

and a rapid decline so that there were periods of several weeks to a month where the level was extremely low whereas with materials such as cyanamid, a relatively uniform level could be maintained. Though production figures were not available it seemed that on areas where a uniform level was maintained better, more uniform production occurred.

Late in 1950, in cooperation with a local grove caretaker, studies were started on a mature grove covering irrigation and fertilizer practices. Ten blocks of trees approximately one acre each having 85 to 90 trees were used. The following is the layout of the plots.

Block 1. No irrigation, but the area will be fertilized in accordance with general practices maintained by the grower.

Block 2. By use of soluble materials, attempt will be made to maintain the nitrate level at 100 PPM or more.

Block 3. Nitrogen derived from Nitrea (P K and MgO), same as applied to the remainder of the grove, applied twice a year, in June and late December or early January.

Block 4. Nitrea, same as block 3, except NuGreen, at the rate of 5 pounds per 100 gallons, applied as a foliage spray, as buds are breaking and when the fruit is setting.

Block 5. Regular fertilizer, plus NuGreen as foliage spray, 5 pounds per 100 gallons of water every 30 days.

Block 6. Regular surface feeding until fruit is set, then sprayed every 10 to 14 days with 10 pounds of NuGreen per 100 gallons of water.

Block 7. Regular grove fertilizer, trees mulched with tobacco stems or scrap paper.

Block 8. Check, regular grove practices.

Block 9. Regular fertilizer applications plus spraying at bloom with Napthalene acetic acid.

Block 10. Nitrogen derived from cyanamid otherwise P K and MgO, same as regular treatment.

Until completion of the work, only 2, 3, 4 and 10 will be summarized.

For 1951, production records were not available. By tree count the fruit for blocks 2, 3 and 4 were as follows:

Block 2	47	fruit per tree.
3	72	
4	72	

Production records were available in 1952 and were as follows:

Block 2	43	fruit per tree.
3	58	
4	49	
10	48	

As will be noted, production was lowest on block 2, on which the source of nitrogen was a readily available material. Though nitrogen fertilizers were applied five times during the year the area could not be maintained at a constant high level and fluctuated widely, while the level on block 3 and 4 remained quite constant.

Indications are that when an adequate level of nitrogen is maintained along with a good supply of other elements as P K and MgO, production is higher than where the level of N varies widely.

On non-irrigated groves our data show that during the drier part of the year, more readily available material will give better results. To get maximum benefit from organics, an adequate level of moisture must be maintained.

THE GEOGRAPHIC AND NATIVE PLANT NAME APPROACH TO WORLD-WIDE ECONOMIC PLANT DISTRIBUTION AND EXCHANGE

G. WEIDMAN GROFF

Lingnan Plant Exchange

Laurel, Florida

(Continued from the 1952 Proceedings, pp. 203 to 209.)

AN ODE TO SAPINDACEAE

*What wondrous beauty, strength and grace
Your forms have painted on earth's face!
In forest dark, and damp and hot
Nephelium rises on a spot
Where fowl alight, in weary flight,
And view thereon a glorious sight*

Of luscious fruits, so red, so rare
 That birds and beasts compete to share.
 And far beyond, in cooler climes,
 Sapindus berries cleanse the line
 Of clothes, which man since Adam wears;
 And oft' alas! in labor tares.
 But stranger still, on China's soil,
 Where men of will so bravely toil,
 Is Litchi, loved, and culture trained;
 And Koelreuteria, 'Golden Blossoms' rained.

The fields of study of the botanist, looking down upon the plants of the earth through a microscope, and those of the astronomer, looking out to the stars in the heavens through a telescope, at least coincide in one respect. The stars in the sky and the plants upon the earth, in number are as the sands of the sea.

There are great and lasting values to be gained through an analytical use of the mind in naming, describing and cataloguing the physical wonders of creation. But the marvel

Tribe IX—**Cupanieae**. 48 genera and 404 species, by far the largest tribe in the family. However, to date only about 10 species seem to have attracted some garden interest. These are tropical evergreen trees and shrubs, a few valued for their wood. Further field work and study should reveal considerably more native usage and folklore.

The chief world centers of origin of the tribe are 3 in number: (a) The Pacific Islands, south-eastward to Australia, and westward and northward to the Asiatic mainland. Within this area there have been described 28 genera and 247 species. There are 10 endemic, monotypic genera: 2 in the Philippines, 1 in Siam, 2 in Indo China, 1 in Hainan, China, 2 in Australia and 1 in New Guinea, a main center of origin of the tribe. Considerably off line, in Zanzibar, East Africa, is also 1. (b) The African-Madagascar subdivision, with 9 genera and 60 species. These are moderately sized genera, each with 5 to 12 species, except for *Bemariwea* of Madagascar which is endemic and monotypic. Within this group is *Blighia sapida* Koen. the 'Akee,' a semi-popular tropical fruit which apparently reached the American tropics from Africa where it is highly developed and widely grown. Later in cultivation it was carried into the Pacific and Asiatic areas. It seems to be the only important economic species of the tribe. (c) The Tropical American Subdivision, an independent group of 11 genera and 97 species. *Cupania*, 42 species, and *Marayaba*, 43, are quite widespread in distribution, the former attracting far more attention by plantmen than has the latter. All other genera have only 1 or 2 species. In Brazil, especially in the northern portions, are found 5 genera; also in Guiana, Argentine, Costa Rica and Peru, 1 each.

The independence of each of the above centers in *Cupanieae* origins, natural relationships and distribution is impressive. Only *Allosanthus* of Peru seems possibly derived from *Eriocaelum*, a tropical African genus of 9 species, one of which is also of South American origin, in Spanish Guiana.

Phylogenetic number, genus name, author and date	Center of origins	Total no. of species, and no. in cult.	Important species, uses and common names
165.69— <i>Cupania</i> Plum. ex Linn. 1737, 1753.	Widespread in American tropics and subtropics. A moderate representation is also found in the Pacific area, especially Australia.	42/5 or more	<i>Cupania</i> is also the common name. The species of most interest are: <i>C. glabra</i> Sw., a tree native to the hammocks and keys of southern Florida, at one time thought to have been exterminated. <i>C. cubensis</i> Maza. and Molinet is an attractive evergreen shrub or small tree of the West Indies which has been under observation at the Harvard Botanical Gardens in Cuba. It was introduced from there into the United States under SPI. No. 115: 26987. <i>C. americana</i> L. is a Mexican shrub or tree, to 30 feet in height and also introduced into the United States through Harvard Botanical Gardens, Cuba, SPI. Nos. 95: 77161 and 103: 87509. <i>C. anacardioides</i> , a slender tree about 40 feet high, native to the Moreton Bay area of Queensland, Australia, has been used more successfully in various areas as a garden ornamental than possibly any other species. A number of other species of <i>Cupania</i> have been introduced into the United States from Brazil and other South American countries. See U.S. Plant Inventory Bulletins Nos. 64, 95, 103, 115, 121, 122, 131, 151. <i>Cupania sapida</i> is a synonym of <i>Blighia sapida</i> , the 'Akee.'
.70— <i>Vouarana</i> Aubl. 1775.	Guiana and Brazil.	1/	<i>V. guianensis</i>
.71— <i>Scyphonychium</i> Radlk, 1879.	N. Brazil.	1/	<i>S. multiflorum</i>
.72— <i>Dilodendron</i> Radlk. 1878.	Brazil, Paraguay, Bolivia and Peru.	1/	<i>D. bipinnatum</i> , a tree to 20 feet.
.73— <i>Diplokelba</i> N.E. Br. 1894.	Argentine, Paraguay, Brazil and Bolivia.	2/	<i>D. floribunda</i> is recorded from the first three countries; and <i>D. herzogia</i> from Bolivia.
.74— <i>Pentascyphus</i> Radlk. 1879.	Spanish Guiana	1/	<i>P. thyrsoiflorus</i> , a tree.

The unity of the above five genera in general area of origins and relationships is interesting. In each the species are only 1 or 2 and little is recorded of their economic values.

165.75— <i>Matayaba</i> Aubl. 1875.	Tropical and subtropical America. Also in Australia.	43/	This large genus has received slight attention by plantsmen. In Queensland, Australia are a dozen or more endemic species recorded under the closely allied genus <i>Ratonia</i> D.C. 1824, which Radlkofer considers a section of <i>Matayaba</i> . We have no record of any introductions into the western hemisphere. Chinese botanists have assigned a Chinese generic name to <i>Matayaba</i> but we have found no record of a species in that country.
.76— <i>Pseudina</i> Radlk. 1878.	Guiana and Brazil.	2/	<i>P. frutescens</i> and <i>P. pallidum</i> .
.77— <i>Dipterodendron</i> Radlk. 1914.	Costa Rica.	2/	<i>D. costaricense</i> , a tree 20-30 meters high, and <i>D. elegans</i> , also a large tree.
.78— <i>Tripterodendron</i> Radlk. 1890.	Brazil.	1/	<i>T. filicifolium</i> (Linden) Radlk. is a tree 20 meters tall.

We have no record of these closely allied genera and species beyond their native habitats.

165.79— <i>Tina</i> Roem. and Schutt. 1819.	Madagascar	12/	No record of species, wild or introduced, in other areas. <i>Tinopsis</i> Radlk. 1888, is now considered synonymous.
.80— <i>Bemarivea</i> Choux. 1925.	Madagascar	1/	<i>B. dissitiflora</i> Choux., a tree 10-25 meters tall.
.81— <i>Molinaea</i> Commers. 1789.	Madagascar, Mauritius and Reunion.	8/	We have no records of garden interest or distribution beyond the native areas.
.82— <i>Laccodiscus</i> Radlk. 1879.	West Tropical Africa, Guiana.	5/	<i>L. ferrugineus</i> and <i>L. spinuosodentatus</i> are in Guiana; <i>L. klaineanus</i> and <i>L. pseudostipularis</i> are in the Cameroons; and <i>L. cauliflorus</i> is recorded from the Gold Coast in West Tropical Africa.
.83— <i>Aporrhiza</i> Radlk. 1878.	Central African Tropics.	6/	
.84— <i>Lychnodiscus</i> Radlk. 1878.	West Africa, chiefly the Congo.	7/	Radlkofer is the author of all the species except <i>L. mortehani</i> DeWild which is from the Belgian Congo.
.85— <i>Blighia</i> Ch. Koenig. 1806.	Tropical Africa, especially the Belgian Congo, Angola and the Cameroons.	6/1	<i>B. sapida</i> Koen. (<i>Cupania sapida</i> of earlier authors) is the beautiful African fruit tree known as the "Akee" which was introduced very early into the West Indies and through introduction is now quite worldwide throughout the tropics. It is valued as a richly flavored fruit, the bright-yellow, fleshy arillus being the portion eaten and prepared in various ways. Much has been written concerning the highly poisonous nature of this fruit if eaten when overripe, soft or pasty. It should be used only when fully understood and then with caution. The other five species apparently have not received much attention in garden culture. For introduction records of this interesting species see U.S. Pl. Inv. Bulletins Nos. 18, 23, 29, 35, 46, 54, 114, 116, and 151, containing many interesting notes.
.86— <i>Phialodiscus</i> Radlk. 1879.	Tropical East and West Africa.	7/1	<i>P. unijugatus</i> Radlk. of West Africa has received some attention as an ornamental tree. It was introduced into the United States by Dr. David Fairchild in 1927 under SPI. No. 91: 73112 with note: "Etu dua. A handsome shade tree with dense, dark-green foliage and salmon-pink fruits which open and expose black seeds."
.87— <i>Eriocoelum</i> Hook. f. 1862.	Tropical Africa, especially the Congo, Cameroons and Liberia. Also Spanish Guiana in So. America.	8/	We have not noted any garden interest and do not list the species.
.87A— <i>Allosanthus</i> Radlk. 1933.	Eastern Peru.	1/	<i>A. trifoliolatus</i> is placed in this phylogenetic position by Radlkofer, without giving key characters.
.88— <i>Guioa</i> Cav. 1797.	Widespread throughout the Pacific Isl., Asiatic mainland, especially Indo-Malayan area and Australia.	60/	We have no record of garden interest. <i>Hemigyrosa</i> Radlk. 1879 is Section II of <i>Guioa</i> in Radlkofer's monograph.
.89— <i>Cupaniopsis</i> Radlk. 1879.	Pacific Islands and Australia.	44/	Little known in the West regarding this large group.
.90— <i>Gloeocarpus</i> Radlk. 1913.	Philippine Islands.	1/	<i>G. patentivalis</i> .
.91— <i>Rhysotoechia</i> Radlk. 1879.	Malaya to Australia.	11/	No records of garden interest.

.92— <i>Lepiderema</i> Radlk. 1879.	Papuasias and Australia.	4/	<i>L. papuana</i> of Papuasias; <i>L. sericolignis</i> and <i>L. pulchella</i> of Australia; and <i>L. punctulata</i> of New South Wales.
.93— <i>Dictyoneura</i> Blume. 1847.	Borneo, New Guinea, Sumatra and the Philippines.	9/	No garden interest.
.94— <i>Diploglottis</i> Hook. f.	Australia.	1/	<i>D. cunninghami</i> is a tall tree, sometimes planted in Southern California. It is well known in Victoria, Queensland and in England has attained some attention. The tree is 30 to 40 feet high, of fine foliage and fitted especially for lofty structures. The fruit is a tomentose capsule, one-half inch across, with seed enclosed in a pulpy aril from which jam is made in Australia. Gard. Ref.: Bail. Hort. 254 and Chittenden 2: 692.
.95— <i>Euphorianthus</i> Radlk. 1879.	Celebes, New Guinea, Moluccas and the Philippines.	3/	No garden interest.
.96— <i>Storthocalyx</i> Radlk. 1879.	New Caledonia.	4/	No garden interest.
.97— <i>Sarcopteryx</i> Radlk.	Islands of Molucca, New Guinea, Papuasias, and Australia.	8/	No garden interest.
.98— <i>Jagera</i> Blume. 1847.	Molucca, New Guinea and Australia.	3/1	<i>J. speciosa</i> Blume in 1920 was sent to the United States by J. F. Rock from Singapore, with note: "A small tree with trilobular fruits which are borne on long pendant racemes. The tree is about 20 feet high and quite attractive on account of the pinnate foliage and orange-red fruits. It is a native of the Malay Peninsula and New Guinea. The fruits are much sought for by the natives. See SPI. No. 65: 51806.
.99— <i>Trigonachras</i> Radlk. 1878.	Malacca and The Philippines.	9/.	No garden interest.
.100— <i>Toechima</i> Radlk. 1879.	Australia and New Guinea.	8/	No garden interest.
.101— <i>Synima</i> Radlk. 1875.	Australia.	1/	<i>S. cordierii</i> .
.102— <i>Congrospermum</i> Radlk. 1913.	Philippines (Luzon).	1/	<i>G. philippense</i> Radlk.
.103— <i>Sarcotoechia</i> Radlk. 1879.	Queensland, Australia.	2/	<i>S. cuneata</i> and <i>S. protracta</i> , the latter not listed in F. M. Bailey's Queensland Flora.
.104— <i>Elattostachys</i> Radlk. 1879.	Indian Archipelago, New Guinea, Samoa, New Caledonia and Australia.	12/	No garden interest.
.105— <i>Arytera</i> Blume. 1847.	Pacific Isls. to Australia. Indo-China.	23/	<i>A. littoralis</i> Blume of Indo China is reported as of some economic importance. Fruit edible and of aromatic flavor.
.106— <i>Mischocarpus</i> Blume. 1825.	India, Malayan Arch., New Guinea and Australia. Indo-China.	21/	<i>Pedicellia</i> is synonymous. In the Lingnan Herbarium at Canton there were 7 folders of plants under these names. They deserve further critical study.
.107— <i>Congrodiscus</i> Radlk. 1879.	New Caledonia.	2/	<i>G. sufferrugineus</i> and <i>G. parvifolia</i> .
.108— <i>Delpya</i> Pierre. 1910.	Siam.	1/	<i>D. murekata</i> .
.109— <i>Phyllotrichium</i> Thorel. 1911.	Indo-China (Laos).	1/	<i>P. mekongense</i> Lecomte, a tree in the Mekong area.
.110— <i>Pavieasia</i> Pierre. 1894.	Indo-China (Tonkin).	1/	<i>P. anamensis</i> Pierre.
.111— <i>Lepidopetalum</i> Blume. 1847.	Islands of Nicobar, Sumatra, Philippines and New Guinea.	6/	No garden interest.
.112— <i>Paranephelium</i> Miq. 1860.	Malacca, Burma, Indo-China, Sumatra and the Philippines.	8/2	<i>P. macrophyllum</i> King was introduced into the United States from Hawaii, SPI. 62: 19553, collected by J. F. Rock on Mount Gedeh, Java in 1919, with note: "A tree 20 to 40 feet high, native to Parak, Java. The alternate, coriaceous pinnate leaves are 18 to 30 inches long, and the flowers are borne in erect axillary panicles. The surface of the globular woody fruits is covered with thick spines. <i>P. spirea</i> Lecomte is described from Hainan Island, China. See also <i>Amesiodendron</i> Hu, which follows. In 1936 H.H.Hu, in Bul. Far Memorial Inst. Biol. Bot. 7: 207-210 described <i>A. chinense</i> (Merr.) Hu, based upon <i>Paranephelium chinense</i> Merr. of Hainan Island.
.112A— <i>Amesiodendron</i> Hu. 1936.	China (Hainan Island).	1/	<i>C. ramiflora</i> (Taub.) Radlk.
.113— <i>Camptolepis</i> Radlk. 1907.	East Africa (Zanzibar)	1/	
.114— <i>Mischododon</i> Radlk.	New Guinea.	1/	<i>M. reticulatus</i> .

and beauty of plant life dawns more fully upon one through the blending of the forms of the trees in a forest, or in the landscape of a garden. It is impossible to paint upon the mind

the unity of world plant life without using for the background the subject of historical plant geography.

The migrations and relationships of plants

Subfamily II—The False Sapindaceae

The plants of this subfamily are differentiated from those of the True Sapindaceae, tribes I to IX, by having 2 or more ovules in the loculi instead of 1. And the seed is abnormal instead of normal as in subfamily 1.

Tribe X—*Koelreuteria*. 4 genera and 11 species only. Radlkofer accounts for only 3 genera, but following *Koelreuteria* of China we have inserted *Handeliodendron* described from the same area in 1935. These two Chinese genera are of great interest because of their unusual north temperate range for genera of Sapindaceae. Their ornamental characters are also very striking.

The largest representation of species of the tribe is in China. It may seem strange that a second center of origin of this tribe is found far across the Pacific to the west. In the Near East is a thorny shrub *Stocksia* and in Tropical Africa two unarmed shrubs, *Erythrophysia*.

165.115—*Koelreuteria* Laxm. China, Formosa. 7/2
1772.

The genus *Koelreuteria* is composed of numerous species and forms with wide geographical and climatic range. These are

recorded in Chinese literature under various Chinese names, a special Chinese character of 23 strokes being reserved strictly for the generic name and used in no other connection. Classical Chinese plant literature presents copious and interesting discussions under this name. *Koelreuteria* is noted in China as containing not only fine ornamental plants, but also food plants for use in time of famine, drugs, especially ointments, and yellow and green dyes. The *Koelreuteria* tree is the standard memorial tree reserved for the graves of minor officials. The pine is used for Kings, cedars for Governors, Sophora, the 'Wai,' for scholars, and the willow for lower groups of society. A galaxy of Chinese common names for *Koelreuteria* are scattered throughout the country including 'Wood *Koelreuteria*,' 'Stone *Koelreuteria*,' 'Black leaf tree' in Honan and Hopeh, and 'Bubbling flower' in Hupeh.

The genus range in China is from Korea in the north to Kwangtung and Formosa in the south. The valid species as listed by Radlkofer are:

- 1—*K. paniculata* Laxm. Korea and North China. This species has been recorded as introduced into the United States as early as 1763 and well adapted to Rehder's climatic zone 5. Rehder established two forms of this species, *fastigata* and *apiculata*.
- 2—*K. minor*. Kwangtung and South China.
- 3—*K. bipinnata* Franch. Yunnan and also reported from Chekiang.
- 4—*K. henryi*. Formosa.
- 5—*K. apiculata*. Szechuan and West China.
- 6—*K. formosana* Hayata. Formosa. The second species of importance in the United States adapted to zones 8 and 9 and quite frequently seen in southern Florida.
- 7—*K. integrifolia* Merr. Kwengtung.

Standardized Plant Names records all of these as in the United States, except 2 and 4. No. 3 they call the '*Bougainvillea Goldenrain tree*.' It is apparent that for some interested plant breeder there is a golden opportunity here for extending the world range and beauty of this magnificent Chinese group of trees. Very interesting notes on United States introductions will be found in U.S. Plant Inventory Bulletins Nos. 14, 45, 49, 56, 63, 82, 121, and 136.

.115A— <i>Handeliodendron</i> Rehder. 1935.	China (Kweichow and Kwangsi).	1/	<i>H. bodinieri</i> (Lev.) Rehder has apparently never been introduced into the United States or other countries. In China it is known as the 'Wall Virtuous Tree' which is also the standard Chinese generic name. This species is fully discussed in Chen's Manual of Chinese Trees and Shrubs (in Chinese), page 689.
.116— <i>Stocksia</i> Benth. 1853.	Persia, Afghanistan.	1/	<i>S. brahuica</i> .
.117— <i>Erythrophysia</i> E. Meyer. 1843.	Madagascar, Africa (the transvall).	3/	<i>E. aesculina</i> . Madagascar. <i>E. undulata</i> . West Africa. <i>E. alata</i> . Transvall.

Tribe XI—*Cossignieae*. A small tribe of 2 genera and 6 species. The first genus contains 4 species, and has petals present in the flowers. It is found from the eastern, coastal islands of Africa to those of the Asiatic area. The second genus of 2 species, with petals absent, is South American in origin. Both genera have species that are considered ornamentals of considerable attractiveness. They have been given attention by English workers but are not yet found in the United States.

165.118— <i>Cossignia</i> Comm. ex Lamarck, 1786.	Mauritius, Bourbon, New Caledonia, Fiji.	4/1	<i>C. triphylla</i> . Mauritius; <i>C. pinnata</i> . Mauritius and Bourbon; <i>C. trifoliata</i> . New Caledonia. <i>C. pacifera</i> . Fiji. Both Don, p. 672, and Johnson, p. 259, record that <i>C. borbonica</i> (possibly now known as <i>pinnata</i>) is a tree 20 feet high which was in cultivation in England as early as 1811. Both remark that it is generally admired because of its golden or orange colored nerves of the leaves, giving a very pleasing appearance.
.119— <i>Llagunoa</i> Ruiz. et Pav. 1794.	Peru, Bolivia, Columbia, Chile.	2/1	<i>L. nitida</i> . Peru, Bolivia, Colombia. <i>L. glandulosa</i> . Chile. Don, p. 673, records <i>L. nitida</i> as having black seeds, quite shiny, and used by the natives of Peru to form necklaces. He considers the species he discusses as shrubs and worthy of garden interest.

are both natural and man-directed through world plant exchange. These are best understood when plants are studied in their family-tribal-generic relationships. The numerous plant forms of a given group are understood more clearly as to natural habitat and area, culture and usage when they are blended into a somewhat complex whole. This requires a synthetical rather than an analytical mind which functions best, however, through full appreciation of the work of the analyst.

This comprehensive presentation of the plants of *Sapindaceae* necessarily is greatly condensed. The present paper covers tribes 9 to 14, in continuation of last year's paper, tribes 1 to 8. In future years more and more of these plants will be introduced into cultivation within the tropical gardens and orchards of our world. The family and generic phylo-

genetic numbers should be found useful in the filing of herbarium specimens, or in the indexing of generic and common plant names. In the column to the right of generic names, their authors and dates are the countries in which the species of the genera are native, and to which we must go for knowledge concerning them, or for the plants themselves if they are not already in our gardens. The number of described species in each genus, and the number known to be in cultivation to date, appear in the third column. The near and distant relatives of each species, so important to the plant breeder and propagator, stand forth in clear linear perspective through the columnar arrangement of tribes and genera. Centers of origin and natural distribution are understood best by close attention to the discussion found within each tribe.

Tribe XII—*Dodonaeae*. 4 genera and 62 species of which the genus *Dodonaea* contains 54. Of this genus 5 species have been used in garden cultivation; and in *Diplopeltis*, 1. The group is distinctly Australian in origin but *Dodonaea* has had considerable diffusion into other areas, even as far as the African coast in one direction and China in the other. Species are also known in the United States, Mexico and Honduras.

165.120— <i>Loxodiscus</i> Hook. f. 1857.	New Caledonia.	1/	<i>L. coriaceus</i> . A shrub with symmetrical flowers and colored petals.
.121— <i>Diplopeltis</i> Endl. 1837.	Australia.	4/1	<i>D. petiolaris</i> , <i>D. huegelii</i> and <i>D. eriocarpa</i> from West Australia. <i>D. stuartii</i> from the Lake McDonald area. The only species of garden interest in this genus seems to be <i>D. huegelii</i> reported in Standardized Plant Names, p. 172 and in Johnson, p. 327, who says it was introduced into England as early as 1837 and is pictured in Botanical Register, p. 1839, table 69, with both rose and white colored flowers.
.122— <i>Dodonaea</i> L. 1837.	Australia, chiefly. Widespread are a few species.	54/5	<i>D. viscosa</i> (L.) Jacq. is widely known in cultivation and escape in many world areas. It has been frequently introduced into the United States. See SPI. Nos. 33: 34717,
37: 36813, 54: 45726, 60: 48029, 61: 48667, 103: 88227, 105: 89234, 113: 101280, 116: 103515, 145: 139568 and 150: 144820. These notes include: 'A small hardwood tree. . . Wood much valued by settlers for making mauls, as it does not split.' 'A very interesting hedge plant (in the Sudan), which is beautiful dense green, responds to the shears perfectly, and when taken in hand early makes a perfectly compact wall clear to the ground. . . The most perfect tropical hedge plant I have ever seen.' 'Cosmopolitan in the Tropics, and in Australia the fruits are used in making yeast. The hard, brown, close-grained wood is used in India for engraving, turning tool handles and walking sticks.' <i>D. thunbergiana</i> introduced from Italy, SPI. No. 51: 44536. A South African shrub, the root of which is used as a purgative decoction in fevers. <i>D. triquetra</i> of Australia with light-colored wood, close-grained, recorded in Pl. Inv. Bulletin Nos. 63 and 126. <i>D. madagascariensis</i> of that country is used by the natives as a silkworm tree, so recorded in SPI. Bul. No. 103: 87491. Unidentified species have also been introduced from other areas. The general common name attached to these plants in the United States is Hopeseed Bush .			
.123— <i>Distichostemon</i> Muell. 1857.	Australia.	3/	Radlkofer records 2 species in Northern Australia: <i>D. hispidulus</i> and <i>D. filamentosus</i> . We noted in the Arnold Arboretum a sheet from Queensland identified as <i>D. phyllapterus</i> .

Tribe XIII—*Doratoxyleae*. 12 genera of 20 species, 3 of which have attracted some garden interest. The members of this tribe are diverse and unique in their somewhat abnormal morphology. This has led the taxonomists to establish so many genera from so few species. Furthermore, the genera and species occur somewhat far removed from one another. Six of the genera are native to Africa, 1 to Madagascar and 1 to Mauritius. The other 4, which Radlkofer gives the most advanced phylogenetic position, are tropical American, with a few represented in the Pacific Islands. Eight of the genera are strictly monotypic, 3 have only 2 species, *Filicium*, 3. The group has attracted slight attention from the point of view of usefulness, except for a few species of *Hypelate*, *Exothea* and *Hippobromus*. The tribe consists largely of tropical trees and shrubs.

165.124— <i>Hypelate</i> P. Browne. 1756.	Florida and West Indies.	2/1	Common name White ironwood , Sturrock and Menninger, p. 29, describe <i>H. trifoliata</i> as a medium sized native tree with attractive foliage and numerous small white flowers followed by attractive purple or blackish small fruits. We have noted in the Arnold Arboretum also <i>H. paniculata</i> of the West Indies.
.125— <i>Euchorium</i> Elman and Radlk. 1925.	West Indies.	1/	<i>E. cubense</i> in Cuba.
.126— <i>Exothea</i> Macfayden. 1837.	Canada to Mexico and Central America.	2/1	Common name Ink wood . Radlkofer lists 2 species. <i>E. capillo</i> of Mexico and Central America, and <i>E. paniculata</i> with a range from Canada to Mexico. Sturrock and Menninger, p. 158, record the latter as 'A medium sized tree with short, slender branches and numerous branchlets densely clothed with dark-green pinnate leaves. The small white flowers are followed by clusters of small, purple fruits. This hardy native tree does well on dry soils. See also U.S. Pl. Inv. 113: 101247 from the Harvard Gardens in Cuba.
.127— <i>Averrhoidium</i> Baill. 1874.	Brazil and Paraguay.	2/	<i>A. gardnerianum</i> . Brazil. <i>A. paraguayense</i> . Paraguay.
.128— <i>Hippobromus</i> Eckl. et Zeyh. 1836.	Tropical Africa.	2/1	<i>H. alatus</i> from Natal is listed in English garden books as a stove shrub, 10 to 30 feet high. <i>H. pauciflorus</i> is also African. See Chitt. 2: 1001.
.129— <i>Dialiopsis</i> Radlk. 1902.	Southeast Africa.	1/	<i>D. africana</i> .
.130— <i>Zanha</i> Hiern. 1896.	Africa.	1/	<i>Z. golungensis</i> , a large tree of Angola and Togoland.
.131— <i>Doratoxylon</i> Thouars. 1862.	South Africa.	1/	<i>D. mauritanium</i> is reported as a timber tree on the Island of Mauritius and Reunion, South Africa.
.132— <i>Ganophyllum</i> Blume. 1850.	Cameroons, New Guinea, Australia, Philippines, and Java.	2/	<i>G. africanum</i> . Cameroons. <i>G. falcatum</i> . The Pacific areas.
.133— <i>Filicium</i> Thwaites. 1862.	Tropical Africa, Madagascar, Fiji, Ceylon.	4/	<i>F. decipiens</i> . Africa to Fiji and Ceylon. <i>F. elongatum</i> , Tropical East Africa. <i>F. abbreviatum</i> . Madagascar. And <i>F. somalense</i> , Somaliland.
.134— <i>Diacarpa</i> T. R. Sim. 1909.	East Africa.	1/	<i>D. elata</i> . Portugal East Africa.
.134A— <i>Cardiophyllum</i> Choux. 1927.	Madagascar.	1/	<i>C. apetalum</i> .

Tribe XIV—**Harpullieae**. 10 genera and 48 species of which 6 are of some economic interest. They are trees and shrubs, a few temperate in range, which display beauty on the landscape and in the garden; and others are valued for their lumber. This tribe, like the preceding one, shows the most instability and change in morphology of all the tribes of Sapindaceae. It is of interest to note that in genetic relationships Radlkofer gives them the most advanced position. The Asiatic Tropics and Islands of the Pacific is the main center of origin of the tribe. But in their migration some forms have radiated outward as far as Africa in one direction and northward into China in another. Species of *Harpullia* have received considerable attention in the work of plant introduction. *Majideae*, closely allied but restricted to Africa is not well known beyond its native areas. Three genera of China, *Xanthoceras*, *Eurycorymbus* and *Delavaya*, each with only one species, reveal their tangential-ecotypical morphology with adaptability to the more rugged Central and North China region. *Xanthoceras* is a handsome ornamental.

165.135— <i>Conchopetalum</i> Radlk. in Durand. 1888.	Madagascar.	1/	<i>C. madagascariense</i> .
.136— <i>Eurycorymbus</i> Hand. Mezz. 1922.	South China.		<i>E. austrosinensis</i> to which <i>E. cavaleriei</i> , reported from Yunnan, Kweichow, Kiangsi, Kwangsi and Formosa, is doubtless synonymous. We have no records of introductions. Common name sometimes applied is Tulipwood . <i>H. cupanoides</i> Roxb. is recorded twice in U.S. Pl. Inv. Nos. 41: 39419 and 86: 66220 with native area stated as India, Ceylon, Sumatra, Java and Borneo. The Naimbul tree of the Singhalese which they use for washing purposes. It is also a lumber tree said to be of considerable merit. Menninger, p. 42, no doubt following Hortus, p. 349, considers the valid name of this species <i>H. arborea</i> , but it did not so appear in specimens on file at the Arnold Arboretum. This tree of the Indian region is not uncommon in California, Florida and the Caribbean area. The Harvard Station in Cuba reports it: 'A fine tree cultivated at this station. Of rapid growth and probably producing good timber. A tree bearing erect panicles of yellow flowers.' The bladderly pod is blood-red in color and contains large black seed. The species is believed to stand several degrees of frost. Forms of the genus in China have been considered sufficiently important to warrant a standardized Chinese generic name. <i>Harpullia</i> deserves greater attention in the gardens of the world.
.137— <i>Harpullia</i> Roxb. 1813.	India, West Malaya, Papuasias, Philippines, Polynesia, New Caledonia, Australia, and China (Hainan).	34/1	

.138— <i>Majidea</i> Kirk. 1871.	Africa and Madagascar.	4/	<i>M. fosteri</i> , W. Trop. Afr.; <i>M. multijuga</i> , E. Congo; <i>M. zanguebarica</i> , Zanzibar; and <i>M. madagascariensis</i> , Madagascar. In line with <i>Harpullia</i> and <i>Akania</i> , deserving of attention.
.139— <i>Arfeuillea</i> Pierre. 1895.	Siam.	1/1	<i>A. arborescens</i> , said in cultivation in Siam.
.140— <i>Magonia</i> A. St. Hil. 1824.	Brazil, Bolivia, Paraguay.	2/	<i>M. pubescens</i> , Brazil and Bolivia. <i>M. glabrata</i> , Brazil, Paraguay and Bolivia.
.141— <i>Xanthoceras</i> Bunge. 1831.	China and Korea.	2/1	Common name Yellow horn . <i>X. sorbifolia</i> , a very handsome ornamental of North China and Korea, the seeds of which are sometimes eaten. Parts of the plant are also used for medicine. A deciduous shrub or small tree to 15 feet, quite hardy north. For the various plant introductions into the United States and very interesting collectors' notes see Pl. Inv. Bul. Nos. 14, 26, 41, 82, 95, 119, 125. From Shansi, China is 41:22457, in 1914, with note: 'A shrub occasionally growing into a small-sized tree, found in loess cliffs. The shiny pinnate foliage reminds one of an ash, but the drooping racemes of white flowers, with yellow stamens, produced in great masses in early spring, give the shrub quite a distinct appearance.' <i>X. enkianthiflora</i> of Kweichow and Szechuan in West China has never been introduced and is not well known.
.142— <i>Delavaya</i> Franch. 1886.	China.	1/1	<i>D. yunnanensis</i> is recorded from Yunnan. Chittenden 2: 646 records it as introduced into England, but we have no records of its appearance within the United States. The genus is named in honor of Abbe J. M. Delavay, 1834-1895 who explored West China's plant life so early and so fervently.
.143— <i>Ungnadia</i> Endl. 1833.	Mexico, New Mexico and Texas.	1/1	<i>U. speciosa</i> , a hardy deciduous shrub, with rose colored clusters of flowers in early spring, before the appearance of the leaves. Common name: Mexican Buckeye . Introduced into England.

Genera of Sapindaceae of uncertain phylogenetic status. 6 genera and 7 species, not any in cultivation.

165.144— <i>Curtissima</i> Ridley. 1920.	Malay Peninsula.	1/	<i>C. penangensis</i> Ridley. See Radlk. p. 1505.
.145— <i>Napeodendron</i> Ridley. 1920.	Malay Peninsula.	1/	<i>N. altissima</i> Ridley. See Radlk. p. 1506.
.146— <i>Poculodiscus</i> Danguy and Choux. 1927.	Madagascar.	1/	<i>P. louvelii</i> Danguy and Choux. See Radlk. p. 1506.
.147— <i>Sennia</i> Chiov. 1932.	Somaliland, Africa.	1/	<i>S. sciap-sciaple</i> Chiov. See Radlk. p. 1507.
.148— <i>Murbeckie</i> Urb. and Ekman. 1930.	Haiti.	1/	<i>M. haitiensis</i> Urb. and Ekman. Not included by Radlkofer but specimens noted in the Arnold Arboretum.
.149— <i>Llavea</i> Liebm. (?) 1853.	Mexico and Central America.	2/	<i>L. viscosa</i> Liebm. Mexico. <i>L. integrifolia</i> Hemsl. Mexico and Central America. Noted in Arnold Arboretum.

Some Genera, the recent studies of which place them close to Sapindaceae. 4 genera and 28 species, most of which are in cultivation.

Radlkofer, who followed strictly the Englerian phylogenetic arrangement, did not include these genera under Sapindaceae. Recent workers, including J. Hutchinson and Alfred Gundersen, account for the following genera either within Sapindaceae or in separate families within the order Sapindales.

165.150— <i>Aesculus</i> L. 1753.	S.E. Europe, North America and S.E. Asia.	25/about 20	Commonly known in English as Horse chesnuts or Buckeyes and well known in garden cultivation. This genus and closely allied <i>Billia</i> of Central America are accounted for within the Englerian system under Hippocastanaceae . They are now definitely included within Sapindaceae by both Hutchinson and Gundersen, who place them somewhere between genera <i>Koelreuteria</i> and <i>Cupania</i> . They are deciduous trees or shrubs with separate species within China, India, the United States, Europe and the Balkan Peninsula. <i>A. hippocastanum</i> , native to Northern Greece and Albania, is the most widely recognized species, very common now in many world gardens. Numerous hybrids of the species have been made as revealed in the excellent treatment, and key, in Chittenden's Dict. of Gard. 1: 58. For introductions into the United States from China and other world areas see SPI. Pl. Inv. Bul. Nos. 14, 30, 40, 42, 50, 53, 61, 66, 69, 74, 82, 97, 111, 129, 135, 144.
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.151— <i>Akania</i> (?)	Australia.	1/	<i>A. hillii</i> (?) is reported as a handsome tree, 30-40 feet in height, in both foliage and flower. Chittenden, l: 70, who gives the best account of it we have seen, cites B.M. 8469, Syn. <i>Lomatia bidwillii</i> . He records its introduction into England as early as 1872 and indicates that it is still grown there in roomy greenhouses. Apparently it has never been introduced into the United States. Some enterprising Floridian plantsman should bring it into Florida gardens from England. The genus <i>Akania</i> is now given independent family status, <i>Akaniaceae</i> , by both Hutchinson and Gundersen.
.152— <i>Bretschneidera</i> Hemsl. 1901.	China (Yunan).	1/1	Hemsley described <i>B. sinensis</i> from the mountains of Yunnan, China and named the genus after Emil Bretschneider, M.D., the outstanding early Russian resident of Peking, China, who made a classical study of Chinese plant and geographical literature. His 'Botanicon Sinicum—Notes on Chinese Botany from Native and Western Sources' was published in the North China Branch of the Royal Asiatic Society in 1881. This species has somewhat distinct morphological characters. Hutchinson includes it in Sapindaceae but Gundersen and other workers give it independent status, <i>Bretschneideraceae</i> , in Sapindales. This tree is not well known in western gardens, apparently only once having been sent abroad from China. See SPI, Pl. Inv. No. 131: 124004, with note: 'From the Botanical Institute, Sun Yat Sen University, Canton, China. A handsome tree about 25 feet high, with deciduous bark, lanceolate, pinnate leaves, 9 to 18 inches long . . . and terminal racemes of showy pink flowers.' <i>A. capensis</i> apparently is the only species described within the genus. Chittenden l: 69 mentions it as a small, greenhouse shrub in England from S. Africa, with rose-colored flowers, stamens long-exserted, and fruit about 1 inch across, red. Introduced as early as 1777 (B.M. 173). This also should be brought into the tropical gardens of the Caribbean.
.153— <i>Aitonia</i> (?)	South Africa.	1/1	

COMMON ENGLISH NAMES APPLIED TO FORMS OF SAPINDACEAE AND HEREIN LINKED BY
PHYLOGENETIC NUMBERS TO BOTANICAL NAMES

Except where noted these applications are quite common throughout the English speaking world and are confirmed by the American Joint Committee of Horticultural Nomenclature in Standardized Plant Names, 1942 edition. Other sources of reference are stated where used.

Akee (fruit, tree and 'apple')	165.85 — <i>Blighia sapida</i> .
Baloon vine	165.4 — <i>Cardiospermum halicacabum</i>
Black winter cherry	165.4 — <i>Cardiospermum leakia</i>
From Danziel's Useful Plants of West Trop. Africa.	
Bretschneider's Tree	165.152— <i>Bretschneidera</i>
Name as applied in China.	
Buckeye	165.150— <i>Aesculus</i> species
Of wide application to many geographical forms of <i>Aesculus</i> .	
Butter bough	165.126— <i>Exotocha paniculata</i>
Cardinal tree	165.99 — <i>Trigonachras acuta</i>
As in Corner's Wayside Trees of Malaya.	
Cattle bush	165.13 — <i>Atalaya hemiglauca</i>
So applied in Australia because the trees are often cut down in time of drought to provide fodder.	
Cat's eyes	165.51 — <i>Nephelium malaiense</i>
As applied in Corner's Wayside Trees of Malaya.	
Cupania	165.69 — <i>Cupania</i> species
Frequently applied as a common name to the species of this genus.	
Dragon's eye	165.54 — <i>Euphoria longana</i>
Translation of the Chinese word 'lungan.'	
Florida <i>Talisia</i>	165.40 — <i>Talisia pedicellaris</i>
Genip tree or <i>Genipa</i>	165.39 — <i>Meliococca bijuga</i>
Considerable application throughout the world, but in the United States Spanish lime is more frequently used.	
Gold rain tree	165.115— <i>Koelreuteria</i> species
Guarana	165.2 — <i>Paullinea cupana</i>
A well known commercial product of Brazil, consisting of a dried paste made from the crushed seeds of this species.	
Heart seed or Heart pea	165.4 — <i>Cardiospermum</i> species
Honey berry	165.39 — <i>Meliococca bijuga</i> or <i>M. lepidopelta</i>
Hop Bush or Hop seed bush	165.122— <i>Dodonaea</i> species
Hop tree	165.139— <i>Arfeuillea arborescens</i>
As applied in Corner's Wayside Trees of Malaya.	
Horse chestnut	165.150— <i>Aesculus</i> species
Applied to many world forms. See also Buck eye.	

Ink wood	165.124— <i>Hypelate trifoliata</i>
Kobbae	165.12 — <i>Allophylus cobbe</i>
A Ceylon name somewhat worldwide in English literature, and in Corner's Trees of Malaya.	165.46 — <i>Schleichera oleosa</i> (Lour. Merr. (Syn.: <i>S. trijuga</i> Willd.)
Lac tree	Not to be confused with the Lacquer tree, species of <i>Toxicodendron</i> .
Lungan (sometimes Longan, Lonyen, or Linkeng). The Dragon's eye of China.	165.54 — <i>Euphoria longana</i> . the Lungan
Lychee (sometimes Leechee, Lichee or Litchi). The Lychee of China.	165.57 — <i>Litchi chinensis</i>
Mamoncillo	165.39 — <i>Meliococca bijuga</i>
Used in Spanish speaking countries for Spanish lime.	165.143— <i>Ungnadia speciosa</i>
Mexican Buckeye	165.57 — <i>Litchi chinensis</i>
Mountain lychee	As applied to a vigorous, mountain form of lychee in China, apparently an escape from cultivation. On Hainan Island the name is also applied to <i>Xerospermum topingii</i> (165.60), a lychee relative.
Pulasan or Pulassan	165.61 — <i>Nephelium mutabile</i>
The tropical lychee relative of Malaya, the fruit surface thickly set with short, blunt, fleshy spines or knobs. The word Pulasan is widely recognized in English plant literature.	165.61 — <i>Nephelium lappaceum</i>
Rambutan	An important tropical lychee relative of Malaya and Asiatic tropics. The fruit surface is densely set with thick, coarse, wavy hairs or soft spines. The word Rambutan is now widely accepted in English plant literature.
Smooth Rambutan	165.62 — <i>Alectryon subcinereum</i> of Australia
So applied in Bailey's Hortus.	
Scap berry	165.17 — <i>Sapindus</i> species especially <i>S. saponaria</i> of Trop. Amer.
Soap berry family is usually applied to Sapindaceae, after <i>Sapindus</i> , the Soap berry genus.	
Soap nut	165.17 — <i>Sapindus mukorossii</i> of Trop. Asia
As applied in Corner's Wayside Trees of Malaya.	
Spanish lime	165.39 — <i>Meliococca bijuga</i>
The name usually used within the United States for this species.	
Talisia	165.40 — <i>Talisia</i> sp.
Apparently the only common name used for the many species of this genus.	
Tit berry	165.12 — <i>Allophylus cobbe</i> .
This name is apparently used chiefly by Corner in Wayside Trees of Malaya, who says the species is very variable with as many as eight specific names.	
Titoki tree	165.62 — <i>Alectryon excelsum</i>
A New Zealand tree where this name is applied. Here the Maoris extracted an oil from the seed.	
Toulicia	165.15 — <i>Toulicia</i> species of So. Amer.
The native name in Guiana chiefly for <i>T. guianensis</i> . This name is beginning to appear in English literature.	
Tulip wood	165.137— <i>Harpullia pendula</i>
The name is so applied in Standardized names, but is not to be confused with Tulip tree, well known as <i>Liriodendron</i> .	
Urvillea	165.3 — <i>Urvillea ulmacea</i> and <i>U.</i> species in general.
Wild Chena tree	165.17 — <i>Sapindus drummondii</i> of SW. United States
Chittenden in Dictionary of Gardening (England) so applies this name, but apparently not so used within the United States.	
Yellow horn	165.141— <i>Xanthoceras sorbifolium</i> of North China.
Yoco	165.2 — <i>Paullinia Yoco</i> of Colombia and adjacent Peru and Ecuador
A caffein-yielding species closely allied to Guarana of Brazil, which see.	

The above alphabetical check-list of 43 common English names applicable to forms of *Sapindaceae* illustrates the usefulness of this type of phylogenetic plant presentation. Such plant name indices can be prepared readily in any language by workers in any country.

The writer has compiled a typed alphabetical list of 174 latin, generic names of *Sapindaceae*, used by the authors of the species and forms. These include synonyms. In addition he has prepared check-lists of 30 romanized Siamese names and of 46 Malayan names, applicable to the family. The list of 69 Chinese names, in Chinese character, he has presented in the stroke-radical arrangement of Chinese dictionaries, a most useful arrangement for

gaining access to Chinese plant literature. A translation of the English equivalents of these names is also given. In preparing the Chinese check-list the author has had in mind especially workers in China who desire to study the plants of Sapindaceae found within their country, but also in relationship to genera and species found within other world areas. Some of these they may wish to introduce into China from abroad.

Limitation of space within the Florida State Horticultural Society's Proceedings prevents publication of these lists. But the writer will be pleased to loan any or all of them to plant students interested.