

Attalea funifera. (Phoenicaceae.) Seeds of the piassava palm from Bahia, Brazil. "A large, pinnate-leaved palm, found in certain sections of the state of Bahia. It is valuable because of the fiber which it furnishes, as well as for its hard, black fruits, which are used to make buttons. The oily kernel, elliptical and nearly two inches in length, is used as an article of food by the natives of the poorer classes. Piassava fiber is an important article of export at Bahia, and the manufacture of piassava brooms forms an industry of considerable extent. The fiber is extracted from the leaf stalks, and is coarse, stiff and cinnamon brown in color." (Dorsett, Popenoe, and Shamel introduction.)

Campomanesia fenzliana. (Myrtaceae.) 37834. Plants of a guabiroba from Rio de Janeiro, Brazil. Purchased of Eickhoff, Carneiro, Leao & Co. "A small Brazilian myrtaeous tree with foliage remarkably similar to that of some of the European oaks. The common name 'guabiroba', which is applied to it, is also given, with various minor variations such as 'gabiroba' and 'guabiraba', to several fruits of the two allied genera *Abbevillea* and *Campomanesia*. Although occasionally reaching a height of from 30 to 35 feet, the guabiroba as commonly seen in gardens is a tree of from 20 to 25 feet in height, rather sparsely foliated, with elliptical-ovate entire leaves about two inches in length, the veins depressed on the dorsal surface, prominent on the ventral surface. The fruits greatly resemble small guavas, being from three-fourths to one inch in diameter, oblate in form, the apex crowned by a large disk and prominent 5-parted calyx. In color they are orange yellow when fully ripe, the surface slightly wrinkled and covered with a thick tomentum or down. The skin is thin, and surrounds a layer of granular light yellow pulp which encloses the seeds and the soft pulp in which they are embedded. The flavor is similar to that of the guava, but frequently a little stronger. The principal use to which the fruits are put is the manufacture of jams and jellies. The tree seems likely to prove suitable for cultivation in south Florida and southern California." (Dorsett, Popenoe, and Shamel introduction.)

Citrus grandis. (Rutaceae.) 37724. Plant of a seedless pomelo from Siam. Presented by Mr. Harry Boyle, Assistant Horticulturist, Department of Agriculture, Philippine Islands. "On September 13 the writer proceeded to the Nakoi Chisii district where the finest pomelo orchards are located. The largest of these was owned by a Chinese planter and contained about 20 hectares, three-fourths of

which was planted with pomelos of the 'seed' variety while some 25 per cent of the area contained 'seedless' trees. The orchard is divided into plats some 7 meters wide by 60 to 90 meters long, separated by trenches some 3 to 4 meters wide by two and one-half meters deep. The pomelo trees are planted in single rows on these plats. All trees are propagated by marcottage, or the 'don' method. The soil of this orchard contains about 60 per cent clay. The first fruits examined in the 'seedless' section proved to be full of seeds. Upon inquiry as to the reason for this it was stated that the seedlessness was due to the salt deposited from the brackish water which backs up into the river during the dry season; the planter also said that a coconut shell of salt was placed in the hole at the time of transplanting the tree and that another shellful was given the tree each year." (Boyle, Philippine Agricultural Review, February 1914.)

Citrus sinensis. (Rutaceae.) 37840. Plants of Laranja selecta from Rio de Janeiro, Brazil. Purchased of Eickhoff, Carneiro Leao & Co. "This unusually choice orange is one of the two principal varieties grown in the Rio de Janeiro district, and has the added distinction of having been, as all the evidence indicates, the parent of the Bahia navel orange or 'selecta de umbigo,' as it is still called, the culture of which in California at the present day forms so important an industry. The origin of the 'selecta' orange is obscure. It has been cultivated in Brazil for more than a century, and although it has been superseded in Bahia by its offspring, the navel orange, it is still cultivated commercially near Rio de Janeiro, particularly in the Sao Goncalo district at Nictheroy. The main crop ripens in July, but it commences to come into the market in March and continues until October. On the fancy fruit stands it brings two or three milreis (\$.65 to \$1.00) per dozen, but in the public market it can be purchased at a considerably lower price. Around Nictheroy the fruit is picked and brought to the market in baskets strapped across the backs of mules and horses. While resembling the Bahia navel orange in general characteristics, 'selecta is normally oblate in form, contains numerous seeds, and does not produce a navel. The typical 'selecta' as found in the markets may be described as follows: General form roundish oblate; cross section regularly round; size medium large, good specimens being three to three and one-half inches in length and three and one-fourth to three and one-half inches in breadth; stem sometimes inserted somewhat obliquely; base usually tapering very little, flattened for a distance of one-half to three-fourths inch from the stem insertion, sometimes slightly

rough, due to thickening of the skin; cavity none or practically none; apex flattened and frequently depressed for a distance of one-half inch from the stigmatic point; surface varying from smooth to rather coarsely pitted; color varying from yellowish green to greenish yellow early in the season, becoming entirely yellow later on and bright orange yellow when fully ripe; skin one-eighth to one-fourth inch thick, usually thickest around the base of the fruit, the oil glands large and abundant; segments eleven to thirteen, rag extremely tender, but core very large, frequently one-fourth inch in diameter at center of fruit, usually solid; flesh light orange, tender, very juicy; flavor never mawkish nor insipid, always sprightly, subacid, with plenty of character, probably as good as the Bahia navel and with greater acidity; quality very good; seeds variable in number, ranging from 1 to 20, but commonly about twelve perfect ones and six abortive or undeveloped ones, in size rather large, varying from one-half to one-fourth inch in length. It is a common occurrence to find rudimentary navels in 'selecta' oranges from trees which ordinarily produce normal fruits. This phenomenon is so common that in some lots of fruit examined in the Rio de Janeiro markets as many as ten per cent showed rudimentary navels, of varying stages of development. In some instances the navels are as large as in the average navel orange. Natives of Rio de Janeiro generally consider the 'selecta', as grown in that locality, superior to the navel orange as grown at Bahia. The Bahianos, of course, do not admit this, but the fact remains that 'selecta' as grown in Rio de Janeiro is somewhat more highly flavored than the Bahia Navel. Both for this and for other reasons it seems important that 'selecta' be given a thorough trial in the orange growing sections of the United States." (Dorsett, Popenoe, and Shamel introduction.)

Citrus sinensis. (Rutaceae.) 37843. Plants of the 'laranja da pera' orange from Rio de Janeiro, Brazil. Purchased of Eickhoff, Carneiro Leao & Co. "This variety is distinguishable from 'selecta' by its elongated form, smaller size, thinner skin, and sweeter flavor. It is extensively cultivated in the vicinity of Rio de Janeiro, especially at Maxambomba and in the neighborhood of Cascadura. While it is not pyriform in shape as the name 'pear orange' would indicate, it is usually oval, and as seen in the markets is rarely more than three inches in diameter. Ripening at the opposite season of the year from 'selecta' the two do not usually compete in the markets. The typical fruit may be described as follows: Form broadly oval to nearly spherical; cross section

round; size medium small, length two and seven-eighth to three and one-half inches, diameter two and one-half to three and one-fourth inches; stem inserted squarely; base rounded, cavity none or practically none; apex rounded; surface smooth; color when fully ripe bright orange; skin one-eighth inch thick, pliable, oil glands rather small; segments commonly ten, rag rather tough, core open, one-fourth to three-eighths inch in diameter; flesh golden yellow, tender, exceedingly juicy; flavor sweet, apt to be cloying when the fruit is very ripe; quality good; seeds averaging eight to ten, small to medium size. While most abundant in the markets about Christmas time the season commences in late September or October and extends to the end of January. The variety is an extremely prolific bearer, quite a contrast in this respect to 'selecta', whose bearing habits are those of the Bahia navel orange. The branches of 'pera' trees are not infrequently so heavily laden with fruits that they have to be propped to prevent them from breaking. One of the finest groves of this variety seen in the vicinity of Rio de Janeiro is that of Sr. Cezar Augusto Henriques, at Maxambomba. The trees here are all budded on the sour orange ('laranja de terra'), the commonest stock in this region and generally considered the best; at four years of age the budded trees produce on an average five hundred fruits per tree, according to the statement of the owner. The usual price obtained for the fruits is 5\$000 (about \$1.60) per hundred. The orchard is situated on a hillside, the soil being rich clay loam, grayish in color. No deep cultivation is given the trees, but the surface is frequently hoed to keep down weeds." (Dorsett, Popenoe, and Shamel introduction.)

Copernicia cerifera. (Phoenicaceae.) 37866. Seeds of the carnauba palm from Joazeiro, Bahia, Brazil. "A valuable wax palm found along the banks of the Rio Sao Francisco from well above Barra to below Joazeiro. In places it grows in great abundance, forming large groves along the banks of the stream. The leaves are fan-shaped, rather finely cut, two to three feet in diameter, and light green in color. The plant frequently attains a height of from twenty-five to thirty feet. The wax is extracted by cutting the leaves and drying them in the sun, when the wax exudes in the form of a powder. Candles made from it are yellowish brown in color, extremely hard and burn with a clear yellow fairly brilliant light. They sell for forty reis each, but very few are made nowadays and they are difficult to obtain. The fruit is for hog feed and many of the large land owners are preserving the trees for the production of fruit. The trunks are extensively employed in building houses. The wax industry was former-

ly prosperous in this region, but it is not now very remunerative and only small quantities are exported. The leaves are used for brooms, etc." (Dorsett, Popenoe, and Shamel introduction.)

Eugenia arrabidae. (Myrtaceae.) 37830. Plants of the cambuhy da India from Rio de Janeiro. Purchased of Eickhoff, Carneiro Leao & Co. "A small, highly ornamental tree, native of Brazil. It is commonly known as Cambuhy da India or Uvaria do campo. The leaves are small, linear-lanceolate, opposite, deep green in color. The flowers, which are produced in September, are axillary and terminal, and are followed by small, yellow, rather acid fruits which are appreciated by the natives. The bark is said to be astringent and aromatic." (Dorsett, Popenoe, and Shamel introduction.)

Eugenia myrcianthes. (Myrtaceae.) 37831. Plants of the Cereja do Rio Grande, from Rio de Janeiro. Purchased of Eickhoff, Carneiro Leao & Co. "The cereja do Rio Grande, a small tree native of Brazil, with small, oblong, acute, dark green leaves, producing in June oblong, purplish red fruits about the size of an olive, with greenish flesh. It is said to bear prodigiously; the fruits are rather hard when ripe, and for this reason are usually mashed into a paste before being eaten." (Dorsett, Popenoe, and Shamel introduction.)

Genipa americana. (Rubiaceae.) 37833. Plants of the genipap from Rio de Janeiro. Purchased of Eickhoff, Carneiro Leao & Co. "A large tree, native of the American tropics. In the British West Indies it is called genipap, in Brazil 'genipapo'. At Bahia it is very common, and during the season the markets are full of the fruit. Some of the finest specimen trees we saw were fully sixty feet in height, symmetrical and stately in appearance, but devoid of foliage for a part of the year as the species is deciduous in this climate. The leaves are a foot or more in length, oblong-obovate, sometimes entire, sometimes more or less dentate, dark green in color. The flowers, which are produced in November, are small, light yellow in color. The fruits are the size of an orange, broadly oval to nearly spherical in form, russet brown in color. After being picked they are not ready to be eaten until they have softened and are bordering on decay. A thin layer of granular flesh lies immediately under the tender membranous skin, and enclosed by this is a mass of soft, brownish pulp in which the numerous small, compressed seeds are embedded. It is difficult to eat the pulp without swallowing the seeds. The flavor is characteristic and quite

pronounced; it may be likened, perhaps to that of dried apples, but it is somewhat stronger and the aroma is considerably more penetrating. As well as being eaten in the fresh state, the fruit is put to numerous other uses, one of the most important of which is the manufacture of a distilled liquor known as 'licor de genipapo.' This article retains the peculiar and distinctive flavor of the ripe fruit, and is highly esteemed by the Brazilians. Its manufacture is carried on commercially in certain regions. A refreshing drink known as 'genipapada', is also prepared from the ripe fruit, with the addition of sugar and water, much as lemonade is made in the United States. A dye is extracted from the green fruit, which, according to Barbosa Rodrigues, is employed by the Mundurucu Indians for tattooing. It is also used for coloring clothes, straw, hammocks, etc. Various medicinal uses are attributed to the genipap by the Brazilians; the root is said to be purgative, and the juice of the fruit diuretic." (Dorsett, Popenoe, and Shamel introduction.)

Melinis minutiflora. (Poaceae.) 37983. Seeds of capim gordura from Sao Joao d'el Rey, Minas, Brazil. Nos. 37983 to 38041 represent seeds of grasses collected by the Brazilian Exploring Expedition at Joazeiro, Sao Joao d'el Rey, Januaria, Xique Xique, and other points in Bahia and Minas. Among these are various varieties of guinea grass, capim d'Angola, and other forage and pasture grasses, some of them flourishing on pure sand, others of very rapid growth. (Dorsett, Popenoe, and Shamel introduction.)

Myrciaria edulis. (Myrtaceae.) 37829. Plants of the Cambucá from Rio de Janeiro. Purchased of Eickhoff, Carneiro Leao & Co. "The cambucá, a native of the state of Rio de Janeiro, and commonly cultivated in gardens for its highly appreciated fruit. In growth the tree is very similar to the jaboticaba, the leaves being considerably larger, however, and the bark a darker shade of brown. The fruits are produced both on the small limbs and on the trunk, though the specimens we have seen do not fruit clear down to the ground as the jaboticaba frequently does. The season is from February to May in this region. In form the fruit is oblate, one and one-half inches in length and two inches in breadth, stem practically none, the fruits being sessile or nearly so; base flattened, calyx persistent, a very small, brown disk not over one-eighth inch in diameter, level with the surface of the fruit; skin smooth, orange yellow in color, thin, tenacious, fairly tough; flesh divided into two portions, the firm outer flesh one-fourth inch thick, leathery, very acid in taste, light orange in color, the inner flesh con-

stituting the edible portion of the fruit, being soft, jelly-like in consistency, translucent, light orange in color, subacid in flavor, greatly resembling some of the Passifloras, quite pleasant and evidently highly esteemed by the Brazilians; seed oval or nearly so, compressed, about seven-eighths inch in length, three-fourths inch in breadth and seven-eighths inch in thickness, the cotyledons light purple in color; seed coat deep brown, reticulated, not adhering very closely to the flesh." (Dorsett, Popenoe, and Shamel introduction.)

Pouteria caimito. (Sapotaceae.) 37929. Seeds of abiu from Bahia, Brazil. "The abiu, a rather rare but highly esteemed fruit, both here and at Rio de Janeiro. In form it is elliptical, two to three inches long, deep yellow in color. The one to four large, oblong seeds are surrounded by a translucent, whitish pulp very similar in flavor to the sapote and fully as agreeable." (Dorsett, Popenoe, and Shamel introduction.)

Rosa setipoda. (Rosaceae.) 37978. Plants of a rose from London, England. Purchased of James Veitch & Sons, Ltd. "A remarkable rose, allied to *R. macrophylla*, with large corymbs of handsome rose-pink flowers. Its long pedicels clothed with spreading gland-tipped bristles and numerous foliaceous bracts give it a singular appearance. The species is not uncommon in shrubberies in the mountains of the north-western part of the province of Hupeh, China." (E. H. Wilson, Kew Bull. 1906:158.)

Spondias tuberosa. (Anacardiaceae.) 37861-865. Seeds of the imbú from Bahia and Minas Geraes, Brazil. "The imbú or umbú, one of the most popular fruits of this region. The tree, which is wild here and quite common in some places, is of a peculiar habit of growth, branching four to six feet above the ground and forming a very broad, dense, and flat topped head of foliage. When the large limbs are cut and placed in the ground as fence posts they take root and grow. The fruits, which are sometimes produced in great profusion and are ripe at this season (February), are oval in form, about one and one-half inches in length and light green in color. The skin is rather tough, and encloses the translucent, juicy pulp in which is embedded the single large seed. The flavor of the pulp is rather suggestive of a sweet orange, and is agreeable in the extreme. Aside from being consumed in the fresh state the fruit is extensively used for the manufacture of jellies and jams in which a considerable trade has been built up. In addition a popular dessert called 'imbu-zada' is made from the slightly unripe fruit by mixing the

strained and sweetened pulp with milk. The ease of its culture together with the superiority of its fruit recommends the imbu for careful trial in Florida and California." (Dorsett, Popenoe, and Shamel introduction.)

Ziziphus joazeiro. (Rhamnaceae.) 37923. Seeds of the jua from Joazeiro, Bahia, Brazil. "Seed of the jua, collected from wild trees on the catinga near the river two miles below town. This interesting and valuable tree is common on the catingas or dry lands bordering on the Rio Sao Francisco from Joazeiro nearly up to the border of the state of Minas. Here at Joazeiro it is quite common, but the trees are usually found scattered among the other plants on the catinga and do not occur in large groves. In places where cattle and horses can get at the trees while young they are kept eaten off almost to the ground, and have a peculiar dwarfed, stunted appearance. When allowed to develop to mature size the tree forms a beautiful dense green umbrageous head of foliage thirty feet in diameter. The leaves are somewhat hard and brittle in texture, oval to ovate and about two inches in length. The small wood is armed with short stiff thorns which are not however, particularly dangerous. The fruit varies greatly in size according to the tree by which it is produced. The best fruits are nearly an inch in diameter, creamy yellow in color, spherical or nearly so. Inside the thin skin is a thick layer of mealy flesh, within which lies the seed and the layer of translucent, mucilaginous pulp which surrounds it. The seed is about the size and shape of a small olive stone. The pulp adheres to it very closely and can scarcely be separated even in the mouth. The flavor is peculiar and somewhat insipid. The trees bear prodigiously, the ground under them being covered with fruit at the end of the season. Sheep, cattle, horses, and swine eat the fruit greedily, and it is considered wholesome for them. The principal value of this tree would seem to be as a source of stock food in dry regions, both the fruits and the foliage being of value for this purpose. In addition the ornamental value of this tree, and its drought-resisting qualities, commend it for culture in arid regions. While it is probably not very hardy, it seems likely to be adapted to the Southwest." (Dorsett, Popenoe, and Shamel introduction.)

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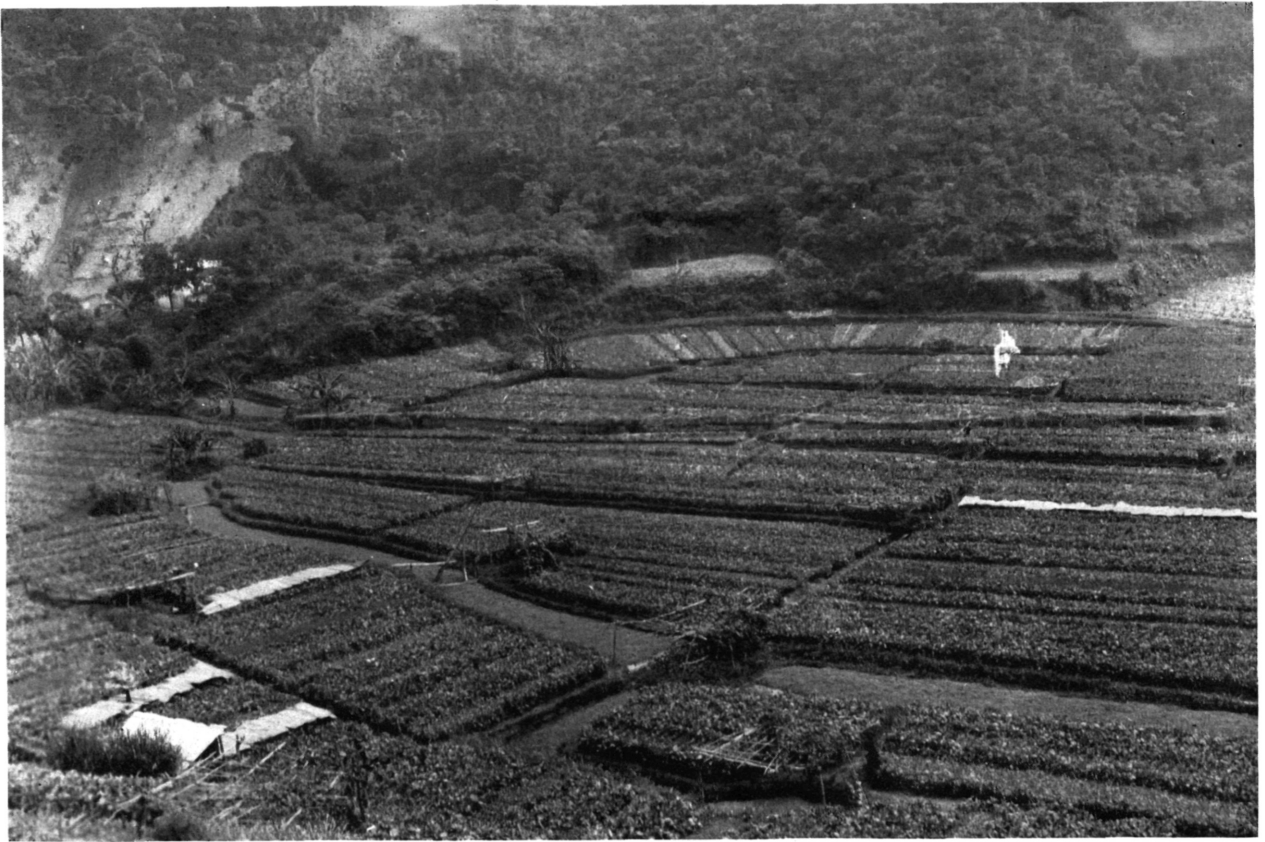
Dr. Joseph Bailie writes from Nanking, province of Kiang-su, China, May 22, 1914: "You see from a bulletin which will be sent you that the Chinese officials have taken hold of the Colonization work which I began and are

now making the Experimental Station a center and a model from which to develop afforestation in this province. The Nanking people have suffered much in the late revolutions but especially in the second, when Chong Hsun, a devil incarnate, let his armies loose and destroyed what they could not loot. Though ordered to leave this city by the President, he would not budge till the city gave him \$800,000 in cash. This was the last straw. Now notwithstanding all this the city has contributed \$20,000 to push this work that I am in. It will be hard for some of the subscribers to raise the money still they are keeping the work going ahead. Under these circumstances it would be of great encouragement to them if a substantial donation of trees could be obtained in recognition of their public spirit, by the U. S. Department of Agriculture. They appreciate any recognition of their efforts and are really trying to do their best. The difficulties can only be appreciated by one who actually lives here. You were generous enough to send me through the U. S. Consul here a large quantity of yellow and white pine seed year before last and last year. The seeds have done good work, though we lost more than three-fourths of the young seedlings through drought and by our men having been driven off by bullets, still we have over 20 acres of nice young seedlings transplanted from those seed. Could a special effort be made this year to help us? They want to do big things this next year. The governor is one of the committee and most enthusiastic. You can see his picture in the bulletin."



Avenue of Mangoes in the Botanic Garden of Rio de Janeiro.

These trees, apparently all seedlings, were brought from India during the reign of the Emperor Don Joao VI, probably about 1808. As far as known none of them has ever matured any fruits, although they bloom profusely at times and even set fruits which grow to the size of a walnut before they fall. Dr. Willis, director of the garden, attributes this to the low, wet soil in which they are growing. The trunks have been hacked to encourage fruiting, a custom widely practiced among the natives of this region. Hacking is always done on the day of Sao Joao Baptista, the 24th of June. Dorsett, Popenoe, and Shamel Photograph No. 506. Rio de Janeiro, Brazil.



Truck gardening in the neighborhood of Rio de Janeiro.

In such gardens as these the vegetables which supply the markets of the city are produced. Lettuce, radishes, onions, and other vegetables are grown in the small beds seen in the picture, each bed being raised about 18 inches above the level of the walks, and bordered with a row of kale around the outside. Water is distributed to small reservoirs throughout the garden by bamboo flumes; from these reservoirs it is distributed over the beds by means of large watering pots. Reed mats are placed over the beds to shade the plants when first set out. Dorsett, Popenoe, and Shamel Photograph No. 1268. Taken between the city of Rio and the Internacional Hotel.

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