PLANT IMMIGRANTS

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GENERA REPRESENTED IN THIS NUMBER.

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Foreign Seed and Plant Introduction.

EXPLANATORY NOTE.

This multigraphed circular is made up of descriptive notes furnished mainly by Agricultural Explorers and Foreign Correspondents relative to the more important introduced plants which have recently arrived at the Office of Foreign Seed and Plant Introduction of the Bureau of Plant Industry of the Department of Agriculture, together with accounts of the behavior in America of previous introductions. Descriptions appearing here are revised and published later in the INVENTORY OF PLANTS IMPORTED.

Applications for material listed in these pages may be made at any time to this Office. As they are received they are placed on file, and when the material is ready for the use of experimenters it is sent to those on the list of applicants who can show that they are prepared to care for it as well as to others selected because of their special fitness to experiment with the particular plants imported. Do not wait for the annual catalogue entitled NEW PLANT INTRODUCTIONS which will be sent you in the autumn and in which will be listed all plants available at that time. Regular requests checked off on the check list sent out with the catalogue are not kept over from year to year. If you are especially interested in some particular plant in the catalogue write and explain in detail your fitness to handle it.

One of the main objects of the Office of Foreign Seed and Plant Introduction is to secure material for plant experimenters, and it will undertake as far as possible to fill any specific requests for foreign seeds or plants from plant breeders and others interested.

David Fairchild,

Agricultural Explorer in Charge.

January 21, 1918.

Amaranthus gangeticus L. (Amaranthaceae.) 44566. **Amaranth** seeds from Peking, China. Collected by Mr. Frank N. Meyer, February 17, 1917. "A red Amaranth, used locally as a vegetable, like spinach, when young. Sometimes the seed is sown in a moist, dark, warm place; and the young, red-colored seedlings are eaten as a rare delicacy at feasts. The seed itself is apparently never used in the north of China as a grain food. Chinese name *Hung hsien ts'ai,* meaning 'Red hsien vegetable'." (Meyer.)

• *Amaranthus paniculatus* L. (Amaranthaceae.) 44469. **Amaranth** seeds from San Juan Batista, Tabasco, Mexico. Purchased from Mr. Cabriel Itié, Director, Agricultural Experiment Station. "*Alegria* is produced in Tlajomulco, Zacoalco and San Pedro Tlaquepaque, districts belonging to the state of Jalisco. This annual is sown in nurseries; in the month of December it is harvested and is used in the making of sweets. I was told that the seeds in question are found with difficulty in the pueblos near Guadaljara, for the inhabitants do not put them to any practical application and if they are sometimes used, it is when they are mixed with dulce for children; they are surely very insipid. They are also seen in the state of Michoacán, where they are used for the same purpose." (Itié.)

Ampelopsis aconitifolia Bunge. (Vitaceae.) 44549. Seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A very handsome vine from northern China, with finely divided foliage. The leaves are 5-parted and 2 to 3 inches long; the inconspicuous flowers appear in summer; and the small orange berries mature in autumn. It should be planted where only a light covering is desired, and is hardy in the northern United States. (Adapted from L. H. Bailey, Standard Cyclopedia of Horticulture, vol. 1, p. 278.)

Annona (cherimola x squamosa) x reticulata. (Annonaceae.) 44671-44673. **Cuatemoya** cuttings from Lamao, Bataan, Philippine Islands. Presented by Mr. P. J. Wester, Horticulturist, Lamao Experiment Station. Obtained by the pollination of an atemoya (*A. cherimola x squamosa*) by a custard-apple (*A. reticulata*). The fruit is well shaped but rather small, about the size of a sugar-apple, with a yellowish green, almost glabrous surface; very thick tough skin; and white, tender melting, juicy,

subacid, aromatic flesh of excellent flavor. (Adapted from P. J. Wester, Philippine Agricultural Review, February, 1914.)

Castanopsis sclerophylla (Lindl.) Schottky. (Fabaceae.) 44663. Seeds from Nanking. An evergreen tree, 25 to 65 feet tall, growing in woods of Hupeh and Chekiang, China, at elevations up to 1500 m. (5000 feet). It is a handsome tree with nearly smooth, dark gray bark, and a densely-branched flattened crown. The natives gather the small chestnut-like nuts and crush them, making an edible paste resembling bean-curd in appearance and the chinkapin in flavor. (Adapted from C. S. Sargent, Plantae Wilsonianae, vol. 3, p. 201, 202, 1916.)

Catalpa bungei C. A. Meyer. (Bignoniaceae.) 44664. Seeds from Nanking, China. Presented by Prof. Joseph Bailie, University of Nanking. A quickly-growing Chinese tree, up to 100 feet in height and with a trunk 10 to 15 feet in diameter a few feet above the ground. The wood, which is strong, light, durable and non-warping, resembles walnut to a large extent and is much in demand for fine furniture. The tree might be cultivated in the semiarid sections of the United States where the winters are not too severe. It prefers a porous soil, and is easily propagated from suckers which spring up from the roots that are near the surface of the ground. (Adapted from note of Frank N. Meyer.) Not the dense round bush ordinarily grown as *C. bungei* Hort.

Clerodendrum trichotomum fargesii (Dode) Rehder. (Verbenaceae.) 44533. Seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A Chinese shrub, 3.5 to 4 meters (10 to 15 feet) in height; with dark green, oval, lance-shaped leaves, 10 to 15 cm. (4 to 6 inches) long; very fragrant, light pink flowers in axillary cymes; and dark purple drupes, 4 to 5 mm. (1/5 inch) in diameter, with very hard, black seeds. It is easily raised from seed, in ordinary soil. (Adapted from J. Pinelle, in Revue Horticole, vol. 83, p. 522-523, under *C. fargesii.*)

Cunninghamia lanceolata (Lamb.) Hooker. (Pinaceae.) 44665. Seeds from Nanking, China. Presented by Prof. Joseph Bailie, University of Nanking. "This handsome tree is found all over the temperate parts of China

from sea level up to 2000 m. altitude, but does not occur where the winters are severe. It is abundant in Fukien, Hunan, and Hupeh, and more especially so in western Szechwan where it is partial to red sandstone and forms pure forests. The trunk is mast-like; the branches numerous, slender, short, and horizontally spreading, giving a lax, pyramidal appearance to the tree. The leaves, usually dark green above, are frequently more or less glaucescent. After felling, sprouts spring from the old stumps and develop into new trees. This peculiarity explains why this tree is still common in regions near densely populated areas. Cunninghamia is the *Shan shu* of the Chinese, and is esteemed the most useful of all their timber trees. The wood is fragrant, soft, and easily worked; and is extensively employed in all branches of carpentry, in general construction work for pillars and planking, and as masts for native boats. It is also the principal coffin wood of central and western China, the fragrant properties being considered to act as a preservative. In parts of western Szechwan, notably in the Chienchang valley of the Tung river, a few days' journey west of Fulin, whole forests of this tree were engulfed by an earthquake two or three centuries ago. The wood of these trees is today mined and furnishes the most valuable of all coffin material. From these logs, known as *Hsiang-mu,* 'fragrant wood', or *Yin-chen-mu,* 'long-buried wood', planks of huge size can be cut, and a coffin made of them sells for a thousand to fifteen hundred ounces of silver. This buried wood is pale brown, close in texture, but easily worked and pleasantly fragrant. Trees of this conifer, equalling in size those buried giants, cannot be found in China today except as rare and isolated specimens associated with temples or shrines." (C. S. Sargent, Plantae Wilsonianae, vol. 2, p. 51-52, 1914.)

Dioscorea sp. (Dioscoreaceae.) 44588. **Yam** tuber from Ogbomosho, Nigeria, West Africa. Presented by Dr. George Green. The natives plant yams following a good shower in the summer or dry season (November to March). Such a storm usually comes about the end of January. The yams are cut cross-wise into sections about three inches thick, and these sections are cut longitudinally. Only 1 piece is planted, about 4 inches deep, in each of the hills or heaps, which are about 3 feet in diameter, 2 feet in height, and 4 feet apart. A tuft of grass is placed on top of the hill to protect the

planted yam from the sun, and soil is thrown on to prevent the wind blowing the grass away. The vines are supported by stout sticks or often by broken cornstalks. Yams require about 6 months to mature, those planted in January being ready for digging in July. Yams may be left in the ground for a week or two after the vines have died down. (Adapted from note by Green.)

Drimys granatensis Mutis. (Magnoliaceae.) 44701. Seeds from Bogota, Colombia. Presented by Mr. M. T. Dawe, Director, Estacion Agronomica, San Lorenzo, Tolima, Colombia. A white-flowered evergreen shrub, 5 to 12 feet in height; with few branches, and oval-oblong leathery leaves with rounded ends. The few-flowered umbels appear near the ends of the branches, and the obovate fruit is berry-like, ¼ inch long, with succulent flesh enclosing the numerous seeds. From the crushed leaves a tonic is prepared, the bark is the basis of an aromatic tonic, and the dried fruits are used as a spice. (Adapted from M. A. de Saint-Hilaire, Plantes Usuelles des Brasiliens, plates 26-28, 1824.)

Docynia delavayi (Franch.) Schneider. (Malaceae.) 44677. Seeds from Yunnanfu, Yunnan, China. Purchased from Mr. Frank Pilson. An ornamental evergreen, spiny tree, up to 30 feet in height; with glossy, ovate-lanceolate leaves, 2 to 4 inches long; and umbels of white flowers which appear in the spring. The fruit is an ovoid pome about an inch long. The tree is a native of southwestern China, and has recently been introduced into the United States. The fruits are more or less acid and are used for cooking. They could possibly be improved by selection and hybridization. The tree is propagated by seeds, and might possibly be grafted on apple stock. (Adapted from Bailey, Standard Cyclopedia of Horticulture, vol. 2, p. 1063.)

Eleocharis tuberosa (Roxb.) Schultes. (Cyperaceae.) 44573. Tubers from Yokohama, Japan. Purchased from the Yokohama Nursery Company. They are mostly eaten raw, but are also sliced and shredded in soups, and in meat and fish dishes. Foreigners in China grate them and serve them as a winter vegetable, in which state they resemble sweet corn very much in looks and taste. The plants need a hot summer to mature and are grown on a muck or clayey soil with several inches of standing water on top, very much in the same manner

as wet land rice. (Adapted from Notes by F. N. Meyer.) According to Mrs. Yamei Kin this water chestnut is planted in hills 3 ft. apart in soil enriched by hog manure and after the plants have started well then they are flooded and kept flooded until the frost cuts back the foliage then the water is drained off and the hills are dug with a broad bladed hoe and the tubers taken out of each hoe full of mud.

Ficus carica L. (Moraceae.) 44472. **Fig** plants from Granada, Spain. Purchased from the Pedro Giraud Nurseries, through Mr. Percival Gassett, American Consul, Malaga. "*Isabeles,* the most delicious fig and much sought after." (Gassett.)

Ficus pseudopalma Blanco. (Moraceae.) 44470. Seeds from the Philippine Islands. Presented by Mr. Elmer D. Merrill, Acting Director, Bureau of Science, Manila. "A single fruit of *Ficus pseudopalma* which apparently has fertile seeds. This fruit was recently sent to me from Corregidor. The species is a most striking ornamental and will probably thrive out of doors in southern Florida and in southern California, and is well worthy of cultivation in greenhouses. The stems are erect, unbranched, and usually about 3 cm. in diameter. The stem is tipped by a dense crown of very characteristic leaves which is sometimes nearly a meter in length. The fruits are born in the leaf axils. On account of its palm-like aspect Blanco selected the name *pseudopalma;* the common Tagalog name is *niogniogan* which literally means little coconut." (Merrill.)

Liquidambar formosana Hance. (Hamamelidaceae.) 44666. Seeds from Nanking, China. Presented by Prof. Joseph Bailie, University of Nanking. A handsome tree, 20 to 40 m. (65 to 130 feet) in height, with a straight trunk, a much-branched head, and frequently buttressed roots. The leaves turn to a chestnut-brown or red in the autumn, and are retained late into the winter. In juvenile plants the trees are 5-lobed, while in the adult trees the leaves are only 3-lobed and are smaller. In Kiangsi the wood is used for making tea-chests. This is one of the most widely distributed trees in China, being particularly abundant in western Hupeh; and it is cultivated in Japan. (Adapted from C. S. Sargent, Plantae Wilsonianae, vol. 1, p. 421-422, 1913.)

Lonicera standishii Carrière. (Caprifoliaceae.) 44537. **Honeysuckle** seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A charming, early-flowering shrub, with pale yellowish brown branches; pale green, nearly oval, deciduous leaves, 3 to 5 inches long; and white, sweet-scented flowers, 1/5 to 1/2 inch long. (Adapted from Curtis's Botanical Magazine, vol. 94, plate 5709.)

Malpighia punicifolia L. (Malpighiaceae.) 44458. Seeds from Curacao, Dutch West Indies. Collected by Mr. H. M. Curran. A shrub, native of the Dutch West Indies, about 12 feet high, with smooth, oval leaves, 4 cm. (1 3/5 inches) long; flowers in the axils of the leaves; and edible stone fruits. In some of the islands this is called cherry. (Adapted from I. Boldingh, Flora voor de Nederlandsch West Indische Eilanden, p. 239.)

Malus sp. (Malaceae.) 44577. **Apple** trees from Yokohama, Japan. Purchased from the Yokohama Nursery Company. "A variety of apple known in Japan as the *Iwai* or *Nakanaruko.* This variety is supposed to have come from this country, but it has also been said that it is of German origin. It has become a leading fall variety in Japan." (J. K. Shaw, pomologist, Massachusetts Agricultural college.)

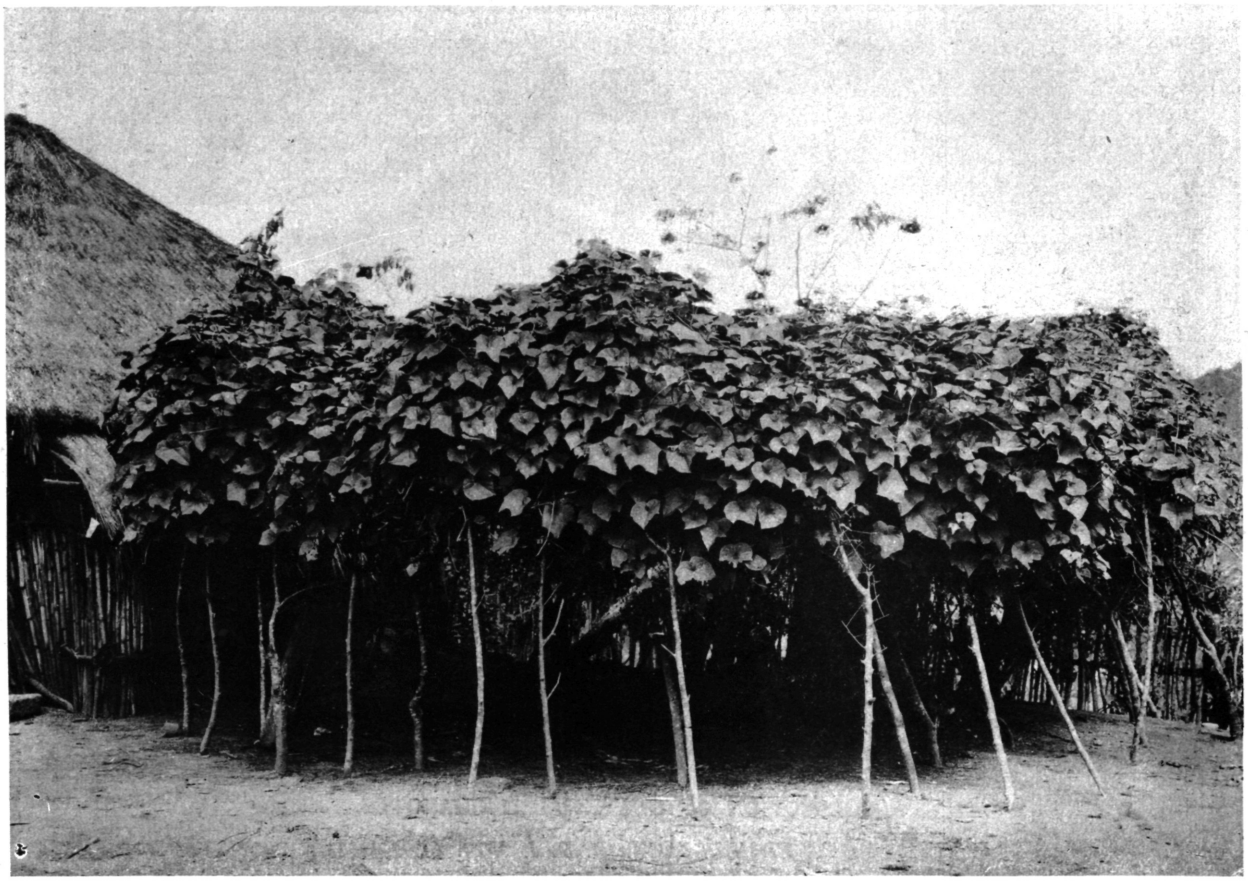
Prunus conradinae Koehne. (Amygdalaceae.) 44538. **Cherry** seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A graceful tree from central China, reaching a height of 25 feet, with oval or oblong, doubly serrate leaves, 2 to 6 inches long; whitish or pink flowers, about 3/4 inch long, in 2 to 4-flowered umbels; and red, ovoid fruits, 1/3 to 1/2 inch long. (Adapted from A. Rehder, in Bailey, Standard Cyclopedia of Horticulture, vol. 5, p. 2840.)

Prunus tomentosa Thunberg. (Amygdalaceae.) 44539. **Cherry** seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A broad, vigorous shrub from northern China, one of the earliest cherries to flower. The flowers are large, with the white petals more or less tinged with red toward the base; and the small, bright red, slightly hairy fruits are of good flavor. It is now being cultivated in the northwestern parts of the United States, and in south-

A COLLECTION OF GUATEMALAN CHAYOTES.

(*CHAYOTA EDULIS* JACQ., *S. P. I. NOS. 43393–43401.*)

Mr. Wilson Popenoe has sent in from the city of Guatemala a very interesting collection of the types of chayote which are grown there. It is particularly interesting to observe the variation in this fruit, since there is only one species known in the genus. It would appear to be a very old cultivated plant in Guatemala. It is still an open question whether the smooth types of fruit with scarcely any longitudinal furrows, although more convenient for cooking, will yield as abundantly or have as fine a flavor and texture as the furrowed form already growing in Florida and Louisiana. (Photographed by E. L. Crandall, October 11, 1916; P20016FS.)



A CHAYOTE ARBOR IN A GUATEMALAN VILLAGE.

It is important to realize that in its native home, Guatemala, the chayote, or "güisquil," as it is called there, is one of the most important vegetables grown. It is cultivated on low arbors much like those used for the Scuppernong grape in our Southern States. To the Guatemalans it is what a perpetual cucumber vine would be to Americans. (Photographed by Wilson Popenoe at Santa Maria de Jesus, Guatemala, October 20, 1916; P16878FS.)

western Canada, where other cherries are not hardy. (Adapted from the Arnold Arboretum Bulletin of Popular Information, No. 19, April 25, 1912.)

Pyrus sp. (Malaceae.) 44674-44675. **Pear** cuttings from Ningpo, China. Obtained by Rev. L. C. Hylbert, American Baptist Mission, through Rev. G. W. Sheppard, English Methodist Mission. These cuttings were sent in response to a request for propagating material of certain pear trees growing on the Island of Chusan which produce immense fruit. Mr. Hylbert reports that "the cuttings were secured from a gentleman's garden, and are said to be beyond price."

Rosa banksiae normalis Regel. (Rosaceae.) 44544. **Rose** seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. "This Rose is very abundant in western Hupeh and eastern Szechwan from river-level to 1000 m. altitude and is fairly common in western Szechwan in the valleys of the Tung and Min rivers and neighboring regions up to 1500 m. altitude. It delights in glens, ravines and rocky places generally, where it forms tangled masses 6 m. and more high, and as much in diameter; commonly it rambles over trees, and Wilson has seen trees 15 m. and more tall, completely festooned with this Rose. The flowers are always pure white, and we have never observed any tendency towards double flowers in the wild plant; nor did Wilson see it or any of its forms cultivated in gardens in central or western China. The umbellate inflorescence well distinguishes this species from its nearest relation *Rosa microcarpa* Lindley. The root-bark is used locally for strengthening fish nets and dyeing them brown." (C. S. Sargent, Plantae Wilsonianae, vol. 2, part 2, p. 317.)

Rosa moyesii Hemsley & Wilson. (Rosaceae.) 44545. **Rose** seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. Forma *rosea* Rehder & Wilson. An upright bush, found in western Szechwan, China, up to 3300 m. (11,000 feet) elevation, growing to a height of 1 to 5 m. (3 to 16 feet), and distinguished from the typical species by its large leaves and large pale pink flowers. The large fruits are either dull red or scarlet. (Adapted from C. S. Sargent, Plantae Wilsonianae, vol. 2, part 2, pp. 325, 326.)

Rosa rubus Leveille & Vant. (Rosaceae.) 44546. **Rose** seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A climbing shrub, common everywhere in western Hupeh and eastern Szechwan, China, from river-level to an elevation of 1300 m. (4200 feet.) It is readily distinguished from its near relatives by the densely hairy shoots and leaves, and grows to a height of 2.5 to 4 m. (8 to 13 feet), with dull red, globose fruits. (Adapted from C. S. Sargent, Plantae Wilsonianae, vol. 2, part 2, pp. 308, 309.)

Solanum tuberosum L. (Solanaceae.) 44580. **Potato** tubers from Bogotá, Colombia. Presented by Mr. Jorge Ancizar. *Papa criolla,* or Creole potato. The tubers are shaped like those of the common potato but are only about an inch in the shortest diameter. They are said to mature in three months; and are reported to be delicious when fried in their skins.

Styrax wilsonii Rehder. (Styracaceae.) 44595. Plants from Orléans, France. Purchased from Messrs. Léon Chenault & Son. A very ornamental, deciduous shrub, 6 to 10 feet high; native of western China. Twiggy and much-branched, with ovate, green leaves, $\frac{1}{2}$ to 1 inch long, usually entire but sometimes with the ends 3-lobed or sparsely toothed. The solitary, nodding flowers are pure glistening white, $\frac{5}{8}$ to $\frac{3}{4}$ inch wide, and are produced in June on short stalks from the leaf-axils. The shrub is remarkable in that it begins to flower when only a few inches high and two or three years old. It is probably hardy as far north as Philadelphia. (Adapted from W. J. Bean, Trees and Shrubs Hardy in the British Isles, vol. 2, p. 560, and from A. Rehder, in Bailey, Standard Cyclopedia of Horticulture, vol. 6, p. 3279.)

Viburnum kansuense Batalin. (Caprifoliaceae.) 44547. Seeds from Ventimiglia, Italy. Presented by the Superintendent, La Mortola Botanic Gardens. A tall Chinese shrub, of loose and open habit, found at elevations of 6000 to 9000 feet. It has oblong leaves, and juicy, red berries which are used in making agreeable drinks. (Adapted from note of Frank N. Meyer, May 11, 1915.)

Zea mays L. (Poaceae.) 44564. Seeds from Rosario, Argentina. Presented by Mr. William Dawson, Jr., American Consul. *Maiz amargo.* A so-called "bitter corn," grown in the Chaco region of Argentina as a locust-proof variety. Otherwise it seems to have no advantages, as the yield is but one-fourth to one-half that of other varieties and the development is extremely slow, requiring from nine to ten months to mature.

Zinziber mioga Roscoe. (Zinziberaceae.) 44579. Roots from Yokohama, Japan. Purchased from the Yokohama Nursery Company. A perennial Japanese herb about 3 feet high, with nearly linear, smooth, membranous leaves, up to 15 inches long; white flowers in spikes, 2 to 3½ inches long; and ovoid capsules. It occurs wild and also in cultivation. In summer and autumn the flowers, with the bracts, are eaten, either raw or boiled; they have a slightly acid taste and an aromatic odor. (Adapted from Useful Plants of Japan, p. 30, and from F. Tracy Hubbard, in Bailey, Standard Cyclopedia of Horticulture, vol. 6, p. 3544, the former under *Amomum mioga.*)

Notes from Correspondents abroad.

Mr. Eugene André writes from Port-of-Spain, Trinidad, B.W.I., October 22, 1917:

"I enclose two bulletins of our Department of Agriculture. Part 1, Vol. 16, pages 18-20, gives the results of certain experiments made by the Government in 1915-1916 with the object of acquiring definite knowledge as to the yield of the various kinds of cassava grown by our peasantry. The spot where the experiments were conducted forms part of the old St. Augustine Sugar estate, one of the oldest estates in the island. Bulletin Part 2, Vol. 16, deals with other matters connected with the cassava industry here. Unfortunately, the inhabitants of Carenage, in spite of the inducements offered to them, would not take up the growing of cassava on a scale that would have kept the factory busy, so that this part of the enterprise has been a failure. Speaking generally, comparatively little cassava is grown here. The laboring man has got used to his wheaten loaf and he turns his nose up at the disks of cassava which is the staple of the Venezuelan poor. Like cassava corn is but little used as a bread, but corn is more widely grown than cassava because it is the food generally given to our domestic

fowls, ducks, etc. In addition to what is grown locally much corn comes from the neighboring mainland. This is eagerly bought up as we do not grow nearly enough to supply our wants. The present price is $2.60 per bag of 110 pounds. In times of scarcity prices range from $3.50 to $5.00 per bag. We are large importers of rice, although of late years local production has been steadily increasing. Up to within a few years we did not grow a single pound of this cereal in spite of the fact that several hundreds of square miles of land in different parts of the island are as fine ricelands as can be found anywhere in the world.

"The whole fact of the matter is that our agriculture and food problems are largely artificial, if I may put it so. The sugar, cacao, and coconut people are interested in exportation not in production for local consumption. The importing merchant would be very sorry to see cassava and corn replace flour from the United States and Canada, which means that neither of these valuable foods is cultivated on a scale that would enable me to give you such definite information as would be of use for your tropical possessions.

"It is only since the war that the dasheen has come into prominence in Trinidad, the high prices of flour, imported, so-called Irish potatoes, and other vegetables having contributed to this. Today, dasheens are being eaten in houses where the very name was unknown a couple of years ago. Formerly, dasheens were sold as cheap as a cent or a cent and a half per pound, now housekeepers consider themselves in luck if their cooks can get them dasheens at three cents. Whether a popular flour for bread-making will ever be prepared from it is a doubtful question; but there is no doubt about its having become a popular vegetable, which it was not before. Two varieties are being grown here; a white and a purplish; the latter looking, when boiled, like blue-mottled soap. The white is preferred. Our Forest Department is making some experiments with dasheens in the Southern District where a twenty-acre block at the Central Range Reserve has been planted up with them as a cover crop for the seedlings of cypress, cedar, and teak, which are being grown there. I suppose something will be published on the subject later on. I shall look out for it and send a copy along to you.

"Years ago, you were kind enough to send me a couple of plants each of *Trapp* and *Pollock* avocados, of which one of each has grown into quite a good-sized

tree. For the last three years they have fruited profusely. *Pollock* is by far the better of the two and is, to my mind, the best avocado I know of."

Mr. Frank N. Meyer writes from Kingmen, Hupeh, China, September 27, 1917:

"To get exact temperatures of places here in central China where the Tung oil tree occurs, is a very hard matter. Around here in Kingmen, there are several trees and last winter the ice was 7 to 8 inches thick. Mr. Joel S. Johnson, a Swedish-American missionary here, estimates that it probably was 10° above zero for several nights this past winter. In the mountains, however, it must have been zero and yet, even there one finds Tung oil trees. Of course, we here in China do not have cold waves like America experiences them. Temperatures rise and fall very gradually. It is the sudden falls of the mercury that do the damage.

"I'll try to get more information regarding quality of oil from various localities. Strange, that Californian oil indicated adulteration. Could a semi-arid, subtropical climate produce that effect? Here is what I have found out; climate makes or destroys a race; after climate, soil influences most; after soil surrounding influences come and last of all the original stock tells.

"Your statement that out of Tung oil a valuable rubber-substitute is made, brings up an interesting point which I have not told you yet. This is the thing:

"After I had given a lecture in the church of the missionary community at Mokanshan, Chekiang Province, in July, 1915, a number of people came around me and told me various experiences. One missionary from South Chekiang informed me that once having been out in the country he had his long rubber boots with him for many weeks. Upon coming back these boots had been packed up roughly and deposited somewhere and forgotten. After many months' lapse this missionary found them and he discovered to his dismay that they had bad cracks in them just above the ankles. Just as he was intending to cut them off, so as to save the nether parts for goloshes, his servant said to him, 'Don't do this, I can have them repaired for you!' 'Well, the missionary said, 'even we white folks do not know how to repair rubber boots so that they are reliable, so how could Chinese do it who haven't even got rubber?' But he allowed his man to have them re-

paired and when they came back, after some weeks' time, they had strips of glue-like material upon them and were absolutely waterproof; later on other parts of the boots became again cracked, but these repaired places remained as elastic as ever. When asking what wonderful material this was, his servant told him it was *Tung yu.* This missionary added that if he were a commercial man, this discovery might have made him a wealthy fellow in a short time. So here you have something to make a fortune with!"

"You ask me whether there is a simple flavoring to take away the beany taste of beancurd. No, there is not! The Chinese are of course used to this peculiar paint or putty-like flavor, but even then they often season their beancurd dishes highly with salt and chili peppers. I have noticed though that the curd in some towns tastes much better than in others and I found that greenish yellow soybeans have a coarser taste and flavor than the light yellow ones. I have some idea that the quality of oil has something to do with this characteristic. If I were you I would try to cook with superheated steam for a considerable time and see if that does not remedy the matter considerably. Remember that the Boston baked beans need a whole night and morning of slow heat before they really are 'tasty'.

"You also might try to de-fatten the beans, before making them into curd. Before doing so, first see whether bean cake can be used for making curd; if so, we are on the road to kill 2 birds with 1 stone.

"Whether there are more vegetable seeds that can be sprouted and used as vegetables? Well, here are some that I came into contact with:

"*Phaseolus angularis,* Adzuki bean, the speckled grayish black variety supplies the finest quality of beansprouts, of very sweet and juicy flavor. The red varieties are boiled, pounded with sugar and used as a filling in cakes and as sweetmeats.

"*Phaseolus aureus,* Mung bean, the ordinary sea-green variety supplies good beansprouts, vermicelli and gelatine, also much eaten boiled with rice as a broth or gruel.

"*Soja max,* the small green and yellowish green varieties are sprouted, but the sprouts have a rank flavor; the large green varieties are allowed to germinate only or often not even that and are fried in oil and some salt sprinkled over them; they are very

appetizing. Often they are served with bits of raw, chopped-up carrots in between, creating a dish pleasing to the eye.

"From the small yellowish green soybeans, beancurd is made in all its forms. The large yellow varieties are used for oil production.

"Broadbeans, *Vicia faba,* are in winter and spring soaked in water over night, often even allowed to germinate and are fried in oil and salt sprinkled over them and eaten like salted peanuts.

"Peas, *Pisum sativum,* brown and yellow varieties are in wintertime soaked in water over night and steamed or fried in oil, sprinkled over with a bit of salt and eaten as a vegetable; flavor excellent. When the peas have made sprouts of 2-4 inches long, they are scalded and eaten like spinach, pea and sprouts left attached; they do not taste very fine. From water-soaked ground peas a gelatine is made, much eaten in summer, resembling a primitive form of 'blanc mange'.

"Mustard seed, *Brassica juncea,* in wintertime is sown out in warm, moist and dark places and the tiny plants eaten with brown sugar sprinkled over them.

"*Amaranthus blitum* and *A. tricolor* are eaten the same way. Chives, *Allium schoenoprasum,* are forced in dark, warm places and eaten in soups, with meats and baked in extremely thin pancakes, made from yellow soybean flour. They are considered, together with the garlic, to prevent ptomaine poisoning. Of all these forced winter vegetables the *Mung bean* is the most commonly used, on account of cheapness and availability, but in my opinion the *Adzuki beansprout* is the best. There is a future in breeding fine varieties of *Vigna sinensis* and *Vigna sesquipedalis:* they stand moist heat and drought at the same time and can be made to bear throughout the whole summer. *Ipomoea aquatica* is, like *Tetragonia expansa,* a summer spinach; it loves moist soils. The Wax-gourd, *Benincasa cerifera,* is like the chayote, a good late summer and winter vegetable. After I have been in Southern China, I may have some more things to write about. Did you have a look at my photographs of soybean products? I hope they have given you, and others, some ideas how big an affair the soybean is in the daily life of one fourth of the world's population and if the white races do not soon stop committing suicide, these people will, by the year 2000, constitute one third of the earth's inhabitants."

United States Department of Agriculture.
Bureau of Plant Industry.
Office of Foreign Seed and Plant Introduction.
Washington, D. C.

Washington Scientific Staff.

David Fairchild, Agricultural Explorer in Charge.
P. H. Dorsett, Plant Introducer, in Charge of Plant Introduction Field Stations.
B. T. Galloway, Plant Pathologist.
Peter Bisset, Plant Introducer, in Charge of Foreign Plant Distribution.
Frank N. Meyer, Wilson Popenoe and F. C. Reimer, Agricultural Explorers.
H. C. Skeels, S. C. Stuntz, and R. A. Young, Botanical Assistants.
D. A. Bisset, R. N. Jones, P. G. Russell, and G. P. Van Eseltine, Assistants.
Edward Goucher, Plant Propagator.
Henry Y. Gouldman, Laboratory Aid.

Field Stations Scientific Staff.

R. L. Beagles, Superintendent in Charge, Plant Introduction Field Station, Chico, Cal.
E. O. Orpet, Assistant in Plant Introduction.
J. M. Rankin, Superintendent in Charge, (Yarrow) Plant Introduction Field Station, Rockville, Md.
Harry Duffield, Jr., Assistant in Plant Introduction.
Edward Simmonds, Superintendent in Charge, Plant Introduction Field Station, Miami, Fla.
J. E. Morrow, Superintendent in Charge, Plant Introduction Field Station, Brooksville, Fla.
Henry E. Juenemann, Superintendent in Charge, Plant Introduction Field Station, Bellingham, Wash.

Collaborators.

Aaron Aaronsohn, Haifa, Palestine; Thomas W. Brown, Cairo, Egypt; H. M. Curran, Laurel, Md.; M. J. Dorsey, University Farm, St. Paul, Minn.; Gustav Eisen, New York City; E. C. Green, Serviço do Algodao no Brazil, Rio de Janeiro; A. C. Hartless, Seharanpur, India; Barbour Lathrop, Chicago, Ill.; C. C. Logan, Luray, Va.; H. Nehrling, Gotha, Fla.; Miss Eliza R. Scidmore, Washington, D. C.; Charles Simpson, Littleriver, Fla.; H. P. Stuckey, Experiment, Ga.; Dr. L. Trabut, Director, Service Botanique, Algiers, Algeria; H. N. Whitford, School of Forestry, New Haven, Conn.; E. H. Wilson, Arnold Arboretum, Jamaica Plain, Mass.