

former eaten as a delicacy on the Banda Islands, and the latter in Amboyna.

In the southern States of North America, upon soil recently cleared of timber, is found the Indian potato, or Indian bread (Tuckahoe), the gigantic *Lycoperdon (Pachyma) solidum*, Gronov., which attains a weight of from 15 to 30 pounds, and was formerly eaten by the Indians. It sometimes furnishes the entire food of runaway negroes.

All these fungi, with the exception of a few, belong to Europe. Only a few, as for example the true mushroom, or *champignon*, the truffle, &c., are cultivated, and thus developed into varieties. The edible fungi may be kept, when dried, for a long period of time.

There is an extensive group of nutritious plants, the seeds, fruit, and even tubers of which are characterized by a great abundance of fatty oil. The oil in these is generally mixed with starch, gum, sugar, and albuminous substances, and forms a kind of emulsion.

The almond, the walnut, the hazel-nut, the oil-palm, the Brazilian nut, and the nut of *Acromia sclerocarpa* and *Attalea compta*, the pistici, the olive, the water-nut, the seeds of *Nelumbium*, &c., as also the earth almond, and several other species, belong to this category.

The almond tree (*Amygdalus communis*, L., ἀμυγδαλή, Theoph.), with a thick and hard, or thin and soft, shell to its kernel, like many other species of the genus, is indigenous to Western Asia and North Africa; although, at the present day, it is hardly met with there in a wild condition. It was known at a very early period to the inhabitants of the Mediterranean regions of Syria and Palestine. The Jews make mention of it; and it was carried by the Phœnicians to the Hesperian peninsula (towards Lusitania and the Baetican province). It was sacred to Cybele, in Greece, where, even at that time, there were two kinds there, with sweet and with bitter nuts. Phyllis hangs herself on an almond tree, and is transfigured into it. Cato called it *nux Græca*, from which it by no means follows that at that time it was not propagated in Italy. Charlemagne caused *amandalaris* to be planted on his estate. At the present time it is distributed over the whole of Southern Europe, throughout Persia, Arabia, China, and Java. In addition to the common almond, the seeds of *Amygdalis orientalis*, Oliv., *Amygdalis scoparia*, Jaub., *Amygdalis arabica*, Oliv., and *Amygdalis agrestis*, Boiss., are eaten at the present day in Eastern and Southern Persia, and constitute an article of trade in the bazaar.

The walnut (*Juglans regia*, L.), characterized by its oily and yet pleasant-tasted kernel, is referred to by Theophrastus under the name of *κάρυον*, and various popular customs in ancient Greece have reference to this nut. The name *περσικά* relates to the region whence it was derived, and it is quite possible that Alexander the Great may have brought it from Persia, where it was earliest cultivated.

The Romans received their *Jovis glans (Juglans)* as early as the time of the kings. The walnut, although distributed from Lebanon throughout all the mountain region eastward to Shiras, occurs generally as a single tree, and never forms plantations. It likewise occurs single in southern and middle Europe, ascending in our Alpine valleys to a height of two thousand five hundred feet. Ledebour states that the walnut grows wild in Southern Caucasus; others refer it to the

mountain valleys of Talysch, where it occurs wild, and the same is stated of Persia and Cashmere. The walnut tree by cultivation passes into various varieties, and is occasionally cultivated more on account of its excellent timber than on account of its fruit.

There are various edible species of walnuts and of allied hickory-nuts in North America, especially *Juglans nigra*, L. (Black walnut), *Juglans cinerea*, L. (Butternut), *Juglans fraxinifolia*, Lam., and *Carya oliviformis*, Nutt., (Pecan nut), with other kinds of *Carya*, the seeds of which are used partly raw for the table, and partly in the preparation of oil. This is the case also with the *Juglans baccata*, L., indigenous to Jamaica, excepting that its seeds are more fitted for furnishing meal, on account of their richness in starch.

The oily seeds of the Cacao, or chocolate, (*Theobroma cacao*, L.), possess an agreeable aromatic taste, and are chiefly used for the preparation of various drinks. The cacao grows wild in the river districts of the Amazon and Orinoco, whence it has been distributed to other parts of Middle America, (Mexico and the Antilles), where its cultivation forms a very important branch of trade in the warm and moist regions. Other species, such as *Theobroma bicolor*, H. B., *Th. speciosa*, Willd., *Th. sylvestris*, Mart., and *Th. guyanensis*, Willd., replace the cacao in the West Indies and South America, and like the latter are introduced into commerce.

There are various species of Hazel nut (*Corylus*), the oily nuts of which are used as food. The principal of these are the common hazel nut, *Noisette*, or filbert (*Corylus avellana*, L.), which is distributed over the whole of Europe and Northern Asia: the Lombardy or Lambert's nut (*Corylus tubulosa*, Willd.), of Southern Europe, and the Turkish Hazel nut (*Corylus colurna*, L.) The latter is a stately tree, forming whole forests in its native land, (Pontus), from which it was carried, from the Island of Thasus, to Macedonia and Thrace, and has been distributed to Pannonia and throughout the whole of Italy. It was brought to Germany in the sixteenth century by Valerius Cordus, who received it from the Hungarian ambassador in Constantinople. The citizens of Avellum, in Campania, could not have cultivated the common hazel nut, but the Turkish species.

The common hazel nut has already developed six varieties by cultivation. *Corylus glomerata*, Nois., is only a variety of *Corylus colurna*, L., with large early fruit.

*Corylus rostrata*, Ait., and *Corylus americana*, Michx., which grow wild in North America, from Canada to Florida, furnish an excellent fruit, commonly known as hazel nuts.

Some other plants, the seeds and fruits of which are quite similar to those we have just mentioned, are *Guevina avellana*, Molina, (*Quadrina heterophylla*, Pav.), the Chilian hazel nut; *Cavanillesia plataniifolia*, Kunth, in Colombia; *Pourretia tuberculata*, Mart., in Brazil; *Anacardium occidentale*, L., (the Cashew nut); *Omphalea triandra*, Aubl., and *Omphalea diandra*, Aubl., in the West Indies. Also *Siphonia elastica*, Pers., *Aleurites moluccana*, Willd., *Cervantesia tomentosa*, Ruiz and Pav., in Peru; *Hamiltonia oleifera*, Willd., (Oil nut), in North America; *Pangium edule*, Reinw., in the Indian archipelago; *Hamamelis virginica*, L., the Witch hazel, and *Hamamelis*

*macrophylla*, Pursh.; *Hamamelis parvifolia*, Nuttall, of North America; *Canarium commune*, L., in Java; *Myrobalanus bellerica*, Gärtner, in the East Indies; also the forest almond of St. Domingo, *Hippocratea comosa*, Swartz, and the fruit of the *Quercus virens*, Ait., or American live oak, from which the wild tribes prepare an oil, in North America.

The seeds of *Cicoia guyanensis*, Aubl., *Parinarium montanum* and *P. campestre*, Aubl., from Guinea, and *Parinarium senegalense*, Poir., from middle Africa, *Licania incana*, Aubl., and *Bombax ceiba*, L., from South America, have much resemblance in taste to almonds.

The Brazilian nuts, or *Juvias*, come from a magnificent tree (*Bertholletia excelsa*, Humb. and Bonpl.) which has an extended distribution in the forests of Guyana and Brazil, particularly between the river district of the Orinoco and Rio Negro. The angular brown seeds of this tree, the size of a walnut, have an oily kernel, and taste like almonds. They soon become rancid and must be eaten fresh. Many tribes of Indians live for a long time upon these seeds, which they collect and harvest with great rejoicing.

The seeds of *Caryocar amygdaliferum*, Cav., and *C. butyrosom*, Willd., called *Pequi* and *Souari* in their native region, furnish nutriment similar to almonds, on account of their oily nature. The former is a high tree in Ecuador and Santa Fe de Bogota; the latter in Guyana. We may also mention *Caryocar glabrum*, Pers., and *Caryocar tomentosum*, W., in Guyana, and *Caryocar nuciferum* on the Essequibo.

Among the palms furnishing oil may be mentioned particularly the oil palm (*Elais guineensis*, L.), belonging to Congo, and the entire tropical region of Africa, and distributed thence to Brazil. From the hulls of the fruit of this tree most of the palm oil of commerce is expressed. There are also the *Acromia sclerocarpa*, Mart., and *Attalea compta*, Mart., the *Alfonsia oleifera*, H. B., in South America, also the king of palms, the cocos palm, or cocoa-nut tree, (*Cocos nucifera*, L., and *Cocos butyracea*, Linn, jr.) This beautiful tree, which at the present time is distributed over all the coasts and islands of the tropics, namely, the islands of the South sea, of the Indian Archipelago, East and West Indies, Brazil, Africa, &c., and which seems to have mainly propagated itself, has nevertheless proceeded from a very limited locality. The large size of the fruit, the ease with which it is transported by means of oceanic currents, and the influence of salt water as a condition of germination, are sufficient to render a great distribution possible. The original native land of this useful tree seems to be the Cocos islands west of Panama and the coast of Central America; from which region its distribution has taken place from a far remote period by means of the equatorial current to the small islands of Duncan and Galega, and thence to the different groups of islands of the Pacific ocean.

When the embryo is unformed the fruit furnishes sweet palm milk; a further development supplies a white, sweet, and aromatic kernel, which tastes much better than almonds. And it finally becomes still firmer, and then possesses a pleasant, sweet oil.

The oily pistacio nut (*Pistacia vera*, Lin.), and the Terebinth pistacio (*Pistacia terebinthus*, L.), are of less moment and more limited distribution. The former is obtained from a tree originally indigenous to Persia, Bactria, and Syria, but cultivated in the Mediterranean regions.

The latter comes from a very large and stout tree of the Mediterranean flora. Boissier has distinguished the former, which occurs in Palestine and Syria as a distinct species, (*Pistacia palaestina*.) The genuine pistacio furnishes a pleasant food, which was liked by the ancient Parses, for which reason this beautiful tree is frequently cultivated, while the fruit of the terebinth (*τερεβινθος*, Theoph.) is scarcely edible on account of its resinous taste. The tree of the Palestine terebinth, which often attains a circumference of 10 to 12 feet, is of importance in other respects, since it stands in the most intimate relationship to the theocracy of the Jews. The terebinths of Mamre, of Ophra, Jabez, and Sichem, have a historical renown.

Here may be mentioned the seeds of some coniferous trees, as those of *Taxus nucifera*, and *Salisburia adantifolia*, Sm., in Japan, and the stone pine (*Pinus pinea*, L.), the Siberia pine (*Pinus cembra*, L.), the cone of the pine of Norfolk island (*Araucaria excelsa*, R. Brown), and the American Araucaria (*Araucaria imbricata*, Pav.) The latter is a tree which furnishes to the Indians of Patagonia a great portion of their nutriment. It grows from the twenty-seventh to the forty-eighth degree south latitude—never in the low lands. It furnishes to the nomadic races (Araucarians) the necessary vegetable nutriment, who depend upon it the more exclusively in proportion to their distance from the whites, and the greater or less difficulty of obtaining the ordinary cerealia by means of trade. The nut is shaped like an almond, but twice as large. A single cone will have from 200 to 300 nuts, and will furnish a days' food to an Indian with the addition of a little meat. The oily seed is nevertheless not very digestible, and cannot be kept any length of time, as it soon becomes of a stony hardness. The natives, however, prepare from it a dish, which keeps a long time.\* The Catappa tree (*Terminalia catappa*, L.), furnishes a pleasant-tasted, edible kernel. This grows on many islands of the Indian Archipelago, especially on the Moluccas. The fruit is similar to the walnut, and has from one to two almond-like kernels. It is now cultivated in the Antilles. Similar fruits are furnished by the *Terminalia moluccana*, Lam., *Terminalia glabrata*, Forst., in the Society and Friendly Islands, *Terminalia mauritiana*, Lam., on the Mascarenhas and *Terminalia latifolia*, Swartz, in South America. Besides these, the kernels of the fruit of *Incarpus edulis*, Fort., *Sterculia balanghas*, L., and *St. fetida*, L., are eaten by the islanders of the South Seas generally.

The unripe seeds of various palms furnish oily kernels, as *Cocos arenaria*, Gomez.

The Olive tree (*Olea europaea*, L.) is incontestibly the most important oil-producing plant. Homer† mentions green olives in the garden of Alcinoüs and Laërtes, which were brought by Cecrops, the founder of Athens, to Greece. Minerva planted it with her own hand upon the consecrated locality of her citadel, by thrusting her spear into the ground. No temple or sacred place dedicated to her is without its olive tree. As light is kept up by means of oil, so this has become an indication of the divine peace and of earthly blessings. Jehovah

\* Pöppig, Reise, i, p. 401. † Odys. vii, 112.

himself announced his reconciliation with earth by means of an olive branch. The olive belongs to the fruits which were promised to the Jews in Canaan. This tree was first brought to Italy in the year 571 before Christ, and at the time of Pliny had been carried over the Alps to Gaul and Spain. At the time of Cato, the Romans were acquainted with only nine kinds of olives, which, however, at the time of Pliny, had increased by cultivation to twelve, and, at the present moment, even to twenty. The cultivated olive tree (*ἐλαία ἡμερα*, Diosc.), was distinguished from the wild olive (*ἐγρια ἀλαία*, Diosc.) Willkom\* is of opinion that the olive tree is indigenous in various parts of the Mediterranean region, Spain, and also in the southern portions of the Peninsula. He states that the olive forest of forty square miles at the foot of the Sierra Morena, to the south, between Andujar and Cordova, may have been entirely planted by hand. He is also of opinion that the olive forest, three leagues in length, situated further south, between Seville and Utrera, to the left of the Guadalquivir, consists of olive trees run wild, having small globular fruit possessing but little oil. He thinks that this forest could only have sprung up in consequence of the driving away of the Moors, or from the neglect of former olive plantations, as has been the case in other instances. He thinks himself, however, safe in stating that the hedges and forests of olives in the southern part of Spain may have arisen from indigenous plants. "The wild olive tree forms forests and groves, not only in the plains of Seville, where it has certainly arisen from the running wild of originally cultivated olive trees, but in the mountains also, as in the Serrania da Ronda, &c. It is most frequently met with in wild sandstone mountains, rising to a height of 4,000 feet along the Straits of Gibraltar, between Algesiras and Alcalá de los Gázules, where, from 2,000 feet and upwards, it forms a principal constituent of the indescribably magnificent foliage which covers that mountain.

"This office is also shared by *Quercus suber*, L., or Cork oak, and *Quercus lusitanica*, Lam., var. *baetica*, Webb. On account of the extraordinary wildness of these mountains, it is entirely out of the question that any cultivation could ever have taken place there. Whence, also, could the massive wild olive trees come which occur in the upper part of the mountains, for in the lower part the forest consists simply of cork oaks? This fact seems to me to speak very loudly in favor of the supposition that the olive tree has been indigenous to Spain from the beginning."

Hence it follows that we must consider the entire coast of the Mediterranean, North Africa to the Canary Islands, Palestine, Syria, Asia Minor, and Greece, as the native land of the olive. On the other hand, however, it is to be borne in mind that the name of this plant has been referred among all nations to the Grecian name *ἐλαία*, and the Hebrew *zait* or *sait*, which renders it probable that the olive tree was probably distributed by these two nations of antiquity from one point, in two lines, which met again in the Iberian peninsula.

At the present time the olive is distributed not only over all the lands of the Mediterranean, still forming an important source of the riches of many of them, as it was at one time the chief possession of

\* Linnæa, 1854, page 702.

Attica and Palestine, but it has also even transcended these limits. The olive oil, next to the cerealia, is the most indispensable necessary of life to the Italian.

The water nuts, or fruit of the water plants, (*Trapa*), which occur in lakes in Europe and Asia, are distinguished for an abundance of starch and fatty oil; although not very pleasant tasted, they are still gathered in large quantities, and used as an article of food, raw or roasted, and even ground into meal.

There are only two species of *Trapa* which here require special mention, namely: the one indigenous to India, especially to Cashmere, the *Singhara* or *Trapa bispinosa*, Roxb., and the one occurring in enormous quantity in the lakes of China, *Trapa bicornis*, Lin.; the first is fished out of Wuller lake during the winter months, and the inhabitants then obtain a harvest of such abundance that they live on it for the entire year. It is also eaten in Lahore. The second species, *Trapa bicornis*, L., called *Ling* in China, is extensively disseminated in the southern regions of the Celestial empire, and furnishes a staple article of nutriment to the poorer classes of the people. This is fished out in a similar way. It has run into several varieties. *Trapa cochinchinensis*, Lour., and *Trapa quadrispinosa*, Roxb., are of less value. Even the European *Trapa natans*, L., is everywhere made use of, and Pliny states that the Thracians baked bread from it.

The seeds of *Nelumbium speciosum*, Willd., are used for food in India as well as those of *Nelumbium luteum*, Willd., (the yellow-water lily), and *Nelumbium codophyllum*, Rafin., in North America.

The earth almond, or chufa, (*Cyperus esculentus*, L.) which is found in Southern Europe (South Spain and France) and North Africa, is also deserving of mention. Its tubers of a sweet and pleasant taste contain a mild fatty oil, similar in taste to nut oil, and, like the potato, have twelve per cent. of starch, for which reason they can not only be used as food, but also in the preparation of oil. It was employed at the end of the preceding century as a substitute for coffee in the whole of Germany. The separation of oil from the earth almond is too laborious and expensive an undertaking, and, in more recent times, has been supplanted by many of the so-called oil plants, such as the *Kohltraps* or Colza (*Brassica campestris oleifera*, DC., *Colza*; Lam.\*), (*Brassica rapa oleifera*, DC., *La navette*, Lam.), the China oil radish (*Raphanus sativus chinensis oleiferus*, H.), the flax† (*Linum usitatissimum*, L.), the poppy (*Papaver somniferum*, L.), the sunflower (*Helianthus annuus*, ‡ L.), the oil Madia (*Madia sativa*, Mollin||), the Sesame (*Sesamum orientale*, L.§), the Leindotter (*Camelina sativa*, Cranz. ¶), the Nuk (*Guizotia oleifera*, DC.), the hemp\*\* (*Cannabis sativa*, L., and *Hibiscus cannabinus*, L.)

\* Growing wild from the Baltic Sea to the Caucasus. Its culture started from Belgium, and is more extensively prosecuted in Holstein.

† Wild in Mingrelia.

‡ Indigenous to Mexico and Peru.

§ Brought from South America, where it was cultivated a long time.

¶ A common oil plant in Persia, which was used in the time of Xenophon by the soldiers to anoint their limbs to preserve themselves from being frost-bitten. At the present day it is cultivated in Abyssinia as an oil plant.

\*\* Indigenous to Central Europe, and found on the Caucasus and in Siberia; it first became a cultivated plant in the mediæval ages in Germany and Russia.

\*\* Allied to *Helianthus*, and cultivated in Abyssinia.

There is a fitness in treating of the plants yielding sugar after those containing starch, on account of the fact that a majority of them contain a mixture of starch and sugar. The principal representative of the saccharine plants is the sugar-cane, of which there are three species and several varieties, all indigenous to tropical Asia, whence they have been distributed over the tropical regions of the whole world. At the present time the plant is not found growing wild in any locality. The common sugar-cane (*Saccharum officinarum*, L.) is indigenous to India, (Bengal,) and has been cultivated there from time immemorial. This is shown by the Sanscrit name *Sarkura*, from which are derived the Arabic name *Sukkar*, the Grecian *σακχαρ*, and the modern European names *Zucker*, *Sucre*, *Sugar*, &c. The second species *Saccharum chinense*, Roxb., is undoubtedly a plant peculiar to China, and has been cultivated there independently, and perhaps still earlier than the Indian sugar-cane. Theophrastes called sugar a sweet salt which is produced from a tubular plant. It was still very rare in the time of Dioscorides and Galen.

In the ninth century the Arabians obtained sugar from the sugar-cane, which at that time was cultivated in Susiana, as shown by the mill-stones used in crushing the cane which are found at the present day upon the hills of Ahwaz, on the Kûren river. Sugar was brought from Alexandria to Venice in the year 996. Ten thousand pounds of sugar were used at the wedding of the Caliph Mostadi Bemvillah, (1087.) The sugar-cane is actually a food plant, since it is chewed and sucked, and perhaps eaten; this is still the case in Egypt, in many parts of Asia, on the Phillipine and South Sea Islands. During the frequent droughts it serves as a means of assuaging thirst among the inhabitants of eastern islands.

The sugar-cane flourishes best at a temperature of from 24° to 25° centigrade (73° to 75° Fahrenheit), though it may be raised at a temperature from 19° to 20° (66° to 68° Fahrenheit). In China the cultivation of the Sugar-cane extends to the thirtieth degree of north latitude, in North America to the thirty-second degree. The Jews were unacquainted with sugar, as was also the case with the ancient Babylonians. The cultivation of the sugar-cane was first extended to South Persia and Arabia, and thence to Egypt, Sicily, and South Spain. It reached the Mediterranean in 1420, and at a later period the Canary Islands. Columbus carried it on his first voyage (1490) from the Canary Islands to San Domingo. Captain Bligh took a variety from the South Seas (*Canna d'Otaheite*) to Antigua and Jamaica. At the present day the chief supply of cane sugar comes from the West Indies, Mexico, Brazil, Peru, and Louisiana.

The sap of some trees possess a sufficient amount of saccharine matter to furnish sugar. The principal of these are *Acer saccharinum*, L., *Acer nigrum*, Michx., *Acer rubrum*, Wangh., and *Acer dasycarpum*, L., of North America. The sugar maple (*Acer saccharinum*, L.), a stately tree, growing between the fortieth and forty-third degrees of north latitude, will furnish at least two quarts of sap in twenty-four hours in the month of March when the flow is most rapid. The yield of crystallized sugar, however, does not usually exceed two to four pounds for a single tree.

There are certain roots characterized by a predominance of saccharine juice, such as those of the Beet, the Sugar beet, the Carrot, the Celery, &c., as well as the fruits of various forest and vegetable growths; among these may be mentioned the Date palm, the Pisang, the Pine-apple, the Fig, the St. John's bread, the Indian fig, &c.

The original stock of the common beet (*Beta vulgaris* γ, *rapacea*, Koch), as well as that of the Red beet (*Beta vulgaris* γ, *rapacea* δ *rubra*, Koch), occurs wild at the present time on the sea-shore of the Mediterranean (Greece), and grows wild in some of the islands of the Atlantic ocean (Canary Islands). This is the common mangold (*Beta vulgaris* α *maritima*, Koch), of which there are two sub-species, with numerous varieties, formed by cultivation, the Garden mangold (*Beta vulgaris* β, *cicla*, Koch), and the Beet mangold (*Beta vulgaris* γ, *rapacea*, Koch.) It was cultivated for food by the Greeks as it is at the present day by the Persians and natives of India. Aristophanes reproaches Euripides with the fact that his mother was a vegetable dealer and sold mangold. The Romans were acquainted with two varieties. Charlemagne ordered the cultivation of the Beet (*Betas*) on his estate, and from this it was distributed throughout Europe and has extended to North America. It is easy to understand that the number of varieties of this plant should increase very greatly, since the species shows a great inclination to varieties even to permanent ones. The leaves of the Beet furnish an excellent spinach-like dish.

The turnip, which is cultivated as a favorite article of food, both for man and beast, on account of its large, fleshy root, and sweet, pleasant taste, is derived from a plant (*Brassica campestris*, L.) growing wild at the present day in Russia and Siberia, as well as on the Scandinavian peninsula. From this, in course of cultivation, a race has been produced as *Brassica campestris*, L., and a second as *Brassica rapa*, L., our white turnip, with many varieties. The cultivation of this plant, indigenous in the region between the Baltic sea and the Caucasus, was probably first attempted by the Celts and Germans when they were driven to make use of nutritious roots. This was less the case among the Greeks and Romans.

In all widely distributed plants there is an especial difficulty in ascertaining the primitive species, especially when no longer found in a wild state; this is particularly the case with the rettig and the radish—two plants which belong among the most widely distributed cultivated plants of Europe and Asia. It seems to be well established, from recent investigation, that the two plants belong to two distinct genera. The original stock of the winter rettig is (*Raphanistrum maritimum*, Gay), a plant which grows wild from the Caspian sea to Gibraltar and the coast of England, and from which the *ραφανίς ἄγρια* of the ancient Greeks, as well as the *Armoracea* of the Romans, does not seem to differ.

The common radish (*Raphanus sativus*, L.) comes from a more remote locality. It is probable that China may be considered as the native land of this plant, where, as in the neighboring Japan, it runs into several varieties, among them an oil plant.

Here also may be mentioned the horse-radish (*Cochlearia rustica*, Lam., *Cochlearia armoracea*, L.), the fleshy root of which is used both for

food and in the materia medica. The name *Armoracea* is derived from the Pontic word *Armon*, by which the Romans designated our rettig, and which has been recently applied by the moderns to an entirely different plant. The plant originated in Southern Russia, and the neighboring countries. Its spontaneous growth extended from Finland to Astracan and the steppes of Cumana, and even to Turkey in Europe. The name *Chren*, which the Slavonian races used to denote this plant, accords with the German *Kren*, and the French *Cran* and *Cranson*, and indicates a by no means early introduction of the plant into these countries—a view which is substantiated by the absence of original names of the plant in the north, west, and south of Europe.

The carrot (*Daucus carotta*, L.) is of much more recent introduction as a plant of cultivation. It grows wild at the present day in the whole of Europe, North Asia, and North America, and the cultivated race returns to the wild original in a very few seasons. It appears that the Greeks and Romans cultivated this plant in their gardens, although not to any great extent. It will require further proof to show that the *Σταφιλῖνος ἄγριος* is the violet variety of the carrot.

As early as the seventeenth century the white and yellow varieties alone were known; at the present day roots are gathered of every size and color.

There is the same relationship between the cultivated and the wild plant in the parsnip, (*Pastinaca sativa*, L.), a meadow plant common in the whole of Europe. The cultivation of the long, sweet, aromatic root, in northwestern France, has already continued for many centuries, during which time several new varieties have been developed, as, for example, that with the top-shaped root. A kind of beer is brewed from it, in Ireland, and even wine has been manufactured from it.

The *Scorzonera hispanica*, L., furnishes a very pleasant vegetable. This plant grows wild, at the present day, in Central and Southern Europe, and in the East; and the slimy, sweetish roots gain considerably in palatability by cultivation. The *Scorzonera glastifolia*, Willd. and *Scorzonera picroides*, L., are somewhat similar in their properties, as are also the roots of *Scorzonera Laurentii*, Hook, jr., in New Holland. The latter is a choice dish of the natives, and might replace the *Scorzonera hispanica*, if enlarged by cultivation. Africa has also a sweet, nutritious root, in the *Bauhinia esculenta*, Burch., of the Cape. The *Arracacha esculenta*, Bancroft, furnishes a similar nutritious root, cultivated in New Granada and Upper Peru on a large scale. The native land of this plant is no longer known, nor can we tell how far it has been changed by cultivation.

We may also introduce here the sugar root, or skirret, and the celery. The former (*Sium sisarum*, L.), obtained from the East, has been cultivated in Europe for more than one thousand years. The Emperor Tiberius is said to have demanded this sweet and somewhat aromatic root as a tribute from the Germans living on the Rhine.

The celery (*Apium graveolens*, L.), is a sea-shore plant, occurring on saline soil on the coast of the Mediterranean, in Greece, and in Turkey in its original form and of a bitter taste. It seems to have come very early into use, for Theophrastus mentions it as *Σέλενον*. At the present day, the cultivated plant is widely distributed in Greece.

It is hardly worth while to mention the root of *Campanula rapunculus*, L., formerly cultivated as a vegetable, a plant growing wild in Western and Southern Europe. The flesh of this tender and palatable root is often eaten in the spring.

We may mention here a few other plants, such as the Evening Primrose, *Gartenrapunzel* or *Rapontik* (*Oenothera biennis*, L.), from Virginia, and *Oenothera grandiflora*, Ait., likewise from North America, which are occasionally sought after on account of their sweet turnip-like roots, which they acquire by cultivation. *Oenothera suaveolens*, Desf., *Oenothera parviflora*, L., and *Oenothera muricata*, L., likewise from North America, also furnish edible roots. All these plants, like the parsnip and the carrot, have laid aside very little of their original nature. The New Zealanders, and inhabitants of the Oceanic Islands, have introduced into cultivation some only slightly-nutritious rhizomes and stems, among which are *Convolvulus turpetum*, L., upon the Society and Friendly Islands, and the New Hebrides, the soft, sweet stem of which is sucked by the boys of Otaheite. The same is the case with the rhizome and pith of *Pteris esculenta*, Forst., *Polypodium medullare*, Forst., *Polypodium dichotomum*, Forst., and *Acrostichum furcatum*, L., in New Zealand and on the Society Islands. The bark of *Hibiscus tiliaceus*, L., furnishes a kind of nutriment to these poor natives in the general want of other substances, as also the exuding gum of *Avicennia resinifera*, Forst., and the ripe, unpalatable fruit of *Pandanus odoratissimus*, L.

Among the edible root-stalks of the Ferns we may also mention *Nephrodium esculentum*, Don., in Nepal, and *Diplacium esculentum*, Sw., in the East Indies, chiefly used by the natives.

Among the plants characterized by an abundance of saccharine juice, those having sweet fruit are of very great importance, as their cultivation is usually attended with little difficulty, the yield being very copious, and their taste much more pleasant than that of the other sweet parts of plants. We will first mention the sweet and nutritious fruit of the Date palm (*Phoenix dactylifera*, L.) "In the East," says Von Martius, "the date tree has ever been considered the benefactor of mankind. The life of the wandering tribes in the desert circles around the date tree; and the Arabian poets ascribed such high importance to it that they maintain that the noble tree was not formed with the other plants, but from the clods which remained after the creation of Adam." The Persian enumerates 360 attributes as peculiar to his palm, probably with reference to the career of the sun, for the tree is consecrated to the sun, and the fruit of the date is called Sun fruit (*Belach*). In the primitive mythology of the Hindoos we find various references to this palm.

The native land of the date palm seems to have been originally in the region along the east side of the Persian Gulf, whence it has been distributed in the earliest periods of commerce to Arabia, Persia, Hindostan, and westward over the whole of North Africa. It reached the West Indies a good while ago.

The date palm occurs in the whole of Greece, and is particularly abundant on the islands, although it bears fruit only at Kalamata in the Southern Morea, and that of poor quality. Dates constitute

the principal nutriment for man, the horse, and the camel, in Arabia, Persia, and Egypt. In the oasis of the desert it is the last resort of the starving. From the great value of this palm to these countries, and its very long period of culture, it is not to be wondered at that it has already expanded into many varieties.

The Banana is of as great, if not greater, importance to the tropical zone. Both in tropical Asia and America almost every hut has its plantain tree. In the great number of different forms of plantain, the size, form, and taste of the fruit are exceedingly different. The question has long since been started as to how far this has been derived from one or several species. In America there are only two especially distinguishable forms. The *Banana da terra* (with long, straight, and decidedly three-cornered fruit, on distinct stems, and with a fresh, juicy pulp), and the *Banana de St. Thomé* (with smaller, blunt, roundish, and soft, sweet fruit). In tropical Asia and the islands of the Pacific ocean the different forms amount nearly to half a hundred. Although the Banana has not been found growing wild in America, with any degree of certainty, various points of Asia furnish, at present, this plant in its original form; a fact which speaks most decidedly for the question of its origin, as it is rarely propagated by seeds, but principally by its suckers. Roxburgh found it growing wild on the coast of Coromandel, Rumphius and Blanco on the Philippines, Loureiro in Cochín-China, Finlayson on the small island of Pulo-Ubi, near Siam, and so on to Ceylon.

The names used for this plant in Asia and America deserve a little further attention. In America there is no indigenous name, while Asia furnishes names in the Sanscrit, Chinese, and Malayan languages, even to the definition of the different forms. It is very probable that all the forms of the Banana are derived from a single stock, the original locality of which belongs to tropical Asia, since the American and Asiatic plants are scarcely distinguishable systematically; and the genus *Musa* is represented exclusively in Asia, and not in America. It will also be borne in mind that the two American forms are less connected with each other than with the corresponding Asiatic forms. It has been asserted that bananas were cultivated in America before its discovery by Europeans, but the historical notices on this point are by no means unanimous, and the fact that the bananas were carried from the Canary Islands, in 1516, to St. Domingo, is against such a supposition.

The cultivation of the true Banana (*Musa sapientum*, L.) is more widely extended than that of the Plantain, (*Musa paradisiaca*, L.), and extends from the 30° to the 35° north latitude, and in the tropics reaches a height of 5,000 feet, though under the equator it does not furnish ripe fruit at a height of 3,000 feet. The fruit, both ripe and unripe, is used both raw and cooked, and eaten with the addition of other condiments, (when ripe nearly all its starch is transformed into sugar), and in many tropical regions it constitutes the principal nutriment of man.

The Banana flourishes upon the high plain of Central America at a mean temperature of 12° Réaumur, (59° Fahr.) Upon the same surface of ground it furnishes 44 times as much nutriment as the potato,

and 133 times as much as wheat. It is more nutritious than the bread-fruit. In Central America it supplies to the poorer classes not only the place of bread, but even of meat and vegetables.

The costly fruit of the Ananas, or pine-apple, (*Bromelia ananas*, L.), is of by no means so doubtful an origin. It is indigenous in South America, and, according to the testimony of Humboldt and Von Martius, grows wild in the forests of the Orinoco, and near Bah. From this region it was transplanted to Asia and Africa. Its American name is *Nana*, and it is without a Sanscrit name. In 1592 it was carried to Bengal, and probably from Peru by way of the Pacific ocean to China. It was naturalized in Java as early as the year 1599, and was taken thence to Europe. It is highly probable that it has been cultivated in its native land from time immemorial, as it scarcely bears seeds any longer. Christopher Columbus became acquainted with it on his second journey, in 1493, on the Island of Guadaloupe; but it was not till the beginning of the sixteenth century that some of its fruit was brought to Europe, where it was elevated to the first rank among all known fruits on account of its pleasant taste. Geronimo Benzoni states (History of the New World, 1568) that no fruit on God's earth could be more agreeable. Christopher Acosta (1578) calls the plant *Ananas*, and states that it was carried from Santa Cruz to the West Indies, and thence to the East Indies and China. It must, however, have been distributed with uncommon rapidity, since a few years after it was tolerably well known. About this time the first experiments of its cultivation were made in Europe, which, however, proved a failure. Several varieties of this plant have been developed which vary in the shape, size, color, and taste of the fruit. Three of these existed at the time of the discovery of America, and a fourth has since then been met with. It is still questionable whether these are not distinct species. A white kind in the East Indies, which has run wild, still contains seed in its fruit. The Ananas thrives best in Brazil. In Peru a vinous drink (*chica*) is made from it.

The Melon tree (*Papaya vulgaris*, D. C., *Carica papaya*, L.), or Pawpaw, *mamão*, represents the bread-fruit in America, and like this plant, is cultivated by the Indians near their huts and places of abode, and introduced by the negroes into their gardens. It is indigenous in Brazil, Surinam, and the West Indies (Jamaica, San Domingo), and from these points has been taken to Congo. Its transfer to the East Indies may have occurred even soon after the discovery of America, for as early as the year 1626, seeds were brought from the East Indies to Nepal. Its further distribution to China, Japan, and the islands of the Pacific ocean, took place only in the last century. The name *Papaya* is American, and there is no Sanscrit term for it. The fruit, about the size of a child's head, resembles the melon. It has a juicy flesh, which, however, is insipid, and can only be improved by the addition of sugar.

The Fig, (*Ficus carica*, L.), a moderately large tree, furnishes a sweet, palatable fruit, which is eaten both fresh and dried. It is indigenous to the regions which border the lands of the Mediterranean, in the East, namely, in Syria, Persia, Asia Minor, Greece, and North Africa; but has been cultivated in the same countries from time im-