

Chapter 2

Early History and Origin of the Peanut

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INTRODUCTION

The peanut, *Arachis hypogaea* L., is a native South American legume. At the time of the discovery of America and European expansion into the New World, this cultivated species was known and grown widely throughout the tropical and subtropical areas of this hemisphere. The early Spanish and Portuguese explorers found the Indians cultivating the peanut, among other food plants, in several of the West Indian Islands, in Mexico, on the northeast and east coasts of Brazil, in all the warm land of the Rio de la Plata basin (Argentina, Paraguay, Bolivia, extreme southwest Brazil), and extensively in Peru.

From these regions the peanut, with other New World cultivars, was disseminated to Europe, to both coasts of Africa, to Asia, and to the Pacific Islands. Eventually, it travelled to the colonial seaboard of the present southeastern United States, but the time and place of this introduction was not documented. However, any claim that the peanut was found by the early colonists either in Virginia or at Plymouth cannot be substantiated with botanical records nor by the historical narratives. The "ground nut" which, with fish, sustained Governor Bradford's tiny colony against the famine of that first New England winter was most likely *Apios* species, certainly not the peanut. The "ground nut" found in Virginia also may have been *Apios*, because the account of its collection in uncultivated woodlands clearly excludes the peanut.

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CHRONOLOGICAL HISTORY

This early history is a chronological account (Table 1) of the descriptions and illustrations of the peanut as found in the chronicles and natural histories of the 16th and 17th centuries. No effort is made to discuss the extensive literature of the 18th century.

The Spanish colonization of America began in the island of Hispaniola (now Haiti-Dominican Republic), whence it spread in two directions: by the island of Cuba to the north and west to Mexico, and through New Granada (modern Columbia) and Panama to the south. The colonization of the La Plata region in the far southeastern interior of South America is of an independent character, though belonging to the general history of Spanish conquest.

Before the time of the Spanish colonization, the Incas of Peru, who achieved one of the world's most highly developed agricultural civilizations, cultivated the peanut throughout the long coastal regions of Peru. Garcilaso de la Vega, son of an Incan princess and a Spanish governor of Cuzco, in his history of the Incas (18) describes the peanut as "another vegetable which is raised under the ground, called by the Indians *ynchic*. It is very like marrow, and has the taste of almonds." He records the fact that the Spanish introduced the name *maní* from the Antilles to designate the *ynchic* (peanut) they found growing in Peru.

Of its food and medicinal uses, he writes: "If the *ynchic* is eaten raw it causes a headache, but when toasted it is wholesome, and very good with treacle; and they make an excellent sweetmeat from it. They also obtain an oil from the *ynchic*, which is good for many diseases".

A sociological note is found at the end of Garcilaso's account. "The *ynchic*, is rather a luxury for the rich and the curious in such things than food for the poor, though the common people collect them to present to the rich and powerful".

Bartolomé Las Casas sailed with Ovando the new Governor in 1502 to Hispaniola where he became a planter. Eight years later he became the first priest to be ordained in the New World, where he was a missionary throughout the Spanish lands from 1510-1547. In his "Apologetic History", begun about 1527 in Hispaniola but mostly composed between 1550 and 1563 in Spain, he describes *maní* as an important secondary food plant generally grown by the natives. Although he may have been the first European to encounter the peanut, his book was not published until 1875. The testimony of Las Casas (30) is definite:

"They had another fruit which was sown and grew beneath the soil; which were not roots but which resembled the meat of the filbert nut of Castille. I say, that they were neither more nor less than the filbert nut without the shells, and these had thin shells or pods in which they grew and were covered in a different fashion than the filbert nuts because they were in a manner similar to (as) beans are found in the pods, because these pods were not green nor soft but were dried in the manner in which the pods of the sweet pea or chick pea of Castilla at the time they are ready to harvest, they are called *maní* (Peanut)."[†]

The first written notice of the peanut appears to be that of El Capitan Gonzalo Fernández de Oviedo y Valdés, who came to Santo Domingo in 1513 as superintendent of gold smelting in the American continent. He later became governor of Hispaniola and royal historiographer of the Indies. In 1525 he sent Charles V his *Sumario Historia*

[†]Numbered textual footnotes at end of chapter.

de las Indias, which was printed in Toledo two years later (39A), and in 1535 began publishing his *Historia general y natural de las Indias*. De Oviedo was the first to publish the common Amerindian name *maní* for the peanut, the name still used in Cuba and Spanish South America. In the chapter on the peanut in the 1535 work, he writes (39B):

“Chapter V. — Concerning the *maní* (peanut), which is another fruit and ordinary food which the Indians have on Hispaniola and other islands of the Indies.

“Another fruit which the Indians have on Hispaniola is called *maní*. They sow it and harvest it. It is a very common crop in their gardens and fields. It is about the size of a pine (piñon) nut with the shell. They consider it a healthy food. However, the Christians do not use it unless they are unmarried males or children, or slaves and common people, who do not pamper their taste. It has a very mediocre taste and little substance. Its consumption among the Indians is very common. It is abundant on this and other islands.”²

Although South America is the unquestioned place of original cultivation, it is of significance that this earliest publication documents the wide distribution of this important crop plant that had taken place many years before the discovery of America.

By the 1851 edition de Oviedo's text notes “it is sown and grows underground, which upon pulling by the branches it dries out, or is uprooted and on the runners there are found such fruit located inside pods as in chickpeas, of the size of a filbert which are very tasty when eaten raw or roasted”.³ This statement does not appear in the 1547 text (39C).

Ulrich Schmidt of Straubing in his account of the Spanish conquests of the warm lands of the interior La Plata river basin, 1534-1555, frequently mentions the peanut, *manduiss*, *mandubi*, as a plant of great importance. Schmidt, the first historian of the Rio de la Plata conquest as well as a German mercenary under Don Pedro de Mendoza, describes the peanut, with reference to the year 1542. An expedition under the command of Alvar Nuñez Cabeza de Vaca, up the Paraguay river from Asunción, met the Surucuis Indians who had (46B) “turkish grain (maize) and mandioca and also other roots, such as *mandi* (peanut) which resembled the filbert (or hazel nut).”⁴

The French colonists, sent in 1555 by Admiral Coligny to the Brazilian coast, next became acquainted with the peanut (*mandobi*). Jean de Léry, a Calvinist missionary was a member of the Huguenot colony founded by the Chevalier de Villegagnon in 1555 on a small island in Rio de Janeiro bay. De Léry, who remained in Brazil less than five years, described the peanut quite unmistakably, and *Manobi Lerii* is a frequent taxonomic reference.

De Léry writes (33) that “the savages (Indians) also have fruits called *manobi*. They grow in the soil like truffles connected one to the other by fine filaments. The pod has a seed the size of a hazelnut and a similar taste; it is grey-brown and the hull has the hardness of the pea. Although I have eaten this fruit many times, I cannot say whether the plant has leaves or seeds, since I neither observed nor recorded it.”⁵

There is no documentation for the first purposeful introduction of the peanut into Europe. Useful and exotic American plants were commonly collected and introduced into Europe from the time of Columbus' first voyage. Therefore, it is probable that the peanut was carried to Europe early in the 16th century. However, the earliest recorded introduction appears to be that reported in 1574 by Nicolas Monardes, a Seville physician. Monardes, in describing a nameless subterranean “fruite welche

groweth under the ground", prefaced his chapter by carefully noting "Thei sent me from the Peru . . ."

Monardes evidently did not try to grow the peanut and (like de Léry) he failed to associate the fruit with a plant. His description follows (37):

"Thei sent me from the Peru, a fruite very good, that groweth under the yearth, and very faire to beholde, and of a very good taste in eatyng, this fruit hath no roote, nor doeth produce any plante, nor plante doeth produce it, but that it is growen under the grownde as the Turmas bee growyng under the yearth, whiche are called of the yearth: It is of the greatnesse of half a finger rounde, and roundi about them with a very fair woorke, it is of a baie coullour: It hath within it a little cernell, that when it is drie, it maketh a sounde with in, like to an Almonde: the rinde of it is taunie, and somewhat white, parted into two partes like unto an Almonde. It is a fruite of good savour and taste, and eatyng of it, it seemeth that you eate Nuttes.

"This fruit groweth under the yearth, in the coaste of the River of Maronnon, and it is not in any other parte of all the Indias. It is to bee eaten greene and drie, and the beste wai is to taste it, it is eaten alwaies after meates, as fruite eaten laste of all, because it drieth muche the stomack and leaveth it satisfied, but if you eate much of it then it giveth heavinesse to the hedde. It is a fruite in greate reputation, as well as emongest the Indians as the Spaniardes, and with greate reason, for I have eaten of theim, whiche thei have brought me, and thei have a good taste. It seemeth a temperate fruite."

This description is informative but it can hardly qualify as an adequate botanical description. Monardes' limited knowledge of the peanut led him to assume mistakenly that it grew only along the Rio Marañón. But, we have already seen that it was distributed from the Antilles to the Rio de la Plata and northwest to Peru.

About the time that Monardes thought the peanut occurred only in one river valley in Peru, the Portuguese naturalist Gabriel Soares de Souza claimed the peanut (*Amendois*) "is not known except in Brazil"! Soares de Souza lived in Brazil, 1570-1587, principally in Bahia. He gave a thorough account of the agricultural practices of the Indians, but he also wrote extensively on the natural and political history, the geography, zoology, and entomology of the country, and a long treatise on the ethnography of the Tupinamba Indians in Bahia. Soares de Souza (51) gives the first detailed description of the plant, its cultivation, and artificial curing by smoke drying. His entire chapter follows:

"Chapter 47: In which is stated the nature of the *Amendois* (peanut) and their use.

"We have to pay special attention to the peanut because it is known only in Brasil, which sprout under ground, where they are planted by hand, a hand's breadth apart, the leaves are similar to those of the Spanish beans and have runners along the ground. Each plant produces a big plate of these peanuts, which grow on the ends of the roots and are the size of acorns, and has a hull of similar thickness and hardness, but it is white and curled and has inside each shell 3 and 4 peanuts, which have the appearance of "pinhões" (pine nuts), with the hulls, but thicker. They have a brownish skin from which they are easily removed as with the "pinhões", the inner part of which is white. Eaten raw, they have the same taste as raw chick-peas, but they are usually eaten roasted and cooked in the shell, like chestnuts and are very tasty, and toasted outside of the shell they are better. In one manner or another, this fruit is excessively hot, and produce headache to anyone eating too many of them if they become sick from them. These peanuts

are planted in a loose, humid soil the preparation of which has not involved any male human being; only the female Indian and halfbreed females plant them; and the husbands know nothing about these labors, if the husbands or their male slaves were to plant them they would not sprout. The females also harvest them, and as is the custom, the same ones that planted them; and to last all year they are cured in smoke and kept there until the new crop.

"Portuguese women make all the sweet things from this fruit which are made from almonds, and which are cut and covered with a sugar mixture as confections (Street Urchin's Foot). And also they are cured in long, thin pieces, from which are made "candied pine nuts", and those that are not familiar with them will eat them as that (will not recognize that they are not "pine nuts", but peanuts). February is the right time to plant peanuts, and they are not beneath the ground any longer than May, which is time to harvest the crop, which the females do with a much celebration."⁶

After Cortés conquered Mexico, many reports of the conquest and descriptions of the Aztec civilization, customs, and the natural resources of the land were sent to Spain. Few of these documents are available for study, and the early distribution and use of the peanut in Mexico is not clear. During the mid-sixteenth century, Friar Bernardino de Sahagún, the ethnologist, made a now-famous encyclopedic study (written in 1558-66 in the Nahuatl language) of the Aztecs which was not published until 1829. He had the Indians prepare copious illustrations to clarify his texts, but these illustrations did not reach public circulation until 1905. Sahagún, the first Latin professor of the famous mission College of Santa Cruz de Santiago Tlatelolco, near Mexico City, mentioned the folk-medicine use of *tlalcacauatl* (the Nahuatl name for peanut, from *tlalte* = earth and *cacauatl* = cacao seed) as a poultice for inflamed gums or toothache (45). The prescription is: "The inflammation of the gums can be cured by pricking and applying a little salt which is rubbed on with the finger. For toothaches . . . grind the earthworm with *ocuzote* to make a paste, and apply to the cheek where the pain is, and warm a chile (pepper), and while it is hot press it to the tooth where is hurting, and place a grain of salt in the proper tooth and prick the gum, and put on the place an herb called *tlalcacauatl* (peanut); and if this is not enough, extract the tooth and fill the cavity with salt."⁷ The method of preparation for Sahagún's toothache remedy suggests the capability for making a preparation like peanut butter. Sahagún did not, however, list the peanut among the principal food plants of central Mexico. Nor, is the peanut in the record of the tribute that Montezuma extracted from tribes conquered by the Aztecs.

The peanut apparently was not of great importance in early Mexico, and it may actually have been introduced from the West Indies by the Spaniards as implied by Hernandez (20). If this was so, Krapovickas (26) suggests that the introduction was probably of the Virginia type, evidently the form grown in the Antilles. The compound name *tlacacauatl*, or earth cacao, has been cited as evidence of its late arrival in Mexico. Recent archeological evidence, cited subsequently, clearly shows an antiquity of cultivation in Mexico, but the absence of any other *Arachis* species is substantive evidence that the cultivated peanut is not native to Mexico nor was it domesticated there.

Molina, who was a contemporary of Sahagún, published his Spanish-Mexican Vocabulary in Mexico in 1571 (36). He derives the name for peanut from *tlalli* = earth, *etl* = bean, *cacauatl* = cocoa, or "earth cocoa bean".

José de Acosta, who began his 17-years work as a Jesuit missionary in Peru in 1571, authored the first book printed in Peru. In his "Natural History", he refers to

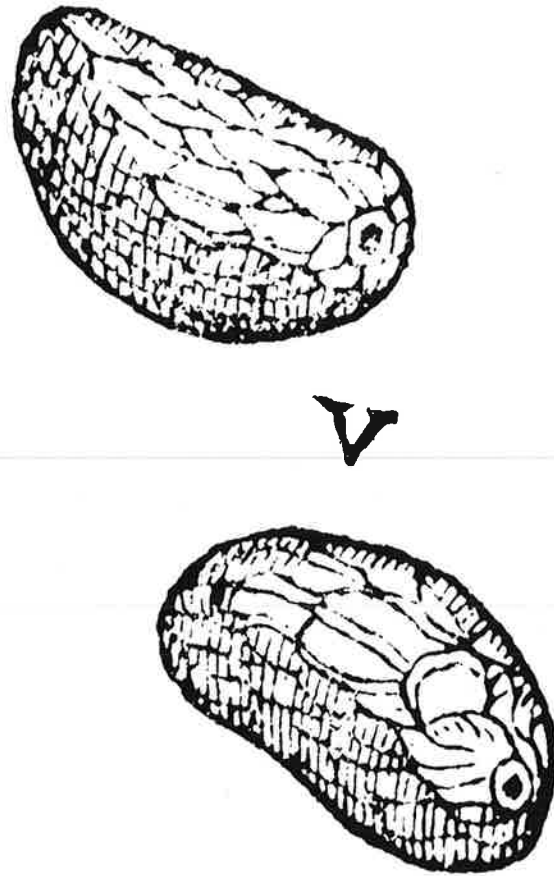


Figure 1. Peanut seed, after Clusius (12). —Courtesy of the Harvard College Library.

the peanut, (in a discussion of other food plants used in South America) and uses the Spanish name *maní*, which we have noted that de Oviedo heard the Indians use a half century earlier in Santo Domingo. De Acosta (1) listed *maní* in book IV, Chap. 18, under "Of divers rootes which growe at the Indies": "But in those countries they have so many divers sortes, as I cannot reckon them; those which I now remember besides papas, which is the principall, there is . . . *maní*, and an infinite number of other kindes".

The book by the Spanish author Monardes was revised in 1574, translated into English in 1577 (37), and published in several other languages by the early 1600's. Clusius brought out a Latin edition of Monardes in 1579, which he reprinted in 1605 (12). In this work Clusius cites Monardes' and de Léry's descriptions of the peanut (12, p. 344-5) and suggests they were probably of the same fruit. Because neither of these writers actually saw the peanut plant, and Monardes and de Léry undoubtedly observed fruits of distinctly different varieties, the question of proper identity, once raised by Clusius, was to preoccupy the natural historians for centuries.

Clusius seems to be the first to draw the peanut seed. His illustration (12, p. 57, fig. V), reproduced as figure 1, shows seeds with a net-veined testa and a pronounced hilum.

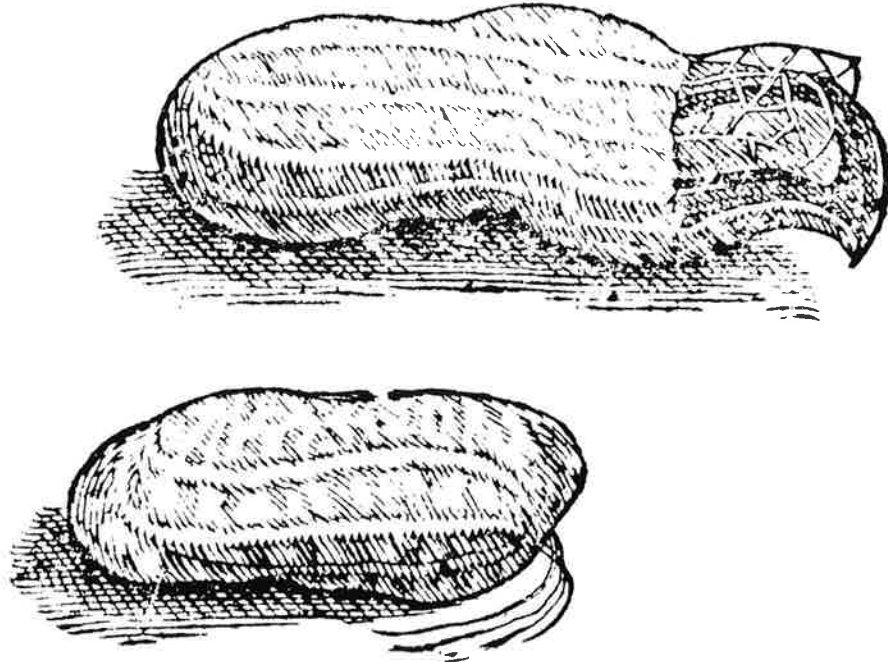


Figure 2. Peanut fruits: beaked pods of a Brazilian variety with 2 or 3 seed per pod. —J. de Laet (29). —Courtesy of the Harvard College Library.

In describing this figure, Clusius says "the kernel has merely been removed from its shell, a strong covering, distinguished by its dark thin membrane and many veins, and cleaving firmly to the kernel; the substance itself is firm, shining white, as if the flesh of the Indian nut is baked, endowed indeed with no odor, but filled with a pleasing taste."⁸

Gaspard Bauhin (4) lists *mani* and *mandues* among the "root" crops for the West Indies and other areas of Hispanic America in 1623, but no recognizable name for peanut appears in his listing of Thomas Hariot's "root" crops from Virginia.

The first figure of the peanut fruits — beaked pods of a Brazilian variety with 2 or 3 seed cavities (see Figure 2) — appears to be that of Jan de Laet (29), Dutch naturalist and editor. De Laet was the managing director ("Prefect") of the Dutch West India Company and had his ship captains bring a variety of plant collections from the New World. More importantly, he was the literary executor for George Marcgrave and, thus, was mainly responsible for editing the 1648 edition of "Historiae rerum naturalium Brasiliae" after the latter author's untimely death in 1644. De Laet's 1625 description follows de Léry's text. In the second Dutch edition, 1630, he first published (29) the illustration of peanut fruits, reproduced as figure 2. This figure also appears in the enlarged Latin edition of 1633 and in the French edition of 1640, with a slightly revised description.

Francisco Hernandez, scientist and personal physician to Philip II of Spain, went to Mexico with unlimited facilities for exploration between 1571 and 1577. His brief discussion of the peanut, written around 1575, and published in Mexico in 1604 or 1615 (20), suggested the possibility of its introduction to Mexico from Hispaniola. Two more complete, independently produced European editions of his work appeared in 1651, and the standard reference is to a 1790 edition (21).

The peanut did not go unnoticed in the natural histories of European authors. Early in the 17th century descriptions and illustrations began to appear regularly in the European literature, and the plant soon became known in botanical gardens. Many of these early naturalists, while they did great and good work for natural history, were compilers, annotators, illustrators, copiers, and editors who systematized the observations of others and were men who themselves rarely saw the plants whose descriptions and figures they put into their great folios. Among the major naturalists to describe and illustrate the peanut during the 17th century were Clusius (12), Bauhini (4), de Laet (29), Parkinson (40), Bauhino (5), Jonstonus (24), Ray (43), and Plukenet (41). In sharp contrast are the works of Marcgrave (35), Cobo (13) and the French priests Dutertre (16), Labat (28) and Plumier (42), whose descriptions and figures were made in most cases from living material observed and collected in nature. Sloane (47, 48) qualifies as a collector but he also had access to vast collections made by others. This fact fits him more properly in the former group.

Parkinson in 1640 described the peanut as "Arachus ΥΙΙΟΓΕΙΣ Americanus⁺, the underground cicheling of America or Indian Earthnuts" (40). Parkinson, a London apothecary and director of the Royal Gardens at Hampton Court, described the peanut (Chap. XI, p. 1069-1070) as follows:

"The Indian Earth-nuts (the figure whereof I give you, together as they are termed to us by them that have brought them to us) are very likely to grow from such like plants as are formerly described, not onely by the name but by the sight and taste of the thing it selfe, for wee have not yet seene the face thereof above ground, yet the fruit or Pease-cods (as I may so call it) is farre larger, whose huske is thicke and somewhat long, round at both ends, or a little hooked at the lower end, of a sullen whitish colour on the outside, striped, and as it were wrinkled, bunching out into two parts, where the two nuts (for they are bigger than any Filbert kennell) or pease doe lie joyning close one unto another, being somewhat long, with the roundnesse firme and solide, and of a darke reddish colour on the outside, and white within tasting sweet like a Nut, but more oily."

For the place of origin, Parkinson states: ". . . and the last groweth in most places of America, as well to the South, as West parts thereof, both on the maine and Ilands." He adds this interesting notation concerning the name of the peanut, ". . . the last is generally called by our *English* sea-men that goe into those parts Earth-nuts, erroneously enough, as they doe most other things that they there meite with." Finally, under the heading, 'The Vertus', Parkinson says, "There is no propertie found out wherewith this is invested that we can understand of as yet." Parkinson's illustration of the *Arachus Americanus* plant and two open shell fruits is reproduced as Figure 3.

The Dutch, having wrested in 1630 the northeastern part of the Brazilian coast between Natal and Porto Calvo from the Spanish, Count Johann Moriz (Maurice) of Nassau-Siegen was appointed in 1636 Governor-General of these possessions. The achievements of Prince Maurice in Brazil from 1636 to 1644 are important. He instituted a scientific exploration of the environs of Pernambuco (or Recife) where he resided. This exploration was made by his body physician, Willem Piso, and the German naturalist George Marcgrave of Liebstad, an intimate friend of Maurice's who lived also at the Count's court. These explorers zealously devoted the years 1638-1641 to their task. The notes and figures collected by them were published, in part, under the editorship of de Laet and have been frequently cited by naturalists.

⁺The Greek letters are (in order): Upsilon, pi, omicron, gamma, epsilon, iota, sigma.

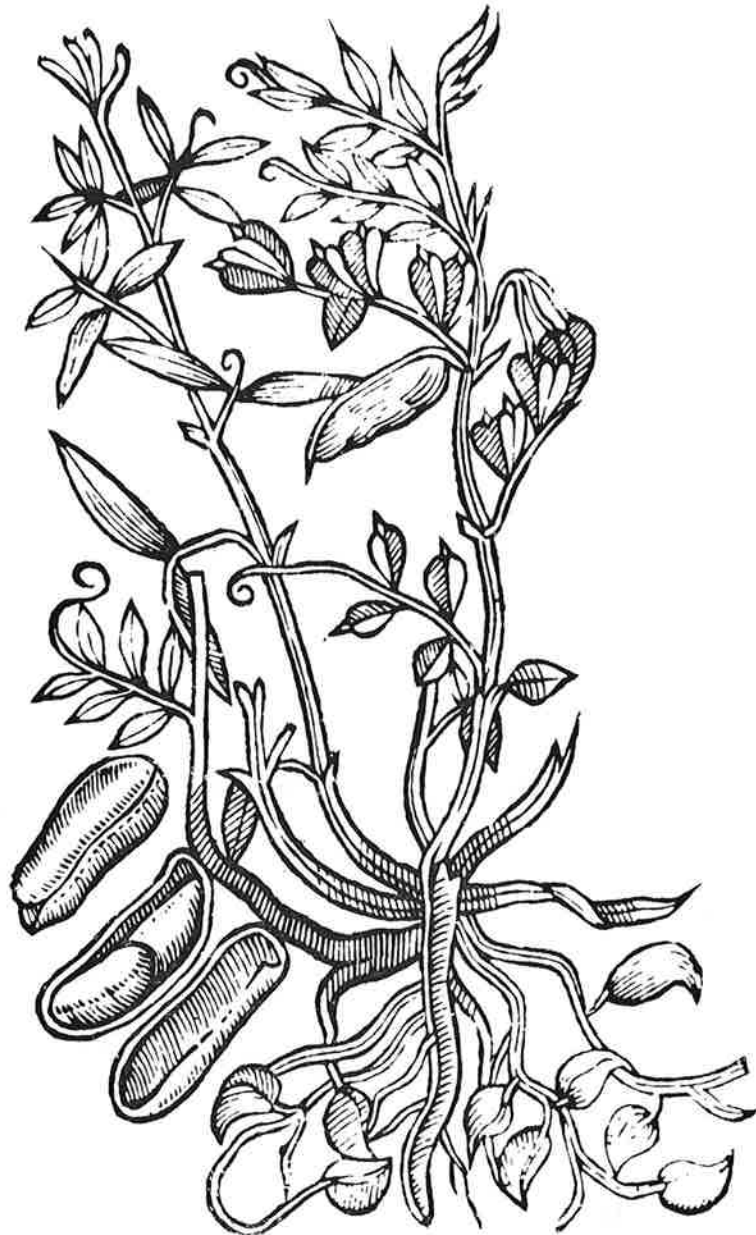


Figure 3. Plant and two open-shell fruits of the "Arachus Americanus, the underground cicheling of America or Indian Earthnuts" figured by Parkinson (40 in 1640). —Courtesy of the Harvard College Library.

Results of their investigations are found in two publications (35) printed in 1648 and 1658. Their "Natural History of Brazil", published at Leyden and Amsterdam in 1648, is composed of two sections. The first, Piso's "De Medicina Brasiliensi", comprises four books. The second section, Marcgrave's "Historiae Rerum Naturalium Brasiliae", consists of eight illustrated books. Marcgrave, who called the peanut by its Brazilian name *Mundubi*, considered the fruits as growing on the roots, an error perpetuated even to the middle of the 20th century, as Smith (49) points out. Marcgrave's illustration, reproduced as Figure 4, shows two-seeded fruits on the half-

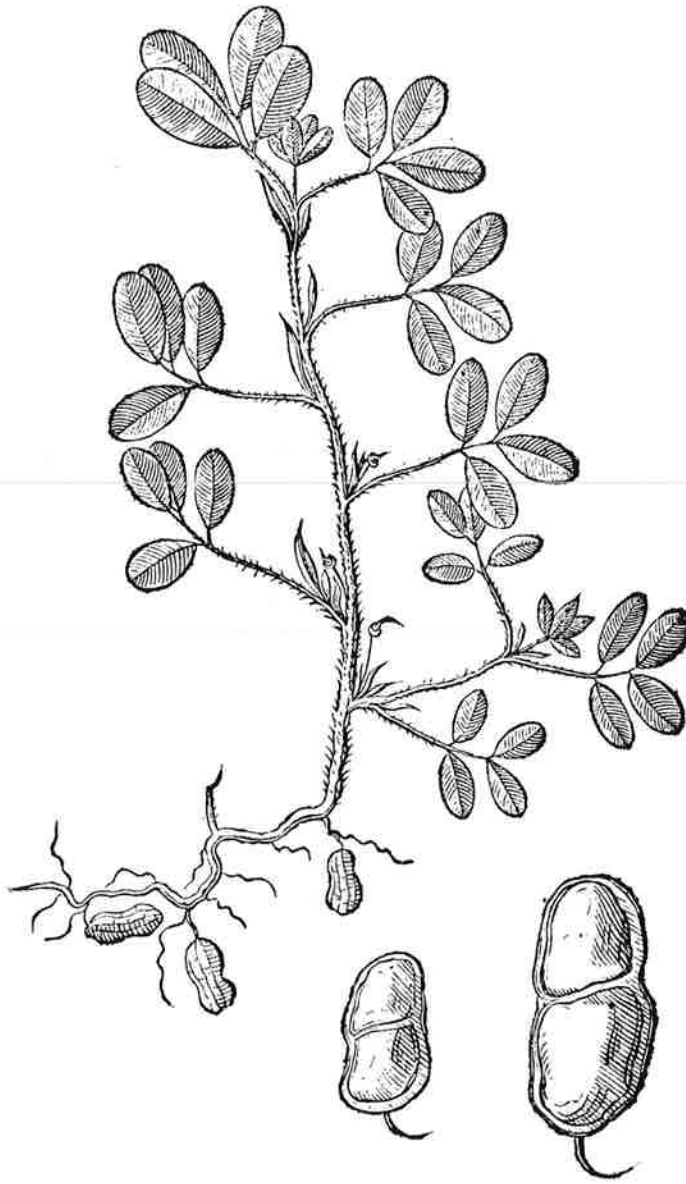


Figure 4. Peanut plant (branch) and two-seeded fruits of Brazilian type figured by Marcgrave in 1648 (35A). —Courtesy of the Harvard College Library.

shell, leaves with 4 leaflets, some opposite, but others alternately disposed. Flowers are shown in the axillary position.

The text of Marcgrave's description translates as follows:

Vol. I, p. 37, "*MUNDUBI* — A Brazilian herb rising to a foot or two feet in height, stem quadrangular or striate, from green becoming reddish, and hairy. From different directions branchlets are sprouted forth, at first as if enclosing the stem and accompanied by narrow, acuminate leaflets (folioles); soon they have a node and are extended three or four inches (digits) in length; in a row; four leaves on any branchlet, two always opposite each other, a little more than two inches long, an inch and a half broad, a pleasing green above,

like trefoil ("trifolii"), becoming a little whitened below, finished with almost parallel, conspicuous nerves and fine veinlets, covered also with scattered hairs. Near the coming forth of the branchlets which bear the leaves, a pedicel appears about an inch and half long, attenuated bearing a little yellow flower, reddish along the edges, consisting of two leaflets (folioles) in the manner of vetch or trefoil. The root of this (plant*) by no means long, attenuated, intricate, filamentous, from which pods are grown from somewhat whitish (to*) grey, of the form of the smallest cucurbits, oblong, fragile, of the size of a balsam fruit ("myrobalanus"): any one contains also two kernels, covered with a rich dark red (dark brown or purple*) skin, the flesh within white, oleaginous, tasting of pistachio nuts, which are recommended baked and are served during dessert. They say that consuming many, however, causes pains of the head (headaches*). The whole fruit being shaken, the seeds rattle within.

"Compare Monardes cap. LX *Anchic* of Peru, the same is called *Mani* in Spanish, as reported lib. X cap. 2 of the description of America."⁹ (*translator's interpretation).

There is apparently no reference to the peanut in Piso's section of the 1648 publication. Ten years later (1658) he published a second edition under the title "De Indiae Utriusque Re Naturale et Medica". The first part of this folio, "Historiae Naturalis et Medicae Indiae Occidentalis", consists of Marcgrave's "Natural History of Brazil" and Piso's "Medicinal Plants" interwoven to form five books. Marcgrave's description of the peanut appears in book IV, Cap. 64, page 256 (35). The illustration in the 1658

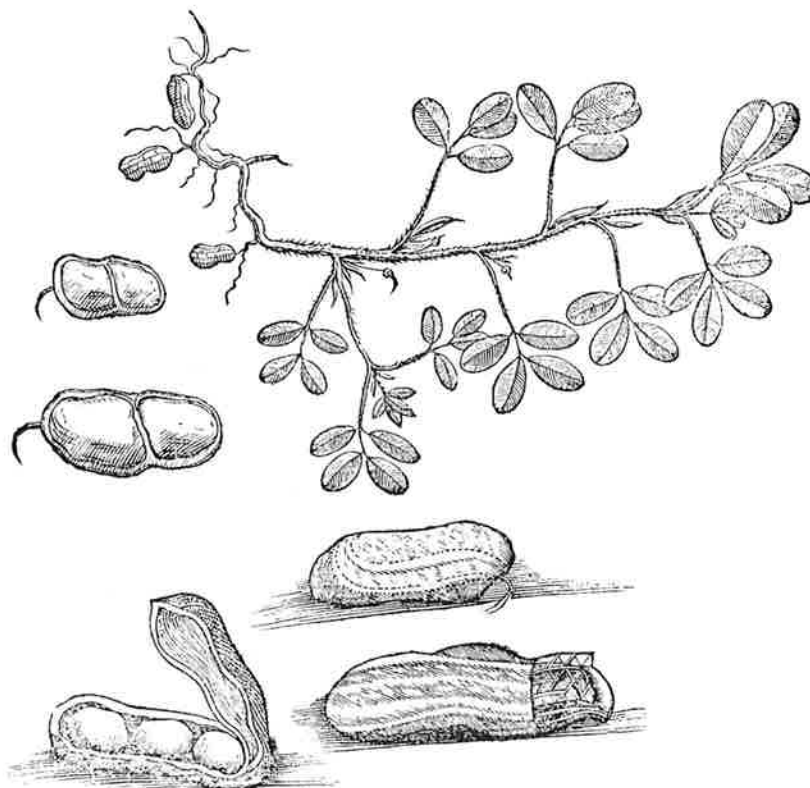


Figure 5. Several peanut fruits and the plant figured in the 1658 edition of Marcgrave (35B) issued by Piso. —(From the Arnold Arboretum copy deposited in the Harvard College Library.)

edition (reproduced as our figure 5) not only shows the plant branch and two pods from the 1648 publication, but adds the two pods from de Laet (29), together with a 3-segmented opened-pod (contrast text figures 2, 4, and 5).

In 1650, Bauhin (5) quoted de Léry's (33) description of the peanut, but questioned Clusius' (12) interpretation of it, and cast doubt on Monardes' (37) description of the fruit! This botanical confusion persisted for three centuries (49).

Father Bernabé Cobo made a classic study of Inca History and, in his "History of the New World" compiled between 1612 and 1653, he describes (13) the peanut as follows:

"The *maní* is a root different from all the other of the Indies, the plant is short and very close to the ground. The fruit of this plant are small roots, each are the size of the small finger somewhat shorter, with a whitish skin very wrinkled and are thin and slender that when slightly pressed between the fingers it breaks; inside of it each root has 2 or 3 seeds very much resembling the pine nuts, covered by a red skin very slender, like that of the almond, which when removed leave the seed very white like the husked pinenut, it divides into two parts like the bean. This root is eaten as a fruit, it has very good taste cooked or toasted; but when eaten raw, it produces headaches, dizziness, and headache (megrim).

"It makes good nougat (candies), confection, and other gifts (treats).

"The way this plant produces fruit is by having thin 'veins' or slender roots (the pegs?) as in sweet potato (Batata) and to uproot it, the plant is pulled and comes out with many little rootlets (pegs?) of *maní* (peanuts). Quite a few are left in the soil but these are gathered by digging around in the soil.

"Foxes are very fond of this fruit, and are seen digging in the ground and getting the fruit. Peanut milk (leche del *maní*), which is obtained as in almonds, can be used much as milk of almond, which mixed with milk obtained from melon or gourd seed causes sleep when there is no sleep . . . "10

Cobo (13) used Amerindian vernacular names to document the peanut's diffusion in pre-Columbian America: "This root is called *Maní* (peanut) in the language of Hispaniola. Mexicans call it *Cacaguante*, and the Peruvian Indians call it *Inchic* in the Quichua language and *Chocopa* in the Aymara language."¹⁰

The first French botanist in the islands of America, to which the French came in 1625, was the monk Dutertre of the Frères Prêcheurs. According to him, soon after a French governor had made peace in 1641 with the Island-Caribs, these Indians, largely from Dominica, brought the peanut plant to him in Guadeloupe. Dutertre coined the name *Pistaches* (16), a name he is thought (2) to have derived from Marcgrave's (35a) account of their subterranean fruiting.

Dutertre figured a lateral branch (?) of a plant with alternate N + 2 branches and paired opposite leaflets, but he erroneously placed the pods on the roots! His figure bears a striking resemblance in the location, configuration, and morphology of organs to the plant figured by Marcgrave in 1648 (35a) and republished by Piso in 1658 (35b). Moreover, Dutertre's 3-segmented pod has the same shape and appearance as the opened pod figured first in Piso's revised edition (35b) of Marcgrave's work (see Figure 5).

Dutertre describes the peanut as "another plant, whose fruits grow in the earth . . . called *Pistache*, because of its shape and taste. It is a little plant that runs along the ground and produces from its small red hairy stems, which are very slender, some short thickened 'pegs' (queuës), and four leaflets, similar to sweet clover, and from

the junction of these shoots it sends out bright little yellow-and-russet flowers This plant produces small grey underground pods, which pop when squeezed: each contains two or three large fruits like a filbert nut, the seed coat is red and the inside is white, oily and of the same taste as the European Pistachio".¹¹

Concerning the uses of the peanut he says, "they are used for dessert, but will cause headaches if overindulged; they are also used for making poultices to heal snake-bite and the expressed oil is considered to be equal to sweet almond oil."¹¹

Jonstonus (24) collated the descriptions previously published in Clusius (12), Nieremberg, Bauhino (5), de Laet (29), and Monardes (37), using Clusius' Latin edition (12) of the latter's book. Jonstonus' text formed the basis for much of Sloane's (48) material.

John Ray (43) traced the etymology of the name *Arachidna* used by Parkinson (40), and compiled a description of the peanut primarily from those published by Parkinson (40) and Marcgrave (35).

British naturalists came late to the Antilles. Sir Hans Sloane, physician to Queen Anne, visited Jamaica, Barbados, and St. Kitts in 1687-88. In his technical catalogue of plants issued in 1696 (47), Sloane described the peanut under the Latin phrase *Arachidna Indiae utriusque tetraphylla* and employed the common name synonyms *manobi*, *mandovy*, *mundubi*, *anchic*, *ibimani*, *mani*, *ynchic*, *pistache*, *mandues*, *earbnuts* or *pindalls*. Sloane refers to at least 14 of the preceding authors who cited the peanut in the Americas. He clearly indicates from frequent reference that the peanut was commonly known and used in the islands he visited. Sloane also notes that he had "found this planted from Guinea seed by Mr. Harrison, in his garden in Liguane."

Even prior to the publication of Sloane's Catalogue (47), Leonard Plukenet (41) had collected and indexed 8 previous references to the peanut which he listed under the name *Senna Tetraphyllas*, and Sloane cited Plukenet. Figure 2⁺ in Plukenet is an especially good illustration of a portion of a branch with leaves and flowers, a pod with two seed cavities and a seed. The pod has average reticulation and a moderate beak.

The French naturalist Father Charles Plumier is credited (2) with giving the French name "Arachide" (*Arachidna*) to the plant the natives called *manobi* in South America and the French Antilles. Plumier, who was sent twice by the King of France to study useful plants, issued his "Description of the Plants of America" in 1693 (42a). Later he visited Guadeloupe in 1697 where Labat was a missionary. In a subsequent publication (42b), Plumier described and figured the peanut fruit, flower parts, and seed, but he did not show vegetative plant parts.

Father Labat, the 'Scholar of Guadeloupe', lived in the French Antilles for 12 years, 1693-1705. His description of the peanut, which he calls "Pistaches des Isles", otherwise *Manobi*, is remarkably instructive. He reports (28) that the fruits of the peanut "came from a plant that is hardly a foot high and which is ordinarily a runner (creeper), because its stem is too feeble to support it. It puts out a lot of slender stems, that are red and velvety, accompanied by little 'pegs' (queuës=—tails), which carry leaves almost like sweet clover and nasturtium-colored flowers, which are yellow with red at the edges and at the extremities. The flowers are delicate and their short life is due to the fact that they are grilled and shrivelled up by the heat of the sun."¹²

By studying the pod and seed(s), Labat observed that "the fruit is found in the earth where it must be looked for. It is attached by filaments to hairs that the roots put out (sic) which come from stems distributed on the surface of the earth, where

⁺Our reference to Plukenet's Tab. LX, figure 2 is from the 1769 edition (41), but Sloane (47) in 1696 also referred to "Pluk. tab. 60, fig. 2."

they enter and produce pods or hulls 12, 15, and 18 'lignes' long which are 4, 5, or 6 'lignes' in diameter.⁺ The pods are not much thicker than a good parchment, or tender almond. The interior is covered with a fine white skin that is smooth and lustrous; the outside is bister (brown) colored with white streaks, and ridges go from one end of the shell to the other and these are totally connected by a network of lines which divide the surface into a number of small areas. The fruit (seed) which is contained in these pods has the shape of an olive when it is single, but ordinarily there are two, or three, in a pod where they take up the entire space so tightly that they take on different shapes. The fruits, or kernels, are covered with a reddish seed coat when they come out of the earth, but the color changes to gray when the fruit is dry. The skin adheres lightly to the fruit when it is fresh and one has only to squeeze it between the fingers to remove it. When dry it is difficult to remove. The meat that it covers is white, compact and dense and it has the odor and taste that resembles an acorn. When the fruit is roasted in its pod the seedcoat (pellicle) becomes powdery and the white meat which it surrounds turns a greyish color and acquires the taste and aroma of roasted almonds."¹²

Concerning the alimentary uses of the peanut, Labat writes "Our 'Esculapes' believe that these fruits are good for the stomach. I don't know anything about that. I have only noticed that eating them raw exaggerates their bad taste and that they are indigestible and that they cause great heating (échauffent beaucoup) . . . They produce less undesirable effects when roasted, since they stimulate the appetite and thirst: people use them to make sugar peanuts, marzipan, and they are put into hash and stews as a substitute for chestnuts. . . . While it is necessary to point out the various uses of the peanut, they are always indigestible and heavy, and they heat up greatly (échauffent beaucoup)."¹²

Father Labat critically examined the three statements about the peanut given by his colleague Fr. Dutertre, *viz.*, that when overindulged they produce headaches, that they are used to make poultices to heal snakebites, and that the expressed oil is like sweet almond oil (16). In evaluating these claims, Labat (28) says: "I have not experimented at all, nor have I heard tell that this fruit caused anyone headaches. I am very sure that no one has ever thought to cure snakebite with such a remedy, and, during the many years that I spent in the islands, I have not heard of anyone recommending expressing the oil from these 'Pistaches' even though we might often enough have had an urgent need for it."¹²

At the close of his article, Labat commented on the persistence of the peanut in volunteering in the fields where grown. From his remarks, it appears probable that the peanut he described possessed appreciable fresh-seed dormancy. Labat's figure (28) of the peanut is a reverse print of Dutertre's (16) illustration, and both figures are similar to or identical (?) with the plant branch and opened pod figured in Marcgrave as revised by Piso (35b; see figure 5).

At the beginning of the eighteenth century the serious student of the peanut had available for use some 18 to 20 historical or botanical works describing or discussing the peanut, including the rather comprehensive reviews or bibliographies of Jonstonus, Ray, Plukenet, Sloane, and Labat. Nearly all of these had widely circulated Latin editions and several of these appeared also in most of the major languages of western Europe.

The only major reference currently known from the first two centuries of the discovery which was not already known before 1700 is the very important work of

⁺ligne = 0.0888 inch.

Soares de Souza (51), which was not published until 1825.

All of the authors cited in Table 1 knew that the peanut was native to the Americas.

ARCHAEOLOGICAL RECORD

The most direct proof for the ancient existence of a crop plant in a given location is to find its recognizable fragments in deposits datable by radiocarbon technique or find archaeological artifacts (pottery, tools). Archaeological evidence for the antiquity of peanuts is available from both American continents, being extraordinarily extensive from the dust-dry prehistoric sites along the rainless strip of the Peruvian coast. Margaret Towle has documented these collections (54) and charted the cultural periods associated with the dated peanut remains. A few samples will suffice for our discussion.

The New World origin of the cultivated species was definitely indicated when E. G. Squier (52) found peanuts in the great prehistoric cemetery of Ancón on the coast near Lima. There, many graves have been found to contain seated mummies surrounded by terra cotta jars that contain various foodstuffs still well-preserved among which the peanut was conspicuous. The numerous specimens of peanuts since recovered from Ancón are associated with the early Ancón culture dating approximately 750-500 B.C. (54, p. 8).

In other prehistoric cemeteries, farther North along the same coast, near Trujillo, there were funerary vases of different sorts. These included terra cotta vases decorated with replicas of peanut pods sculptured in relief. In some cases, where these are mold-made vessels, peanut pods were evidently used when making the mold. An earthenware pan with peanuts painted on the handle has been recovered from a grave at Chimbote.

Bird's discoveries at and near the pre-ceramic Huaca Prieta mound on the coast-line of the Chicama Valley, at about latitude 8° S (ref. 7, and personal communication), have given the best dates yet established for the occurrence of peanuts in Peru. He says it is clear that peanuts appeared at Huaca Prieta prior to maize and may well have been introduced at the same time as the warty squash. Neither peanuts nor warty squash appear in the pre-ceramic refuse, so it seems probable that their introduction was simultaneously with the first pottery. Using radioactive carbon dating, present estimates for the beginning of the ceramic period, and thus for peanuts, range from 1200 to 1500 B.C.

The usual variety of *Arachis hypogaea* found in the coastal sites of Peru has a long, slender, reticulated pod (54), with the sharp, recurved apices characteristic of subsp. *hypogaea* var. *hirsuta* Kohler as recently described by Krapovickas (26). These pods, with either one or two hump-like protuberances on the dorsal surface, are similar in external morphology and seed number to the varieties sold today in Lima markets. This indicates that the cultivation of the plant had been practiced extensively and had reached a high plane of development in ancient Peru.

In addition to the predominant type of prehistoric Peruvian peanut, Towle (54) recovered a variety from a site at Supe that belongs to the Early Ancón period. This variety had a smaller fruit in which the shell was only slightly reticulated and lacks the dorsal humps. This strongly suggests selection under cultivation. Krapovickas (26) points out that this second variety seems to be rather similar to several cultivated varieties now grown in the United States.

Professor F. Engel of Lima, Peru, reports peanuts from a Las Haldas site in what he believes is a pre-ceramic context with a radiocarbon age of about 3800 years. He

also claims similar but undated association at his Site 3 in the Paracas area (personal communication).

The general lack of historical evidence from Mexico and Central America gave rise until recently to the suggestion that the peanut may have been brought from Hispaniola or South America to Mexico by the Spaniards, who are known to have opened trade routes between their New World territories at an early date.

The recent discovery of ethnobotanical remains of the cultivated peanut in Coxcatlan cave in Tehuacan Valley (34, 50) effectively establishes the peanut as a cultigen in Mexican agriculture for centuries before the conquest. Peanuts appeared in Coxcatlan cave in a Palo Blanco phase tentatively dated about 100 B.C. Although present in later phases (A.D. 800 to ca. 1540), the peanut was never in abundance.

An important facet of the interpretation of the archaeological plant remains both in Peru and Mexico is the fact that peanuts were introduced into the local agriculture of both countries. From whence did they come? No ethnobotanical remains or clay phytomorphic representations of the peanut have been found in Brazil or in Bolivia. Moreover, there are no known illustrations of peanuts in any of the surviving copies of the 16th century Aztec codices. Nevertheless, the climate along the Peruvian coast and in the Tehuacan Valley was more favorable than elsewhere for the preservation of archaeological plant remains.

As more archaeological material becomes available, it should be possible to assess more accurately the interplay between different areas in the New World on the basis of changes in the cultivated plants. Present evidence indicates that in Mexico the peanut was cultivated as an introduced crop of minor importance. In contrast, although one might expect the arid coast of Peru and the inner-continental Gran Pantanel to have been effectively isolated by the high Andean barrier, contact between the two regions seem to have been effective and prolonged, as shown by the presence of peanuts, manioc, and the pepper, *Capsicum chinense*, in the early ceramic cultures on the coast, as they were domesticated east of the mountains.

Thus, the geographical deductions drawn from archaeological data must be supplemented and extended by evidences from the natural histories, from the botanist, and from other disciplines.

GEOGRAPHIC ORIGIN

The question of the geographic origin of the cultivated peanut was the subject of early and sustained interest among botanists concerned with the origin and domestication of this cultivated species (2, 3, 6, 8-11, 14, 15, 17, 19, 22, 23, 25-27, 31, 32, 49, 56). The peanut today is an important food crop generally distributed in the tropical, subtropical, and warm temperature zones of the earth. All other species of its genus are wild plants of South America (except for the semi-domesticated *A. villosulicarpa*). Previously, many botanists thought that *Arachis hypogaea* was domesticated in the Gran Chaco of southwestern Brazil. The leading systematist studying the genus now thinks (26) that the peanut more likely originated in eastern Bolivia.

The specific place of geographical origin for a plant known from archaeological data to have been under cultivation for 3000-3500 years is obscured by human migrations and cultural exchanges through these 30-odd centuries. Moreover, pinpointing the location for origin of the peanut is made more difficult by the absence of prehistoric plant remains and of phytomorphic representations under the prevailing climatic conditions in the area where the peanut very probably originated. Hence, the

historical records and the archaeological data must be coupled with botanical considerations and with philological (linguistic) comparisons. Ethnological studies are of supplementary value. As far as fossil remains are concerned, however, the geological record is blank.

Botanical Information

Botanical facts concerning the origin of the peanut include information on the natural distribution of its nearest wild relatives, on the degree of variation the cultivated species exhibits in different areas, and on its dispersal in time and space.

Distribution of the genus Arachis

Arachis is confined to South America (2, 3, 9, 11, 22, 25, 26, 49, 55). It includes perhaps 35-40 endemic species (Krapovickas, 26, and verbal communication), all found in Brazil, Paraguay, Argentina, Bolivia, or Uruguay. The habits and habitats of these species are frequently varied. Some species are solitary while other species grow in solid masses. They are never in the jungle forest but frequently appear in spots of sunlight between sparsely spaced trees. Most seem to grow best on a sandy soil.

During the past 100 years the range of wild *Arachis* species has been extended over more than a million square miles of the 6,800,000 square mile continent. They are abundantly distributed from the North and Northeast of Brazil to about latitude 35° S, and from the Andean foothills to the Atlantic.

Wild species of *Arachis* form the single important leguminous component of the native range forage supporting vast herds of cattle on ranches in South America.

The center of origin for the genus is probably in the Mato Grosso (Brazil), close to the Gran Pantanal (26). Here the species are especially adapted for growth and survival in the alternating dry-wet climate and under conditions of close grazing. Representatives are found there for each of the taxonomic sections into which Krapovickas and Gregory (unpublished) divide *Arachis*.

Peru lacks any known wild species and, thus, could hardly qualify as a place of origin for the genus. Uruguay and Bolivia possess comparatively few species. Argentina has several perennial species in Corrientes and Misiones Provinces and the annual *Arachis monticola* from the mountains to the Northwest. Wild species occur at various places in the vast expanse of Brazil, but their greatest frequency lies from the vicinity of Cuiaba in Mato Grosso southward on both sides of the Paraguay river to the point of its confluence with the Apa. The wealth of species diminishes through neighboring Paraguay.

Recently, Krapovickas (26) gave a fuller review of the species distribution and of their bearing on the evolution within *Arachis* and upon the origin of *A. hypogaea*. Apart from *A. hypogaea*, only *A. villosulicarpa* appears to have been cultivated by aborigines for its seeds, though never more than as a subsistence food in a limited area. Smith (49) noted that the flowers of all species are essentially similar, and that all known species produce pegs and subterranean pods. But seed production has yet to be recorded for certain of the species (e.g., *A. repens*). Hammons (unpublished) has observed that the androecium regularly has 8 anthers (rather than 10).

Variation in Arachis hypogaea

Taxonomically the cultivated species may be divided into two subspecies, each with two botanical varieties (26):

subsp. *hypogaea* with var. *hypogaea* (Virginia),
and var. *hirsuta* (Peruvian), and
subsp. *fastigiata* with var. *fastigiata* (Valencia),
and var. *vulgaris* (Spanish).

A description of each type with distinguishing features and its geographical distribution has been given previously by Krapovickas (26) and need not be repeated here. His analyses of these varieties, from studies of large collections of land races, gave new insight into the origin of the domesticated peanut, its spread in pre-Conquest times in the Americas, and its subsequent distribution to practically all tropical and subtropical lands throughout the world.

Origin of the Cultivated Peanut

His extensive travels collecting *Arachis* throughout South America for two decades led Krapovickas (26) to postulate, "It seems likely that *A. hypogaea* originated in Bolivia, at the base or in the foothills of the Andes." There exists in this area a very important center of variability for subsp. *hypogaea*, the subspecies with the greatest affinity with both the wild annuals and with the *A. villosa* group. As further evidence of its presence in Bolivia for a long time, Krapovickas cites a diversity of uses. In addition to all of the customary alimentary uses, it is employed to make a refreshing non-alcoholic drink (*chicha de maní*), it is made into soap, and the natives of Northern Bolivia even eat the entire soft fruit at the stage when the pericarp is thick and juicy.

This hypothesis moves the place of origin for *A. hypogaea* farther west than had been previously thought (3, 9, 11, 14, 22, 55). Cardenas (10) supports a Bolivian origin. He reports a wide range of variation in the size, shape and markings for both pods and seed. He adds still another use in the preparation of *cerveza de maní*, a beer.

The exact origin of the peanut is yet unknown and will probably continue to be a source of inquiry for some time to come. At present, the evidence seems to favor the upper Plata basin of Bolivia as the home of this legume. Independent origin in Brazil is less likely. The Andean area was a center of post-Columbian dispersal.

Dispersion of Arachis hypogaea

In the Old World *A. hypogaea* was not known until post-Columbian times. We can dismiss categorically any supposition that the peanut is indigenous to Africa or Asia. Theories of African or Asian origin were soundly disproved by de Candolle in 1882 (9). The peanut is not mentioned by ancient Greek, Latin, Arab, or Sanskrit authors (3, 55). The earliest references to peanut in China are considerably subsequent to the discovery and conquest of America (19, 32).

The peanut is too valuable a plant not to have been used had it been known (55). Although Rumpf (44), the Dutch governor of Ambon, found the peanut cultivated there by 1690, it must be remembered that the Dutch had control of Brazil a half century earlier and that Marcgrave had figured and described the peanut there in clear detail (35).

As is the case with most cultivated crops, the origin of cultivated peanuts was not recorded by its Indian domesticators. That it had been under selection and cultivation for centuries, however, seems certain not only from the archaeological evidence (7, 34, 50, 52, 54), but also from the wealth of phenotypic variation found in the primitive cultivars grown by the relatively unsophisticated aboriginal cultivators in

some of the less readily accessible areas of Mexico, Peru, Bolivia, Paraguay, and Central Brazil (26).

Thus, it is not surprising that two or more distinct types of peanuts were early distributed over the world from South America: one being a two-seeded Brazilian type and the other a three-seeded Peruvian (var. *hirsuta*) type (14). Most authorities credit the Portuguese navigators with enriching African agriculture by introducing the peanut there from Brazil, then to the Malabar coast of India, and possibly to other lands. However, there is no particular record or document that reveals for sure that they did and, if so, when.

The "hump-backed" Peruvian type was transported to the Western Pacific, to China and Java, and to Madagascar. Dubard (14) found a concurrence in size, shape, segmentation, and general configuration of pods for random samples taken in the last three places named, and between these and the peanuts found in the tombs at Ancón, Peru. It is probable that the peanut moved up the coast from Peru to Mexico, and thence across the Pacific on the long-continued Acapulco-Manila galleon line which regularly scheduled crossings for 250 years to 1815.

In all these lands the peanut became readapted and specialized and returned again from Africa, with the slaves (48) and after them, to tropical America and the United States. We can only speculate on the time and place of the first introduction into the U.S. (22). The long-held popular contention that the peanut was first introduced into the U.S. on slave ships from Africa rests primarily upon an interpretation by Sloane (48) of a statement made by Clusius a century earlier. According to Burkill (8), "Clusius (*Rariorum Plantarum Historia*, ii, p. 79, 1601) informs us that the slavers took as food for their captives on the voyage from the Guinea Coast to Lisbon, roots of the sweet potato, 'besides certain nuts', and these nuts Sloane (48, vol. I:184) identifies as fruits of *Arachis*." But, as Burkill notes, Clusius does not give information which puts Sloane's identification beyond doubt.

A small-podded Virginia-type (var. *hypogaea*) peanut with the spreading runner growth habit was obviously the earliest form successfully introduced into the Southeastern United States (22). A long-season peanut, it was known variously as African, Wilmington Runner, North Carolina Runner, Georgia Runner, Southeastern Runner, etc. and probably came from Africa. However, this type agrees in pod and seed morphology and in growth habit and branching pattern with those peanuts described and illustrated in the Antilles by the 17th Century naturalists Dutertre (16), Plumier (42), and Labat (28). Thus, direct introduction from the Caribbean Islands to the U. S. cannot be ruled out.

Soares de Souza recorded a runner peanut cultivated in Brazil in the 1570's (51). Since the pods contained 3 to 4 seeds, and the plants had a comparatively short growing season (February to May), additional studies on the range of variability for the varieties indigenous in Northeast Brazil are necessary to investigate this type.

More information is available for the Spanish (var. *vulgaris*) type. The Guarani region in Northeast Argentina, Paraguay, and South Brazil is a center of variation for var. *vulgaris*, and it is reasonable to assume that the Spanish peanut was disseminated from this region. According to Krapovickas (26), Gili and Juarez record its introduction into Europe. They say the plant came from seed sent in 1784 from Brazil to Don José Campos in Lisbon. A priest, Dom Tabarès de Ulloa, later bishop of Valencia, is said (2) to have invented the first machine to shell peanuts. The description of this machine appears in the 1805 supplement issue of Abbé Rozier's *Traité Général d'Agriculture*.

The Spanish type appears to be that spread by Tabarès in Valencia, from whence it was taken to the south of France by Lucien Bonaparte in 1801 (2, 3, 8, 26). Dubec (15) records that the oil was first extracted in Europe by the Spaniards who cultivated the peanut for two purposes, for oil and for preparation of chocolate-covered peanuts.

A small-podded variety requiring a relatively short growing season and adaptable to diverse conditions, the Spanish peanut was introduced to the U. S. in quantity from Malaga, Spain, in 1871 (38, 22). A small consignment of 404 bags arrived earlier in 1868 from the same area (38).

The origin of the large-seeded Virginia-type (*var. hypogaea*) is still uncertain. McClenny thinks (38) this peanut was probably cultivated in Virginia as early as 1844 by a Dr. Harris. Chevalier states (11) that the Jumbo originated at Bahia, Brazil, but failed to document this statement (22).

The Valencia-type (*var. fastigiata*) peanut spread throughout the World from Paraguay and Central Brazil (26). Dubard (14) describes the fruit, but Beattie (6) apparently coined the name in referring to a recent introduction to the U.S. from Spain. This term escalated to characterize a group of varieties with similar traits.

The first purposeful introduction of a particular variety of peanuts by scientists for a specific agricultural utilization seems to have been the Waspada cultivar. This peanut, which matured in 4 to 5 months, was introduced by Holle (23) into Java in October 1875, tested in yield trials, and released to growers as a replacement for the common variety which had a growing period of 8 to 9 months.

Industrial development of the peanut followed the world-wide shortage of oil in Europe during the first two decades of the 1800's. Joubert, a French colonist at Goree near Cape Verde, is credited (17) with first suggesting, about 1840, its importation as an oilseed into Marseilles, where it soon became the most important article of trade.

In the United States the increased need for oil for various uses has caused an expansion in production in times of war for the past 100 years. During the 20th century the quantity of peanuts processed into peanut butter has steadily increased to well beyond 50% of the shelled edibles. The notion is widely held that an unnamed St. Louis physician first popularized peanut butter about 1890 as a nutritious, easily digested food for certain of his patients. I found no critical published evidence to support this claim. Neither the American Medical Association nor the Peanut Butter Manufacturers Association have any information concerning this belief (personal communications). However, John H. Kellogg, of Battle Creek, Michigan, filed an application November 4, 1895, to produce a "nut-butter" product from peanuts or other nuts. His "Process of Preparing Nutmeal" was issued Patent No. 580,787, dated April 13, 1897.

Ethnological Comparisons

Proof of origin of the peanut in South America can also be adduced from ethnological studies which report its widespread culture and common use throughout the area, indicating centuries of cultivation under domestication before the Spanish Conquest. At various times since the subjugation of the Incas in 1532 the peanut has been found as a cultigen among many of the major Indian tribes of South America. J. H. Steward and his collaborators (53) in the 6 volumes of the "Handbook of South American Indians" trace its dispersion through the records of the food plants sown and cultivated by Indians from the Caribbean region southward through Brazil to the lower course of the Parana-Paraguay river system and westward to the Pacific coast.

The Spaniards found some 40 food plants, including the peanut, in the lower Andean valleys. Mètraux (*In* 53, v. 3:381-454) reports that the Spaniards who penetrated Eastern Bolivia with Gonzalo de Solís Holguín, Governor of Santa Cruz de la Sierra, in 1617 and again in 1624 were amazed at the size of the plantations of the Mojo and the Bauré and by the wide straight roads that crossed them. Peanuts were sown by the Mojo preferably along the sandy beaches.

Sixteenth century Indians around Puerto de las Reyes in Upper Paraguay were agriculturists with the peanut as one of their main vegetable plants (53, v. 1:245). After Alvar Nuñez Cabeza de Vaca re-established peace between the Guaraní and the Mbaya Indians, the latter frequently visited Asunción with peanuts as a trade item (53, v. 1:301). Lowie (*In* 53, v. 3:3) cites peanuts as aboriginal throughout the vast tropical forest where they were grown by tribe after tribe on farms in natural or man-made clearings as a staple crop.

Mètraux (*In* 53, v. 3:99) records peanuts as a crop listed in early sources as a food plant for the Tupinamba. Moving on to the northeast of Brazil, we find that Wagley and Galvão report peanuts as widely cultivated by the Tenetehara (*In* 53, v. 3:139). They also found (*In* 53, v. 3:168) that the Tapirape of central Brazil made great clearings in the forest and their large gardens guaranteed them an economy of abundance. Peanut was one of the principal cultigens, which along with cotton was planted and harvested solely by the women, as Soares de Souza (51) had first observed.

Steward notes that the Arawak grew peanuts with the aid of irrigation (53, v. 4:24-25). Elsewhere in the Caribbean coastal region, the lowland tribes (53, v. 4:219) and the Guayupe and the Sae (53, v. 4:385-386) commonly grew peanuts on their farms.

The Indians prepared peanuts for eating in a variety of ways: roasting, boiling, broiling, crushing, or grinding for mixing with other foods and making into cakes. Garcilaso (18) noted the medicinal use of the oil by the Incas. Throughout Brazil's tropical forests peanuts are usually boiled or roasted. The Tupi-Cowahib of Central Brazil grind them with maize to make chicha, an intoxicating drink (53, v. 3:301). In Bolivia the peanut is used in the preparation of both a beer (10) and a non-alcoholic drink and the natives also relish the entire soft fruit at the stage when the pericarp is thick and juicy (26).

Linguistic Affinities

Garcilaso de la Vega (18) pointed out that the Spanish introduced the name *Maní* from the Antilles to designate the peanut which they found cultivated in Peru and substituted this term for the Incan name *Ynchic* in common use. Since that time, the natural historian, botanists, philologists, and ethnobotanists have attempted to trace the dispersal of the peanut through linguistic comparisons.

The Spaniards in Mexico accepted the Nahuatl name, modified it slightly and took it to Spain. Elsewhere in Spanish America and in other land under Spanish influence (e.g., Philippines) the Hispaniola name *Maní* was employed. The Portuguese name *Amendoim* apparently stems from a number of cognate words still widely used in Brazil.

Vernacular names and their linguistic affinities were studied by Badami (3), Burkill (8), Chevalier (11), Dubard (14), Fluckiger and Hanbury (17), Goodrich (19), Higgins (22), Kopp (25), Kurtz (27), Laufer (32), McClenny (38), Waldron (55), and Williams (56), among others. It is unnecessary to repeat their findings. Chevalier (11), for example, lists several hundred local or dialectal names. Many of

these are simply descriptive of the subterranean fruit production habit of the plant. The etymology of the American name "Peanut" is not documented in the literature known to the reviewer.

Recently, Krapovickas (26) employed vernacular names used by Amerindian aborigines to correlate the peanut's diffusion throughout South America. His list shows that in the Tupi-Guaraní region numerous variants of the actual name *Manduví* occur while in the remainder of South America the vernacular names show little linguistic similarity. A number of variant forms of *Manduví* appear in the languages from the eastern Andean foothills interspersed with others of Arawak affinity. The Arawaks inhabit a vast area which extends from the Caribbean to the heart of South America (53, v. I:507-539) — as far as the Bolivian border with the Chaco.

Krapovickas holds (26) that *A. hypogaea* is indigenous in the region where Arawak linguistic influences predominate. Although he does "not necessarily conclude" that the Arawaks are responsible for the spread of the peanut from its center of origin to the Circum-Carib area and the Caribbean Islands, Krapovickas does hold that such a hypothesis is consistent with the evidence at the present time.

Further exploration in this area, and especially in the Amazon basin, will greatly increase our knowledge of the peanut and elucidate the importance of the region in its spread.

Many other problems connected with the origin and dispersal of peanuts remain to be solved. In these studies the agricultural historian joins with the phytogeographers, geneticists, taxonomists, archaeologists, ethnologists, and the philologists.

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Table 1. The Peanut in Early Post-Columbian Historical Records:

A chronology for the 16th and 17th centuries.

(The material in this chart is arranged to emphasize the time of exploration of the chroniclers and the geographical distribution of the peanut in the New World rather than the publication date which often follows many decades beyond the actual event.)

<u>Time</u>	<u>Location</u>	<u>Author and publication date</u>	<u>Ref.</u>
1502 - 1547	Peru	Garcilaso de la Vega	1609 18
Pre-Conquest	New Spain	Las Casas	1875 30
1513 - 1524	Hispaniola	de Oviedo y Valdés	1527, 1535 39
1534 - 1554	La Plata basin	Schmidt	1567 46
1555 - 1560	Rio de Janeiro	de Léry	1578 33
pre-1569*	Peru	Monardes	1569, 1574 37
1558 - 1566	Mexico	Sahagún	1829 45
1570 - 1587	Bahia, Brazil	Soares de Souza	1825 51
1571	Mexico	Molina	1571 36
1571	Peru	de Acosta	1588-89 1
1571 - 1577	Mexico	Hernández	1604; 1790 20, 21
*	Brazil, Peru	Clusius	1605 12
*	West Indies	Bauhini, C.	1623 4
*	Brazil	de Laet	1625, 1630 29
*	Americas	Parkinson	1640 40
1637 - 1644	Pernambuco	Marcgrave	1648, 1658 35
*	Brazil, Peru	Bauhino, J.	1650 5
pre-1653	New Spain	Cobo	1653 13
pre-1654	French Antilles	Dutertre	1654 16
*	Americas	Jonstonus	1662 24
*	Americas	Ray	1686 43
1687 - 1689	Jamaica, Barbados	Sloane	1696, 1707 47, 48
*	Americas	Plukenet	1691 41
1693	Guadeloupe	Plumier	1693, 1703 42
1697	Guadeloupe	Labat	1724 28

*Indicates European compiler describing and illustrating material collected by others in the New World.

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(text footnotes)

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¹Las Casas (30), v. I, p. 29: "Otra fructa tenían que sembraban y se criaba ó hacia debajo de la tierra, que no eran raíces sino lo mismo que el meollo de las avellanas de Castilla; digo que eran ni más ni menos que las avellanas sin cáscara, y estas tenían su cáscara o vaina en que nacían y se cubrían muy diferente que las avellanas, porque era de la manera como están las habas en sus vainas cuando están en el habar, puesto que ni era verde la vaina ni blanda, sino seca, cuasi de la manera que están las vainas de las arvejas o de los garvanzos en Castilla cuando estan para cogerlas; llamàbase *maní* . . ." (Tr.: M. Latham.)

²Oviedo y Valdés (39B), lib. 7, cap. 5, Del maní, p. 74: "Del Maní q es orta fruta r mantenimieto ordinario que tiené los indios enesta y s la española.

Tra fruta tienelos indios enestra y sla espanala q se deze Maní : la ql ellos siembran r cojen r les es muy ordinaria planta en sus huertas : y estamañado mo piñones con cascara ; r tienela ellos por sana : pero los xpianos poco se curam della sino son hombres baros r muchachos y ef clausos r gente quo no perdona sugusto a cosa alguna. Es de mediocre saboz/r no de substancia : pero es muy ordinaria los indios : r ayla en grande cantidad enesta y s la rotras."

³Oviedo y Valdés (39C), lib. xxiii, cap. 12, p. 193 — "Se siembra y nasce debaxo de tierra, y tirándose la rama se seca ó arranca, y en la rays está aquel fructo metido en capullos como los garbancos y tamaño como avellanas, y assados y crudos son de muy buen gusto." (Cited from B. Mitre: "Prólogo del Traductor," p. 49, in Schmidel, ref. 46B. Tr.: M. Latham.)

⁴Schmidel (46B), cap. 32, p. 201-2: ". . . una nación que se llaman *Suruchakuis*; estos tienen algo trigo turco (maíz) y *mandeoch* (*fariña*) y otras raíces, como *manduies* (*maní*) que se parece á las avellanas . . ." (Tr.: M. Latham.)

⁵Léry (33), p. 216: "Les sauvages ont semblablement vne sorte de fruits, qu'ils nomment *Manobi*, lesquels croissans dans terre, and s'entreteneans l'un l'autre par petits filamens, ne sont pas plus gros que noisettes franches & ont le noyau de mesme goust. Neant moins ils sont de couleur grisastre & n'en est pas las creuse plus dure que la gousse d'un poix: mais de dire maintenant s'ils ont fueilles & graines, combien que i'aye mangé beaucoup de fois de ce fruit, ie confesse ne l'auoir pas bien obserué & ne m'en souuient pas." (Tr.: T. B. Stewart, from the 1960 Portuguese ed.)

⁶Soares de Souza (51), p. 175-6, cap. 47: "Em que se declara a natureza dos amendois, e para que servem:

"Dos amendois temos que dar conta particular, porque é cousa que se não sabe haver senão no Brasil, os quaes nascem debaixo da terra, onde se plantam á mão, um palmo un do outro; as suas folhas são como as dos feijões de Hespanha e tem os ramos ao longo do chão. E cada pé dá um grande prato d'estes amendois, que nascem nas pontas das raizes, os quaes são tamanhos como bolotas é tem a casca de mesma grossura e dureza, mas é branca e crespa tem dentro de cada balnha tres e quatro amendois, que são da feição dos pinhões com casca, e ainda mais grossos. Tem uma tona parda, que se lhes sahe logo como o miolo dos pinhões, o qual miolo é alvo. Comestos crus tem sabor de gravaços crus, mas comem-se assados e cozidos com a casca, como as castanhas, e são muito saborosos, e torrados fóra da casca são melhores. De uma maneira e d'outra é esta fructa muito quente em demezia, e cauzam dor de cabeça, a quem come muitos, se é doente della. Plantam-se estes amendois em terra solta e humida, em a qual planta e beneficio della não entra homem macho; só as indias os costumam plantar, e as mestiças; e n'esta lavoura não entendem os maridos, e tem para si que se elles ou seus excravos os plantarem, que não hão de nascer. E as femeas os vão apanhar, e segundo seu uso hão de ser as mesmas que os plantem; e para durarem todo o anno curam-nos no fumo, onde os têm até vir outra novidade.

Desta fructa fazem as mulheres portuguezas todas as couzas doces, que fazem das amendoas, e cortados os fazem cobertos de assucar de mistura com os confeitos. (Pé-de-moleques). E tambem os curam em peças delgadas e compridas, de que fazem pinhoadas; e quem os não conhece, por tal a come se lh'a dão. O proprio tempo em que se os amendois plantam é em Fevereiro, e não estão debaixo da terra mais que até Maio, que é tempo em que se lhes colhe a novidade, o que as femeas vão fazer com grande festa". (Tr.: T. B. Stewart.)

⁷Sahagún (45), v. 3, p. 173, par. 28: "La hinchazón de las encías se curará con quinzarse y echar encima un poco de sal, y con el dedo frotarse. Para la enfermidad del dolor de las muelas será necesario buscar el gusano revolton que se suele criar en el estiércol, y molerle, juntando con *ocuzote* y ponerlo en las mejillas hacia la parte que está el dolor, y calentar un chile, y así caliente apretarlo en la misma muela que duele, y apretar un grano de sal en la propia muela, y punzar las encías, y poner encima cierta hierba llamada *tlalcacamatl*; y si esto nobastare, sacarse la muela, y ponerse en el lugar vacío un poco de sal." (Tr.: M. Latham.)

⁸Clusius (12), lib. II, cap. 29, p. 57: *Quintus*, nucleus dumtaxat erat suo putamine exemptus, firmus, tenui membranâ fuscâ & multis venis distinctâ, firmiterque ipse nucleo inhaerente, tectus: ipsa substantia firma erat, candida, pulpae nucis Indicae sive cocci, similis, nullo quidem odore praedita, sed satis grato sapore." (Eng. Tr.: Ben W. Smith.)

⁹Marcgrave (35B), lib. primus, p. 37: "Mundubi Brasiliensis herba, in pedalem aut bipedalem altitudinem adsurgit, caule quadrato aut striato, ex viridi rufescente & piloso. Hinc inde enascuntur ramuli primo quasi caulem amplectentes & foliolis angustis, acuminatis stipati; mox habent nodum ac trium vel quatuor digitorum longitudine extenduntur; continet; quilibet ramulus quatuor folia, duo semper sibi opposita paulo plus quam duos digitos longa sesquidigitum lata superne, laete viridia, instar trifolii, inferne paulum canescentia, mervp cpmslocip & subtilibus venulis quasi parallelis dotata, raris quoque pilis vestita. Ad exortum ramulorum qui folia gerunt prodit pediculus sesquidigitum circiter longus, tenuis, flosculumgerens flavum & per oras rubentem duobus foliolis constantem, more viciorum aut trifolii. Radix illius haud longa, tenuis, contorta, filamentosa, cui adnascuntur folliculi ex albicantegrysei, figura minimae cucurbitae, oblongae, magnitudinae Myrobalani fragiles: quilibet autem continet in se duosnucleos, pellicula saturata purpurea vestitos, carne intus alba, oleaginoso, sapore pistaceorum, qui comeduntur cocti & inter bellaria aponuntur. Multum tamen comesti capitis colores causare ajunt. Fructu integro quassato nucle intus strepunt." (Eng. Tr.: Ben W. Smith.)

¹⁰Cobo (13), v. I, cap. 12, "Del Maní. El Maní es una raíz diferente a todas las demás de las Indias, la mata es baja y muy aparrada a la tierra. La fruta de esta mata son unas raicitas, cada una del tamaño de un dedo mênique algo más corta, con una cascarilla blanquencina muy arrugada y tan delgada y sutil, que apretada ligeramente entre los dedos se quiebra; dentro della tiene cada raíz dos o tres pepitas muy parecidas en todo a los piñones, cubiertas de un hollejito rojo muy sutil, como el de la almendra, que quitado queda la pepita muy blanca como piñón mondado, la cual se divide en dos partes como la haba. Cómese esta raíz por fruta regalada y de muy buen sabor, cocida y tostada; pero comida cruda, causa dolores de cabeza, vaguidos y jaqueca. Hacense della muy buenos turrone, confitura y otros regalos. El modo como esta planta produce su fruto es asido á unas venillas delgadas ó barbas como la *Batata*, y para desenterrarlo, se arranca la mata, en la cual salen asida muchas desta raicillas de *maní*, aunque muchas mas quedan soterradas, las cuales se sacan cavando toda la tierra al rededor.

Las sorras son muy golosas desta fruta, la cual se en men escarbando la tierra y desenterrándola. La leche del Maní, que se saca como la de las almendras, sirve para almendradas, y mezclada con la que se saca de las pepitas de melon ó calabaza, agrava blandamente el cerebro y causa sueño en los faltos dél; y si á la almendrada, en lugar de azúcar se le echa miel de abejas, es contra la itericia y purgazón de riñones. Ilámase Maní esta raíz en la lengua de la Isla Española; los mexicanos le llaman *Cacaguato*, y los indios peruanos *Inchic*, en la lengua quíchua, y *Chocopa* en la ayamará." (Tr.: M. Latham and C. G. del Valle.)

¹¹Dutertre (16), v. II: 121, ". . . une autre plante, dont les fruits croissent dans la terre, . . . llappelle *Pistache*, à cause de sa forme & de son goust, c'est une petite plante qui rampe sur la terre, & pousse de ses petites tiges qui sont fort desliées, rouses & veluës, de petites queuës fort drües, qui portent chacune quatre petites fuëilles assez semblables à celles du Mélilot, il sort de la jointure de ces rameaux de petites fleurs jaunes & rougissantes par le haut, . . . cette plante produit sous la terre de petites gousses grises, qui font du bruit lois qu'on les casse: elles contiennent chacune deux ou trois fruits gros comme des Avelaines, l'escorce en est rouge, & le dedans en est blanc, oléagineus & de mesme qoust que nos Pistaches de l'Europe; on les presente au dessert, mais ils font mal à la tête de ceux qui en mangét trop; l'on en fait des cataplasmes qui guerissent les morsures des serpens & l'huile que l'on en tire est estimée comme l'huile d'amande douce." (Tr.: H. G. Cutler.)

¹²Labat (28), t. IV: 366-9: "Pistaches des Isles autrement Manobi. (1696).

"Les fruits qu'on appelle pistaches aux Isles viennent d'une plante qui ne s'éleve guéres plus d'un pied hors de terre, ella rampe ordinairement, parceque sa tige est trop foible pour la soutenir.

Elle pousse quantiré de jets déliez, rougeâtres & velus accompagnez de petites queuës, qui portent des feüilles presque comme celles du mélillot & des capucines qui sont jaunes avec un peu de rouge aux bords & à l'entrémiré. Elles durent peu, & leur délicatesse est cause qu'elles sont bien-tôt brûlées & consommées par l'ardeur du Soleil. Le fruit se trouve en terre où il faut le chercher. Il est attaché à des filets & aux chevelures que la racine pousse, & que la tige répand sur la terre, dans laquelle ils entrent, & produisent des gousses ou cosses de douze, quinze & jusqu'à dixhuit lignes de longueur, sur quatre, cinq & six lignes de diamètre. Elles n'ont guères plus d'épaisseur qu'un bon parchemin, ou comme celles des amandes tendres. Le dedans est revêtu d'une petite peau blanche, unie & lustrée: le dehors est de couleur de bistre avec des rayes plus blanches, élevées au-dessus du fond, qui vont d'un bout de la coque à l'autre, & qui sont unies ensemble par d'autres petites lignes moins élevées, qui partagent toute la superficie en quantité de petites lozanges. Le fruit qui est renfermé dans ces cosses a la figure d'une olive, quand il est seul, mais pour l'ordinaire il y en a deux ou trois dans chaque cosse, dont ils remplissent exactement la capacité, ce qui leur fait prendre différentes figures. Ces fruits ou amandes sont couvertes d'une pellicule rougeâtre, quand on les tire de terre, dont la couleur change & devient grise lorsque le fruit est sec. Cette peau eit peu adhérente quand le fruit est nouveau, on n'a qu'à le presser entre les doigts pour l'en dépouïller. Elle est plus adhérente lorsqu'il est sec. La substance qu'elle couvre est blanche, compacte & pesante, & a peu l'odeur & le goût du gland. Quand le fruit est rôti dans sa cosse, cette pellicule s'en va en poussiere, & la substance blanche qu'elle rensermoit devient grise, & acquiert le goût & l'odeur des amandes rories. Nos Esculapes prétendent que ces amandes sont bonnes pour l'estomach. Je n'en sçai rien. J'ai seulement remarqué qu'étant mangées cruës, outre leur mauvais goût, elles sont indigestes, & échauffent beau-coup. C'est peut-être en cela seul qu'elles ressemblent un peu aux veritables pistaches. Elles sont moins mal faisantes étant roties, elles ouvrent l'appérit, elles excitent à boire; on en fait des dragées, des massepains, on les met dans les hachis & dans les ragôts en guise de marons : on s'en sert encore pour donner au rossolis une odeur & un goût d'amandes roties qui n'est pas désagréable. Cependant il faut convenir qu'à quelque usage qu'on les employe, elles sont toujours indigestes & pesantes, & qu'elles echauffent beaucoup.

"Le Pere du Terre dit qu'elles sont mal à la tête à ceux qui en mangent beaucoup, que l'on en fait des cataplasmes qui guërissent les morsures des serpens, & que l'huile que l'on en tire, est estimée comme l'huile d'amandes douces.

"Je n'ai point experimenté ou entendu dire que ce fruit ait causé mal à la tête à personne. Je suis très-certain qu'on n'a jamais pensé à guérir les morsures des serpens avec un pareil remède; & pendant le grand nombre d'années que j'ai demeuré aux Isles je n'ai jamais entendu dire, qu'on se soit avisé de tirer de l'huile des pistaches, quoique nous en ayons eu assez souvent un besoin pressant.

"Quand cette plante a été une fois dans une terre, on peut compter qu'ele s'y conservera long-tems. Car quelque soin qu'on se donne en fouillant les fruits, il n'est pas possible qu'on les enleve tous, ou du moins qu'il ne reste en terre quelques filets, ou quelque chevelure de la racine, & cela suffir pour en perpetuer la race à l'infini." (Tr.: H. G. Cutler.)

