [when] taken reasonably, may be a wonderful antidote against corosive poisons" (Quélus 1719, pp. 76–77).

He wrote that "chocolate oil" when applied externally to the body could "clear and plump" the skin when it "[was] dry, rough. . . without making it appear either fat or shining. . . [and] there is nothing so proper as this to keep [one's] arms from rusting, because it contains less water, than any other oil made use of for that purpose" (Quélus 1719, pp. 77–78). Elsewhere, Quélus wrote that "chocolate oil" was used to cure piles, sometimes as a sole ingredient, in other instances mixed with lead dross reduced to a fine powder and mixed with the oil, and in other instances, the "chocolate oil" was blended with millipede powder, "sugar of lead" and laudanum. Beyond hemorrhoids, however, oil of chocolate was also used to ease the pain of gout (Quélus 1719, p. 78).

The famous naturalist Carl von Linné (Linnaeus) examined the medicinal uses of chocolate in his 1741 monograph Om Chokladdryken. He wrote that chocolate was an excellent source of nourishment and that it cured many ills. He identified three categories of illness that responded well to chocolate therapy: wasting or thinness brought on by lung and muscle diseases, hypochondria and hemorrhoids. Linnaeus wrote further that chocolate was an effective aphrodisiac (von Linné 1741).

Vincente Lardizabal wrote Memoria Sobre las utilidades de el Chocolate para Precaber las Incomodidades in 1788 and discussed how chocolate drinking countered the bad effects from mineral water and how chocolate could be used, medicinally, to control vomiting. He wrote that "stagnant humors" were cleared after drinking chocolate and reported the case of a phlegmatic patient of his who suffered daily from severe belching and flatulence but was cured after drinking a small cup of chocolate each morning (Lardizabal 1788, pp. 16–18).

Alexander Peter Buchan wrote Medicina Domestica ó-Tratado de las Enfermadades Quirurgicas y Cirugia en General (1792) and described how women in labor should be served chocolate. He identified additional medicinal uses of chocolate: among them, chocolate should be administered to prevent fainting brought on by blood loss. Buchan also suggested that sick persons should eat frequently and that their diet should consist of light, nutritive foods "such as chocolate" in small portions (Buchan 1792, p. 224).

Antonio Lavedan published his influential treatise Tratado de los Usos, Abusos, Propiendades y Virtudes del Tabaco, Cafe, Te, y Chocolate in 1796. This important work contained a wealth of medicine-related information regarding the use of chocolate. He wrote that chocolate was most beneficial if drunk only in the morning, and he cautioned against its use and urged a prohibition of chocolate drinking in the afternoon (Lavedan 1796, p. 223). Lavedan wrote extensively on "health chocolate" (*chocolats de santé* or *chocolats thérapeutiques du médicinaux*) and concluded:

" 'Health Chocolate' made without aromas is preferable and has the properties to awaken the appetite in those who do not usually drink it. Chocolate is good sustenance for those who typically drink it in the morning. . . . The chocolate drink made with lightly toasted cacao with little or no aromas, is very healthy for those who are suffering from tuberculosis and consumption. It protects against obstructions, and if they are able to recover, cures sufferers of tuberculosis who seek this remedy on time, by replacing the loss of nutrient balsams that have stolen the consumptive warmth, dominating and sweetening the feverish acid that the spirits absorb. . . . Chocolate is a food that repairs and fortifies quickly and therefore it is better for phlegmatic persons that need stimulation. . . . It is possible for chocolate alone to keep a man robust and healthy for many years, if he takes it three times a day, that is, in the morning, at noon and at night, and there are examples of this. . . Without help from other food, chocolate can prolong life through the great nutrients that it supplies to the body and it restores strength, especially when one mixes an egg yolk with some spoonfuls of meat broth. It is a good stomach remedy, repairing all weaknesses, afflictions, indigestion, vomiting and heart pain, freeing the intestines of flatulence and colic. Those who have weakness of the stomach because of diarrhea or because of some purging substance will experience relief with the chocolate drink. It strengthens those suffering from tuberculosis, who are without hope, and its daily use reestablishes their health more than what could have been expected. For gout or podagra it is of great use—those suffering from gout should drink this nectar of the gods without worrying about any ill effects, for it will be very beneficial to them.. . it is a universal medicine. . . not only for preserving health, but to undo many ills, and for this reason it strengthens and increases natural warmth, generating more spirituous blood. It vivifies the substance of the heart, diminishes flatulence, takes away obstructions, helps the stomach, and awakens the appetite, which is a sign of health for those that drink it. It increases

virility, slows the growth of white hair, and extends life until decrepitude. To people of any age, including the youngest, it can be given" (Lavedan 1796, selections from Chapter V., pp. 221–237).

After the death of Anthelme Brillat-Savarin in 1825, his writings were assembled and published under the title Handbook of Gastronomy, sometimes as The Physiology of Taste (Physiologie du Goût). While best known for his aphorisms "animals feed, man eats; tell me what you eat, and I will tell you what you are; and the destiny of nations depends on how they nourish themselves," Brillat-Savarin also penned an important chapter on medicinal uses of chocolate. He wrote that "chocolate, when properly prepared, is a food as wholesome as it is agreeable. . . it is nourishing, easily digested. . . and is an antidote to the [inconveniences]. . . ascribed to coffee" (Brillat-Savarin 1825, p. 95). Brillat-Savarin wrote that chocolate was most suitable to those "who have much brain work to do, such as clergymen and lawyers, and especially for travelers; in short. . . it suits the weakest stomaches. . . and is the last resource in affections of the pylorus" (Brillat-Savarin 1825, pp. 95–96). He urged consumers to drink a cup of good chocolate after breakfast, as this facilitated digestion (Brillat-Savarin 1825, p. 97). Brillat-Savarin recommended a medicinal form of chocolate, one mixed with ground amber dust, as a remedy for hangover, when the "faculties [are] temporarily dulled, and during periods of 'tormented thinking' " (Brillat-Savarin 1825, p. 97). He also identified several additional forms of medicated chocolate; for example, persons with delicate nerves were to consume chocolate mixed with orange flower water, and when the patient's nerves were irritated, chocolate mixed with almond milk was prescribed (Brillat-Savarin 1825, p. 100).

Thomas J. Graham wrote his Medicina Moderna Casera in 1828. This treatise on modern home medicine included a range of popular treatments that sometimes included cacao as an ingredient; for example:

For asthma. "This diet should be uniformly light and easy to digest, consisting mainly of a fresh food of animal origin, such as eggs, as well as bread, tea and chocolate" (Graham 1828, p. 231).

For indigestion or dyspepsia. "For breakfast and in the afternoon, one should drink tea, cacao or light chocolate, with biscuits, bread and butter, or dry toast. Rolls, and any other type of spongy bread are bad, and it is important to refrain completely from coffee" (Graham 1828, pp. 412–413).

Drs. S. Milne Edwards and P. Vavasseur wrote their Manual de Materia Medica ó Sucinta Descripcion de los Medicamentos in 1835. They briefly comment on cacao butter and describe the cacao tree, the beans and both pleasurable and medicinal uses of chocolate:

"The cacao, after having been toasted, serves to make chocolate, which has wide use as a food. With regard to the oil, it is used as an emollient, in the flegmasias of the digestive, respiratory and urinary organs. It is often useful in cases of cancer of the stomach. Externally, it is applied to hemorrhoid tumors, and on chapped lips and nipples" (Milne Edwards and Vavasseur 1835, pp. 339–340).

Auguste Saint-Arroman published his influential work Coffee, Tea and Chocolate: Their Influence upon the Health, the Intellect, and the Moral Nature of Man in 1846. From this intriguing document, we learn a variety of chocolate-related recipes; that chocolate could be made from roasted cacao, sugar and aromatic substances, such as ginger, pimento, cloves and (sometimes) vanilla and cinnamon; and that in Spain, a common form of chocolate was prepared by adding the bulb of the root of arachis or earth pistachio—a plant known in English as the peanut (Saint-Arroman 1846, p. 82). This passage represents an early mention of the peanut in European literature and is one of the earliest to suggest blending chocolate with peanuts. Still, the preparation was not perceived as an everyday item, for Saint-Arroman concluded that "such a chocolate must be very heavy on the stomach" (Saint-Arroman 1846, p. 82).

Throughout his manuscript, Saint-Arroman encouraged the use of chocolate as part of medical treatment and healing. After drinking chocolate, he also recommended drinking a glass of water (Saint-Arroman 1846, p. 84). He argued that chocolate was suited to the aged, to the weak and to worn-out persons but that it was injurious to the young and to those with liver conditions (Saint-Arroman 1846, p. 85). Saint-Arroman identified several varieties of medical chocolate; one, ferruginous chocolate, was considered:

"Beneficial to women who are out of order, or have the green sickness, is prepared by adding to the paste of chocolate iron in the state of filings, oxide or carbonate" (Saint-Arroman 1846, p. 86).

He also held that chocolate exerted an effect on the moral nature of consumers and suggested that chocolate paste could not affect the brain, if the stomach digested it easily, that chocolate was a nourishing "aliment," but if given at an improper time might cause poor vision (Saint-Arroman 1846, p. 87).

An archival document entitled Semana de las Señoritas Mexicanas (dated to 1851) identified chocolate as a general food to administer to those convalescing from illness. This medicinal form was prepared by mixing chocolate with pepper, sugar and wine until the product achieved a pasty consistency, then, the mixture was diluted with boiled water and served.

Auguste Debay wrote Les Influences du Chocolat du thé et du Café sur l'Economie Humaine in 1864. He provided recipes for medicinal, healing chocolates (*chocolats de sante*) that combined cacao beans of different geographical locations with refined powdered sugar (Debay 1864, p. 58). For patients suffering from general debilities, weak stomach and nervous gastrointestinal distress, Debay recommended a formula that consisted of different varieties of cacao beans, blended with wheat gluten (Debay 1864, p. 60). Several "restorative" (*analeptique*) forms of chocolate were prepared using cacao beans ground and mixed with a variety of ingredients, including ground cinnamon, gum, sugar and tincture of vanilla (Debay 1864, pp. 86–87). Other medicinal chocolates included various combinations of cinnamon, iron hydrate, iodine, ground lichen, quinine extract, starch and sugar (Debay 1864, pp. 88–89). Chocolate also was a primary ingredient in an antihelminthic (vermifuge) prescription that was combined with calomel, cinnamon, oil of croton and sugar (Debay 1864, p. 90). Medicinal chocolate was used to treat syphilis, where the prescription called for balm of "Pérou" [?], aromatic cacao, sugar, and an unidentified sublimated corrosive, to be dissolved in alcohol (Debay 1864, p. 91).

Debay concluded his treatise by providing opinions and testimonial evidence from distinguished physicians and scientists of his era regarding the positive effects of chocolate as a nutritious food (*aliment*). The physician to the King of France, Dr. Alibert, reported that chocolate was "*très-salutaire*" (very healthful) for persons suffering from weakness and exhaustion. The physician to the King of Prussia, Dr. Huffeland, stated that chocolate was useful to treat persons who were excitable, nervous or violent and that medical chocolate could combat fatigue and debilitation and improve the life of invalids. Dr. Huffeland recommended chocolate for patients with chronic intestinal distress and praised its use by women who wanted to lactate. Debay also quoted "le grand naturaliste" (Baron

Georges Lépold Chrétien Frédéric Dagobert Cuvier), who cited the ability of chocolate to help the emaciated (Debay 1864, pp. 101–108).

Jose Panadés y Poblet wrote his influential La Educacion de la Mujer in 1878. In this extensive book, he reviewed the history of cacao, identified it as the national food of Mexico and mentioned the formula for the *chocolate de la salud* (chocolate of health), which consisted of cacao, sugar and (secret) aromas (Panadés y Poblet 1878, pp. 187–188). He cautioned that "falsification" of chocolate could transform this "pleasant and useful food into an expensive and unhealthy drug" (Panadés y Poblet 1878, p. 190). While he extoled the merits of chocolate, Panadés y Poblet commented that:

"The digestibility of the chocolate is a subject of its history with many points of view. Some affirm that it is digestible; others deny it. This is simply due to the fact that neither chocolates nor stomaches are the same" (Panadés y Poblet 1878, p. 191).

He argued further that chocolate served to convalescents or to persons with "delicate stomaches" should be prepared with water but concluded that chocolate was nutritious if consumed in small quantities, capable of "repairing the losses due to work, pleasures, and staying up late at night" (Panadés y Poblet 1878, p. 192).

Pedro Felipe Monlau produced an early "how-to" manual entitled Higiene de Matrimonio: El Libro de los Casados in 1881. This tract on health-related issues for married couples included the observation that "cacao paste and cocoa butter enhances sexual desire" (Monlau 1881, n. p.)

The Manual del Farmacéutico published in Mexico in 1881 and 1882 provided a recipe for *chocolate de salud* (chocolate of health) that consisted of Caracas and Maracaibo cacao (3000 grains of each) and 5000 grains of powdered sugar with 30 grains of powdered cinnamon (pp. 202–203). Recipes were also given in which chocolate was featured as an administrative vehicle for medicines or to mask unpleasant flavors. To create purgatives, ground cacao was combined with *Convolvulus scammonia* (scammony) and *Convolvulus jalapa* (jalapa), whereas "mineral-based chocolates" contained calcinated magnesia as well as iron powder fillings as active ingredients (Manual del Farmacéutico 1881, pp. 202–203).

Other uses of chocolate identified in the pharmaceutical manual included the preparation of suppositories prepared from cacao butter, glycerin, white wax and sometimes aloe powder. Antihemorrhoid suppositories were prepared using cacao butter, cocaine hydrochlorate and ergot. A "calming suppository" (*supositorio calmante*) was made of cacao butter, belladonna extract and laudanum (Manual del Farmacéutico 1882, pp. 354–356).

Jules Rengade wrote La Vida Normal y La Salud in 1886 and noted that chocolate was always a calmative and that in some countries, such as Italy and Spain, "entire populations consume it everyday in a quantity sufficient so as not to need much other food" (Rengade 1886, p. 202). He also noted that "chocolate is more a true food than a condiment. [It is] very agreeable for the palate and very nutritious, its digestion is, however, somewhat difficult because of the great quantity of fatty material that it can contain" (Rengade 1886, p. 91).

In 1888, Gustavo Reboles y Campos translated into Spanish the French treatise Higiene Therapéutica: La Higiene Alimenticia by Georges Octave Dujardin-Beaumetz. In this work, Dujardin-Beaumetz offered a range of positive and negative views regarding the therapeutic role of chocolate. In one passage, he provided instructions on how to force-feed patients to cure different illnesses:

"One can use mixes of flour, lentils and meat powders in the form of soups. But it is preferable to mix this powder with chocolate or with liqueurs, making a mix that is known as meat powder 'grog' " (Dujardin-Beaumetz, in Reboles y Campos 1888, p. 183).

Mariano Villanueva y Francesconi wrote the Arte de Hacer Fortuna: 5000 Recetas de Artes, Oficios, Ciencias y de Familia in 1890. This popular book included specific recipes and discussions on health and home medical treatments that commonly included cacao as ingredients; for example:

Recipe 1340. "[If suffering from] anemia, convalescence, chlorosis, [or] cancerous diseases [do the following: eat] soups without fat, red meats, roasts, beefsteak and roasts on the broiler. . . wild game and fowl, like partridge, duck, pheasant, woodcock, etc. . . . avoid coffee and tea. . . chocolate is preferable.. . no salads. . . avoid acids and alcoholic beverages" (Villanueva y Francesconi 1890, p. 329).

In *recipe 1345*, chocolate was identified among a range of ingredients (ground melon/pumpkin seeds, ground almonds, milk of sweet almonds) used to prepare an emulsion to counter diarrhea (Villanueva y Francesconi 1890, p. 333).

Mariano Villanueva y Francesconi also wrote El Médico y la Botica en Casa in 1897 and touted the value of chocolate as a primary food source. He wrote that chocolate should be a breakfast food for children because of its nutritious qualities and that the ideal breakfast would consist of "a little chocolate and a little glass of milk, or a custard or also toasted bread with butter" (Villanueva y Francesconi 1897, p. 23).

Chocolate in early 20th century medical accounts

Dr. J. Millam Ponce wrote his La Medicina en el Hogar, Pequeño Tratado de Medicina Doméstica in 1902, a work directed to the general public to permit the preparation at home of "indispensable medicines" to cure illnesses. He explained that when nursing infants become ill, the wet nurse should go on a light diet that consisted of coffee with milk or chocolate (Ponce 1902, p. 91). Ponce also described use of chocolate for another common ailment, hemorrhoids, for which cacao butter suppositories were recommended (Ponce 1902, p. 123).

Shortly after the turn of the 20th century, medicinal uses for chocolate products such as cacao butter were still being discussed by scholars. According to one source, Ensayos Sencillos y Prácticos de los Principales Medicamentos Galénicos, cacao butter was frequently used as a main ingredient in ointments, along with pig lard, tallow, wax, oil of sweet almonds, olive oil, vaseline and lanolin (Anonymous 1904).

Juan Bardina wrote Higiene Moderna: Manual Hispanoamericano in 1905 and discussed the healthful use of foods. He listed cacao as a fruit and cautioned that candy bars of this era were often wrapped in silvered paper, which he stated was toxic. Bardina recommended that an ointment prepared from one part cacao butter, one part white wax and four parts oil of sweet almonds be applied to the breasts of nursing women who developed sores or abscesses (Bardina 1905, p. 307).

An account on medical uses of chocolate appeared in the Diccionario de la Moda Elegante, Vocabulario Usual y de la Salud, published in 1906 (Anonymous). The text related that the cacao tree contained seeds, or "almonds," that contained a whitish oil (cacao butter) used to prepare suppositories that contained belladonna or sometimes ergot. Cacao butter also was recommended as a skin lubricant and to heal cracked lips and could be used as an emollient to treat bronchitis and chronic catarrh (Anonymous 1906, p. 338). Elsewhere in the same volume, the authors concluded that chocolate was a good food, but difficult to digest if prepared with milk, and they

cautioned children and "very nervous people" not to drink chocolate as a beverage to "avoid excitation" (Anonymous 1906, p. 385).

In 1912, Curso Elemintal was published; it provided basic information on the physical and natural sciences, natural history and hygiene. In this widely distributed work, whose authors are identified only as "several professors," chocolate as a beverage was praised as a "complete food like bread and milk" but was not considered healthful when eaten in either candy or cake forms (Varios Profesores 1912, p. 4).

Medicinal uses of chocolate: A synthesis

Indigenous, Colonial Era and early Modern Period texts reveal that cacao, or chocolate, has long played important roles as a medicine or as vehicles to administer medicinal products. In some manuscripts, cacao/chocolate is touted and praised as useful for a broad sweep of medical complaints; in other documents, chocolate beverages are recommended for a narrow range of quite specific ills; and in still other accounts, chocolate was not the central element but was used to mask strong or irritating flavors or served as a "binder," in which more active ingredients could be readily combined and more easily administered to patients (Table 2).

Throughout the historical period, three consistent medicine-related uses for cacao/chocolate can be identified. First, there are numerous accounts that the use of chocolate produced weight gain in consumers. Ancient, colonial and early modern physicians regularly recommended or prescribed chocolate with the specific purpose of adding or restoring "flesh" to emaciated patients although the quantities of chocolate needed to effect weight-gain are not discussed (Debay 1864, pp. 101–108, Hernández 1577, p. 305; Hughes 1672, p. 146; Linné [Linnaeus] 1741; Saint-Arroman 1846, p. 85). Second, the medicine-related texts commonly prescribed chocolate to patients who suffered from two diametrically opposed conditions. In some instances, chocolate was recommended to patients to stimulate their nervous systems, especially those identified as feeble, who lacked energy, or who suffered from "lassitude," exhaustion, or apathy—symptoms that appear from the perspective of the 21st century to mirror various aspects of depression (Brillat-Savarin 1825, pp. 95–97, Debay 1864, pp. 101–108, Quélus 1719, p. 45, Morton 1981, Thompson 1956). In other instances, however, chocolate was recommended to patients identified as "overstimulated" or who suffered from hyperactivity, because in the minds of the physicians who so prescribed it, chocolate produced a calming, soothing, almost tranquilizing effect (Brillat-Savarin 1825, p. 100, Debay 1864, p. 60, 101–108, Quélus 1719, p. 51, Rengade 1886, p. 91). The third commonality in the texts was the view that regular chocolate drinking improved digestion and elimination, that chocolate was an effective prescription that countered "weak or stagnant stomaches" (Brillat-Savarin 1825, pp. 95–96, Colmenero de Ledesma 1631, p. A4, Quélus 1719, pp. 44, 50, Farfan 1592, Hurtado 1645, Vol. 1, 2:13, Panadés y Poblet 1878, p. 191, Rengade 1886, p. 91, Saint-Arroman 1846, p. 86, Stubbe 1662, pp. 53–54, 84–86); that chocolate stimulated the kidneys and produced or hastened urine flow (Colmenero de Ledesma 1631, p. A4, Gage 1648, p. 108, Hughes 1672, pp. 153–154, Stubbe 1662, pp. 53–54, 58–60, 84–86) or that chocolate (because of its fat content) improved bowel function, softened stools, and thereby reduced and sometimes "cured" the bane of hemorrhoids (Quélus 1719, p. 78, Farfan 1592, Linné [Linnaeus] 1741, Manual del Farmaceutico 1881 and 1882, pp. 354–356, Milne Edwards and Vavasseur 1835, pp. 339–340, Morton 1981, Ponce 1902, p. 123, Thompson 1956).

Two further conclusions can be drawn. Chocolate was regularly served as a pharmacological "binder" with which 16th through early 20th century physicians could effectively administer a broad range of drugs to combat specific diseases. In the Florentine Codex (1590), for example, de Sahagún relates a cure for diarrhea that includes *Yiauhtli* (unknown root) as the primary medicinal ingredient that "one is to drink in chocolate" (p. 192) and the use of ground "giant's bones" mixed into the chocolate drink to cure bloody diarrhea (p. 189–190). At least one modern-day chocolate enterprise can trace its roots to the use of chocolate as a medicinal binder rather than a primary curative. The enterprising pharmacist Jean-Antoine-Brutus Menier created a chocolate factory in France in 1825 in which "the idea of coating his more revolting medicines with chocolate, . . . the various powders were ground down and made more palatable"(McGuire 1994, p. 98) The Menier sons continued their father's efforts but relied on the then more lucrative business of candy manufacture rather than medicinals (McGuire 1994).

Still, physicians and pharmacologists viewed chocolate as more than just a binder, or as a popular "flavor." Beginning in the 19th and extending through the 21st centuries, accounts appear in which chocolate-related concoctions were prepared and used in a medical or pharmacological situation specifically for their healthful properties. These preparations appeared under various titles (*cacao du sante*, *cacao de salut* or health chocolate) and consisted of cacao powder obtained from several types of beans grown in different geographical regions of Central America and northern South America, usually combined with granulated sugar and additional ingredients deemed by the manufacturer/preparer to be salutory.

Postscript

The continued use of cacao as medicine by indigenous peoples of the Americas was reviewed by Eric Thompson (1956) and Julia Morton (1981). Numerous additional accounts and documents reveal medicinal uses of cacao throughout Central and South America in which different components of the tree are still used today, in the late 20th and early 21st century, including cacao bark, fat, flowers, fruit pulp and leaves (see Table 2).

One of the present authors (S.E.) recently conducted ethnographic fieldwork among the Mixtec in 1999 and 2000 and found that in several regions of Oaxaca, Mexico (including various communities of the Central Valley of Oaxaca, the Sierra Norte Juárez and La Mixteca Alta, Western Oaxaca), many of the Mesoamerican and Colonial practices and beliefs relating to chocolate continue to survive. Beliefs about the nutritional properties and sacred nature of chocolate make it one of the principle foods consumed in Oaxaca on a daily basis. Religious ceremonies, fiestas and other special events are also occasions in which to partake of chocolate.

In parts of Oaxaca today, chocolate is commonly prepared by adding sugar, cinnamon and almonds to the cacao beans, although other ingredients, such as aromatic substances and eggs, may de added. Although it is now widely believed among many curanderos (traditional healers) that chocolate is not good for certain persons because of its fatty substances and *pesadez para el estómago* (heaviness on the stomach), just as Auguste Saint-Arroman concluded in 1846, still others use chocolate for certain ailments. For example, in the Sierra Juárez, we found a traditional healer who uses cacao beans to prepare a cure for bronchitis. This may well be for the oils as

is described in the Diccionario de la Moda Elegante, Vocabulario Usual y de la Salud (Anonymous 1906). In the same region as in El Istmo in Eastern Oaxaca (as we were informed by Istmeños, who reside in the capital of Oaxaca), people are encouraged to eat chocolate or cacao beans as a preventative against the effects caused by the venom of a scorpion, bee or wasp. Chocolate is also used as a cure in these situations and is eaten immediately after the insect's bite to diminish the effectiveness of the venom. In La Mixteca Alta, *curanderos* use cacao to treat *espanto* (also known as *susto* in other parts of Mexico). *Espanto* is an ethnodisease in which a person becomes ill after experiencing a fright. To cure *espanto*, the *curandero* must to go to the exact location at which fright was experienced. At this location, the earth is "fed" cacao beans and other products, such as tobacco, fermented beverages and herbs. Feeding the earth acts both as a form of "payment" to restore wealth to the earth in exchange for healing the patient and to "distract" the mother earth so she will release the patient's spirit so it can be restored to the person. Cacao also continues to be considered as a sacred plant and is often used in ceremonies performed in sacred places, such as caves and mountain entrances. Its use has the same purpose as it has in curing *espanto*: to feed the earth and request from it the restoration of well-being for a person or community.

How is chocolate viewed in a medicinal/nutritional sense in the United States? Harold E. Yuker published an account in 1997 entitled Perceived Attributes of Chocolate. Using a survey questionnaire based upon paired adjectives, 325 respondents (primarily undergraduate students at Hofstra University) rated attributes of chocolate along a 5-point continuum. Results from Yuker's convenience sample provided interesting insights into the perception of chocolate by U.S. college students: 91% of his sample perceived chocolate as sweet, 81% perceived chocolate as fattening, 60% perceived it to be energizing, 54% perceived chocolate as unhealthy and 50% perceived it as good. Women in Yuker's sample reported that they liked chocolate more than did the men. When asked to identify additional adjectives that characterized chocolate attributes, respondents supplied a broad range of terms, including awesome, calming, dangerous, delectable, erotic, heavenly, intoxicating, irresistible, mysterious, non-nutritious, satiating, sexy, sinful, sticky and tranquilizing (Yuker 1997, pp. 35–43).

Chocolate is more than a beverage or confection; chocolate is more than the sum of its interesting phytochemicals. Chocolate is a part of history; chocolate tells the story of people and events from antiquity to the present. Although there may be >1 million plants globally, of these, <500 are domesticated (Grivetti and Ogle, 2000). Of these relatively few domesticated species, perhaps only chocolate (*T. cacao*) and wine (*Vitis vinifera*) have so captivated the imagination of humans for centuries and are thought to possess medicinal and, among some cultures, magical qualities. To taste chocolate, therefore, is to share in a common connection through history, from the time of the Olmec over 3000 years ago to the present, from the frothy cacao beverages prepared at the court of King Moctezuma, to the era of the modern chocolate bar.

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