CYCADACEAE

Palm-like dioecious plants, the caudex bulb-like, tuber-like or columnar, simple or branched, few or several leaves borne from the apex; leaves spirally arranged, often a dense crown on the apex of the stem, coriaceous, pinnate or bipinnate, the leaflets usually linear or lanceolate, entire or dentate; inflorescence borne at the apex of the caudex or lateral, cone-like, the pistillate cones broader than the staminate ones.

Three genera native in Central America and about nine in the tropics of the world. Ceratozamia mexicana Brongn. is an attractive plant of Mexico and Guatemala that should be in cultivation.

Dioon mejiae Standl. & L. Wms. Ceiba 1: 37. 1950.
Teosinte, palma teosinte.

The Indians of Olancho, Honduras, where the plant is native, boil and grind the large chestnut-like seeds and make of them a kind of tortilla of good flavor and agreeable to eat. The leaves are in demand for decorating altars and for funeral wreaths. Becoming widely distributed as an ornamental. The common name given for this plant is usually that applied to Euchlaena mexicana.

Zamia loddigesii Miq. Tijdschr. Nat. Geschied. 10: 73. 1843.
Camotillo, cocalito, teosinte, chacuhua.

The large starchy roots are said to be used in poisoning rodents in Petén. There are reports of their use in criminal poisonings which may be or not based on fact. Standley reports that "It is stated, further, that if the root has been out of the ground three days, they cause death in three days; if dug ten days, they kill in ten days, and so on." The coastal Caribs have used the roots as food, after cooking.

Zamia skinneri Warsc. Allg. Gartenz. 19: 146. 1851.

The starchy roots of this plant are said to be poisonous. The plant is an attractive one now widely grown as a greenhouse ornamental and in the tropics out-of-doors. Atlantic coast of Costa Rica and Panama, perhaps elsewhere.

CYCLANTHACEAE

Stemless palm-like or sufrutescent vines; the leaves like those of palms, usually bilobed or the lobes divided or lacerate; the inflorescence a distinctive axillary densely-flowered spadix.

Five or xis genera and perhaps a hundred species. The family has been monographed (Harling, C., Monograph of the Cyclanthaceae in Acta Horti Bergiani 18: 1-428, tt. 1858) and the Central American kinds split into six not very convining genera.

Carludovica costarricensis (Harling) L. Wms. Fieldiana, Bot. 29: 345. 1961. Asplundia costarricensis Harling, Acta Horti Bergiani 18: 186. 1958.

Cuajiote, tucuso, palma, chidra, cola de gallo, coligallo.

The leaves were used in weaving good quality "straw" hats and perhaps still are. The flexible stems are used in making furniture and in tying large bundles. Long known as C. utilis (Oerst.) Benth. & Hook. but that name not tenible.

Carludovica funifera (Point.) knuth, Enum. Pl. 3: 106. 1841. C. oerstedii Hemsl. Biol. Cent. Am. Bot. 3: 416. 1885.

Chidra, chirrivaca, coligallo, tucuso.

Oersted reported that the ripe spadices were eaten by Indians.

Carludovica palmata Ruiz & Pavón, Syst. Fl. Peruv. 291. 1798.

Chidra, junco, palmilla, palmero, palma de sombrero, pita, calá, pojóm, tuna, Panama hat palm.

Cultivated and also naturalized, perhaps native, in many parts of Central America for the leaves which are used to weave hats, baskets and other things. The well known sombreros de Jipijapa of Nicaragua are made from this plant as are the sombreros de junco of Honduras and El Salvador. The making of hats by hand is a dying industry in Central America due to the inadequate income which the weavers can make. Narrow strips from carefully dried young leaves are used in the fine hats. An extra fine hat may weigh only 50-75 grams but require two or three weeks to weave. The famous "Panama hats" are mostly all made in Cuenca, Ecuador.

CYPERACEAE

Grass- or rush-like annual or perennial herbs, often with strong rhizomes, occuring most commonly in damp or marshy habitats; the stems (culms) solid, terete, triangular or quadrangular, sometimes compressed; flowers perfect or imperfect, arranged in spikelets in spicate, racemose, paniculate or umbellate inflorescences; fruit an achene.

A large family of 70-80 genera and perhaps as many as 3,000 species. Widely distributed over the world but less common in the tropics. In Central America several species are used in weaving, a few are used for food. Many occur in pastures and are of some importance as animal forage.

Cyperus articulatus L. Sp. Pl. 44. 1753.
Sontol, canutillo, polol.

The spongy stems are occasionally used in weaving mats. A widely distributed species.

Cyperus canus Presl, Rel. Haenk. 1: 179. 1830.
Tule, tule silvestre, tule de petate, junquillo, sivate, say.

Not common in Central America but planted and encouraged in some places, especially along edges of shallow lakes or in bogs. The coarse rush mats, called petates, commonly used as beds in our area, are offered for sale in every market. The strong culms are fairly resistant to use and wear. Other useful things are made from the culms of this species, fans for fires, coasters, sleeves for water glasses. Distributed from Mexico to Colombia and doubtless carried by early man as an introduction in part of this area.

Cyperus esculentus L. Sp. Pl. 45. 1753.
Cebollín, cebolla de río, sivac, suchipaite.

The fibrous stems used as string. A drink is prepared from the root in Guatemala, this often flavored with spices or toasted sapote seeds. The plant may become a troublesome weed.

Cyperus rotundus L. Sp. Pl. 45. 1753.
Coyolillo.

This small weed is one of the worst pests in gardens and cultivated fields. It is almost impossible to eradicate it. Small tubers left in the ground, when attempts are made to remove them, soon grow into full sized plants. Cultivation seems to divide the tubers and to increase the numbers of the plants. The comon name, coyolillo, is due to the resemblance of the plant to the coyol palm (Acrocomia mexicana). Native of the old world, now widely distributed.

Eleocharis caribaea (Rottb.) Blake, Rhodora 20: 24. 1918.
Tule, sintule.

In Guatemala a beverage, to which other substances may be added, is made from the thick roots of this plant.

Eleocharis elegans (HBK.) Roem. & Schult. Syst. Veg. 2: 150. 1817.
Tule, tul, sintul, guirnalda, camalote, cebolla de río, junco.

The culms which are tough and spongy are commonly used in weaving petates used almost everywhere as "mattresses" in Central America. Distributed from Mexico to South America where it is thought to be native.

DICKSONIACEAE

Large terrestrial ferns with horizontal, ascending or erect stems which are often massive and trunk-like; fronds to several meters long, the petioles densely lanate at the base with golden-colored trichomes.

Species are found in both the New and the Old World tropics.

Cibotium regale Versch & Lem. Ill. Hort. 15: t. 548. 1868. Stolze, Fieldiana, Bot 39: 96, t. 15. 1976.
Micos, lanilla.

The rhizomes and the bases of the petioles covered with long golden-colored trichomes. Fragments of these have been seen in markets in Guatemala and El Salvador where they are sold to be used as decorations or novelties. In Honduras the

abundant scales have been used to fill pillows. Rare and possibly now extinct in El Salvador.

DILLENIACEAE

Trees, shrubs or sometimes vines; leaves alternate, entire, dentate, simple or sometimes pinnatifid; flowers unisexual or bisexual. A small tropical family of some 15 genera and 400-500 species. Actinidia and Saurauia are often put into separate families based on these generic names.

(Actinidia chinensis Planch. in Hook. Lond. Journ. Yang-tao, yangtaw, Ceylon gooseberry. Bot. 6:303. 1847.

A perennial woody vine to about 10 meters long which produces a hispid-pubescent rather acid fruit 5-10 cm. long. The flavor is variable, somewhat like either strawberries or pineapples. The plants should be grown in cool or cold mountain regions of Central America. The plants may be propagated by cuttings to secure the desired proportions of pistillate and staminate vines for fruit production. I have not seen these fruits offered for sale in our markets nor have I seen the plants. Fruits are frequently offered in markets in the United States (1978) at about 50-60 cents each.)

Curatella americana L. Syst. 10: 1079. 1758-59.

Chaparro, chumico, chumico de palo, lengua de vaca, malcajaco, hoja chique, raspaguacal, yaha, saha, haja.

A common small tree in the dry forests and savannas of Central America. The leaves are rough and used to polish wood, in cleaning dishes and other similar uses. The leaves feel much like sand paper. There is a story current in Central America that the conquistadores used the rather stiff leaves as a substitute for playing cards. The leaves are hard and firm but would hardly serve this purpose.

Davilla kunthii St. Hil. Pl. Usuel. Bras. 6. 1824-28.
Bejuco chaparrón, chaparro, sajab.

The heavy, very rough leaves contain much silica and often are used like sand paper for cleaning pots and dishes.

Dillenia indica L. Sp. Pl. 535. 1753.
Dillenia (trade name).

This species is planted occasionally in Central America but I do not know of it being used as a food. In India, where the plant is native, the ripe fruits are gathered and the thickened sepals, which are sour, are used to flavor curries or are made into preserves. The juice, when sweetened, is used as a refreshing drink.

Saurauia kegeliana Schlecht. Bot. Zeit. 694. 1853.
Capulín montés, capulín, capulín de montaña, cresta de gallo, alais, moco, moquillo.

The fruits of this species are edible and are found occasionally in markets in Guatemala and El Salvador. The pulp is rather bland, thin and somewhat sweet. Used as a fruit out of hand and perhaps also in preserves.

Saurauia villosa DC. Mém. Soc. Phys. Hist. Nat. Genève 1: 420. 1822.

Moco, moco blanco, moco de chucho, moquillo, cerbatana confite, sho'ot.

The branches were hollowed out and used by Indians as blow guns in the hunting of small birds and mammals. Native from Mexico to Honduras.

Tetracera sessiliflora Triana & Planch. Ann. Sci. Nat. Ser. IV. 17: 21. 1862.
Raspa guacal, water vine.

The rough leaves are used as a substitute for sand paper to polish wood and other objects. The vine is widely distributed in Central America and is known as a water vine. Properly manipulated the potable sap may be extracted and used as a substitute for water when safe drinking water is not available. The tough stems of this liana are used as a substitute for cordage.

Tetracera volubilis L. Sp. Pl. 533. 1753.

Raspa, raspa guacal, chique, bejuco de agua, cachicón, lengua de vaca, water vine.

The uses of this species are the same as those of the preceeding one.

DIOSCORIACEAE

Climbing herbs or vines from tuberous roots or rhizomes or from thick woody, aerial or subterranean caudices; flowers inconspicuous, usually unisexual (ours) and the plants dioecious; fruit a capsule (and often winged) or a berry.

The family is almost entirely tropical with perhaps 8-10 genera and 400-500 species. There is one large genus, Dioscorea, to which the greater yam belongs. It is the only plant of the family having economic importance in Central America although some of the wild kinds are collected and used as starting materials in the manufacture of cortisone.

Dioscorea alata L. Sp. Pl. 1033. 1753.
Ñame, ñame blanco, yam, great yam, greater yam, white yam.

Yams are relatively little used as food plants in Central America although they are to be found occasionally where there are populations of Caribs on West Indians. Yams are grown for the large roots, the flesh of which may be either white or purple. The roots are usually prepared for food by boiling. I have seen tubers in El Salvador which weighed 25 kilograms or more. Harvest of some 7 to 35 tons per hectare have been obtained under intensive cultivation. The roots should be useful for hog feed in our area. Native of southeastern Asia and now widely cultivated in tropical regions. Introduced in America about 1550. The so called yams grown in the United States are usually one of the poorer varieties of sweet potatoes, often with white or pale flesh.

Dioscorea bulbifera L. Sp. Pl. 1033. 1753.
Papa del aire, papa caribe, papa voladora, air potato.

Tubers or bulblets are produced in the axils of the leaves which, in addition to the roots, are cooked and used for food. Reported from Honduras and Costa Rica and said to be naturalized in Honduras. I have not seen it. Native of southeastern Asia.

Dioscorea cayenensis Lam., Encyc. 3: 233. 1789.
Ñame negro, yellow or attoto yam.

Grown along the Caribbean coast of Costa Rica by West Indian Negroes. Quality said to be inferior. I have not seen it. Native of Africa.

Dioscorea convolvulacea Schlecht. & Cham. Linnaea 6: 49. 1831.
Madre de maíz.

The tubers of this species are said to have been used in Guatemala as emergency food in the time of famine when the maize crop failed. Native in Central America.

Dioscorea macrostachya Benth. Pl. Hartw. 73. 1893.

Camotillo, cuculmeca, cabeza de negro.

The root is chopped and mixed with lime then used as a fish poison in El Salvador and Honduras.

Dioscorea trifida L. f. Suppl. 427. 1781.
Ñame de la India.

Said to be cultivated in Costa Rica for its tubers which are small but of good quality. Perhaps native of America.

Dioscorea violacea Uline in Engler, Jahrb. 22:423. 1896.

The roots are said to be used in El Salvador as a barbasco in fishing. Native of Mexico and Central America.

EBENACEAE

Dioecious, rarely monoecious, trees or shrubs with entire, simple, alternate, or ternate, coriaceous leaves; flowers unisexual, actinomorphic, axillary and solitary or in cymes, the calyx gamosepalous, the corolla gamopetalous and urceolate and contorted or impricated; fruits a berry.

A small family of 5 or 6 genera and 300-400 species, widely distributed in temperate and tropical regions. Diospyros

is the only genus of importance. There are several native species of Diospyros of which the fruits may be eaten. Those which I have tried are quite acrid unless fully ripe and even then are not very good.

Diospyros digyna Jacq. Hort. Schoenbr. 3: 35, t. 313. 1798.

Zapote negro, zapote prieto, sapote de mico, matasano de mico, tauchya, black zapote.

The tree is sometimes cultivated in Mexico and possibly in Central America. The fruits are to about 8 cm. in diameter and brown when ripe, the pulp is brown or blackish. The fruits are repulsive looking when ripened completely but are used as fresh fruits or to make preserves, fermented and distilled to make a brandy-like liquor. The green fruit is caustic and along with the bark is reported to be used as a barbasco in Dominica, and in the Philippines. Often reported as Diospyros ebenaster Retz. in literature.

(Diospyros kaki L. f. Persimon, kaki, Japanese persimmon. The Japanese persimmon is reported to be grown in Guatemala although I have not seen it there nor have fruits been collected from the markets. It is a fine and attractive fruit.)

ELAEOCARPACEAE

Trees or shrubs usually with perfect, actinomorphic flowers; leaves simple, alternate or opposite, sepals 4-5, distinct or connate; the petals none or usually 4-5, either free or connate, sometimes fimbriated; anthers dehiscing by terminal pores; ovary superior, fruit a capsule or drupaceous.

A small pantropical family of 6-8 genera and as many as 100 species.

Elaeocarpus serratus L. Sp. Pl. 515. 1753.

The fruits, for which I have no common names, is sometimes used in Honduras.

Muntingia calabura L. Sp. Pl. 509. 1753.
Capulín blanco, majaguillo, pacito.

The fruits are rather insipid and very sweet, mostly eaten by small children. The bark contains strong fiber and from it are made string, baskets and bark cloth. Occasional throughout our region where it is sometimes planted.

ERICACEAE

Shrubs (ours), occasionally trees, herbs or vines, sometimes epiphytic; flowers perfect, gamopetalous, actinomorphic; leaves simple, alternate or subopposite or whorled; calyx 4-7-lobed; corolla 5-7-lobed, connate or sometimes the lobes free, usually campanuate or urceolate; stamens often twice as many as the corolla lobes, dehiscing by pores, chinks or longitudinally; ovary superior or inferior; fruit a capsule or a berry.

A wonderfully variable family (including the Vacciniaceae) distributed from the arctic regions to the tropics over the world. There are perhaps 50 to 100 genera and as many as 1,000 species, none of much economic importance in our area.

Pernettia coriacea Klotzsch, Linnaea 24: 85. 1851.
Arrayán.

The fruits of this shrub have an agreeable flavor but many people consider them to be poisonous.

Satyria warszewiczii Klotzsch, Linnaea 24: 22. 1851.
Muelas, juetilla de cuaresma, coralillo, matapalo de uva, palo de miel, colmillos (the flowers).

The juicy and acidulous fruits are good to eat. Jellies and confections may be made from them.

Vaccinium confertum HBK. Nov. Gen. & Sp. Pl. 3: 265, t. 250. 1818.
Cacalate, sco.

The berries are good but probably few of them are gathered as food.

The plant is occasionally abundant in the mountains of Guatemala.

Vaccinium consanguineum Klotzsch, Linnaea 24:64. 1851.
Arrayán.
The small dark purple berries are sweet and edible.

ERYTHROXYLACEAE

Shrubs or small trees with simple alternate leaves; the small flowers perfect, actinomorphic; sepals 5, persistant; corolla rotate with 5 petals; stamens usually 10 in two series; ovary superior, fruit a berry.

A small tropical family, mostly South American, with 3 genera and about 200 species. The only plant of economic importance is coca, from the leaves of which cocaine is prepared. The leaves are chewed by the Indians of the high Andes and they help to relieve the strain of the users' arduous lives. It has been estimated that some 15 million South Americans, from Colombia to Argentina, are addicted to coca. Pizarro found it in general use in 1553.

Erythroxylon coca Lam. Encyc. 2:393. 1786.
Coca.

Coca is grown as an ornamental and hedge in a park in one Central American capital. So far as I know there are no coca addicts in the region and no coca is grown for the leaves.

EUPHORBIACEAE

Monoecious or sometimes dioecious herbs, shrubs or trees, often with milky or mucilaginous sap; leaves usually alternate, sometimes opposite or whorled, simple or compound, stipulate, the stipules often reduced to spines, hairs or glands; flowers usually reduced by suppression, unisexual; inflorescences various; calyx and corolla present or one or both absent, sepals and petals usually 5, stamens usually twice as many as the petals or reduced to one, infrastaminal disk (or gland) often present in flowers with many stamens, pistillate sometimes with staminodes, often pedicellate, styles usually 3 which are usually bilobed and with six stigmas, these sometimes dissected; fruit usually a trilocular capsule, each cell usually bilobed and with six stigmas, these sometimes dissected; fruit usually a trilocular capsule, each cell usually 1-seeded.

A large and difficult family with perhaps 300 genera and 7,000-8,000 species, common in the tropics of the world and extending into temperate regions. Most abundant in Africa and America.

The family is an abundant one in Central America. The milky or mucilaginous sap is often caustic or even poisonous. Little is known about the chemistry of the sap and almost certainly useful compounds will be found. The seeds of most of the species of the family contain oil, sometimes in considerable quantities. The oils are often drastic purgatives and may be poisonous.

The important economic plant of the family is Pará rubber Hevea brasiliensis or related species, which have been cultivated without great success in our region. The castor bean (Ricinus communis) is of some importance in Central America as an oil crop.

Many of the plants of the Euphorbiaceae are "poisonous" in fact or fancy. Whenever one of these plants is thought to be "poisonous" I have added this characterization of it to the record.

I have used the words "poison" and "poisonous" to translate the idea often expressed or implied by the words "veneno" or "venenoso" in addition to the presumed strict meaning of the words, to destroy or be harmful to life, are used in a multitude of ways. Anything that may be harmful to health or the well-being of any organism is "venenoso." Plants or animals that may resemble others known or suspected of being poisonous are often suspect. Snakes and wasps, for example, all are considered poisonous, because some are.

Acalypha hispida Burm. Fl. Ind. 203, t. 61, f. 1. 1768.

Commonly cultivated as an ornamental in Central America in the lower and middle elevations. Perhaps native of Oceania.

Aleurites fordii Hemsl. in Hook. Ic. Pl. tt. 2801-2802. 1906.

Tung, tung-oil, china-wood oil.

Tung oil has been known in China for a long time, where it was the principal oil used in paints. It is, and was, used also in varnishes, laquers, for coating fabrics and other purposes. Found occasionally in Central America but I have seen no commercial plantations.

The foliage, sap and fruits are said to contain a saponin toxic to stock and to man. Non-fatal poisoning is known to have occurred in Honduras from eating the fruits.

Aleurites moluccana (L.) Willd. Sp. Pl. 4: 590. 1805.

Reported to have been grown in El Salvador and that the seed oil is both edible and medicinal. Report perhaps in error.

Cnidoscolus aconitifolius (Mill.) I. M. Johnston, Contr. Gray Herb. 68:86. 1923. Jatropha aconitifolia Mill. Gard. Dict. ed. 8. 1786.

Chaya, chayo, copapapa, chichicaste, chaidra, chaira, chicasquil, chay, tzimchay, tzah.

The plant is not uncommonly planted as an ornamental or as a hedge around dwellings. It becomes a small tree and is quite attractive. The tender leaves are harvested and used as a pot herb. They are quite good. I have seen the plant only in cultivation in Central America, never as a wild plant although it may occur. The cultivated plants that I have seen were without stinging hairs or bristles. The name chichicaste applies to those with stinging hairs, which indicates that such plants are known in our region.

Cnidoscolus chayamansa McVaugh, Bull. Torr. Bot. Club 71: 466. 1944.
Chaya, chayamansa.

The leaves of this plant are cooked and eaten as pot herbs. It is rarely cultivated in Central America and is reported only from Guatemala and Belize where it was originally found by C. L. Lundell. The plant is not known to set seeds and propagation is by cuttings. Some plants are said to have stinging hairs or bristles but usually there are none, hence the common name chayamansa.

Codiaeum variegatum (L.) Blume, Bijdr. Fl. Ned. Ind. 606. 1825.
Laurel, croton, pon, tirabuzón.

Cultivated in many varieties nearly everywhere in Central America below 1,500 meters as an ornamental and especially

common in low humid areas. It is included here because it is one of the common ornamentals even though it is of little economic importance. I have found the Codiaeums to be good host plants for small epiphytic orchids. Bromeliads also root well onto them. Possibly native from Malaya to Australia.

Croton ciliatoglandulosus Ortega, Hort. Matr. Dec. 31. 1797.

Hierba mala, comemano, hoja de sierra, ciega ojo, ciega vista, copalito, chirca, pela nariz.

Small erect shrub easily recognized by the abundant long, gland-tipped hairs and divisions of the stipules. The belief is widely held that the sticky glandular material may cause blindness if this material comes in contact with the eyes. It is thought also that cattle browsing where the plant is may become blind,- either from getting the material in the eyes or from eating the foliage. I know of no proof for these beliefs.

Croton gossypifolius Vahl, Symb. Bot. 2:98. 1791.
Targuá, targuá colorada.

A gum-like material which exudes from the stems is said to be used in cleaning the teeth in Costa Rica.

Croton reflexifolius HBK. Nov. Gen. & Sp. 2: 68. 1817.
Copalchí, hoja amarga, sasafrás.

The aromatic fruits, leaves or bark sometimes are used in flavoring the local rum in El Salvador.

EUPHORBIA. Many species of Euphorbia are said to have acrid or poisonous sap. The sap of many kinds is a white latex-like substance. Much chemical work remains to be done to verify whether or not the latices of this group of plants have components which may be of value, medicinally or commercially.

Euphorbia cotinifolia L. Amoen. Acad. 3: 112. 1756.
Barrabás, mala hierba, mala mujer.

The caustic milky sap may blister the skin. It is said to be poisonous and to have been used in criminal poisoning. The seeds are said to contain a purgative. The plants have been used in South America as a barbasco. In Guatemala used as a living fence post.

Euphorbia hirta L. Sp. Pl. 454. 1753.

Golondrina, hierba de paloma, sabana de la virgen, coliflorcito, cocmachpín, chicken weed.

A common and often abundant weed in cultivated or waste ground at elevations below 1,000 meters. It has been reported, and also denied, that the plant harbors an organism that causes tropical ulcers.

Euphorbia lancifolia Schlecht. Linnaea 7: 143. 1832.
Ixbut, ixtun, sapillo, isbut.

This plant is commonly reported, in Guatemala, to be an excellent galactagogue. When given to nursing women it is said to increase their flow of milk. It is reported also to increase the quantity of milk given by cows. but so far as I know no controlled experiments have been made in either case. It has been claimed that ixbut will cause milk to be produced even after the flow has ceased normally, or even that it will cause women who have not given birth to produce milk.

In Africa I was told that Abrus precatorius has much the same reputation.

Euphorbia pulcherrima Wild. ex Klotzsch, Allg. Gartenz. 2: 27. 1834.
Flor de pascua, pascua, guacamayo, pastora, poinsettia.

Native of Mexico and possibly Guatemala and now cultivated every where in the tropics and subtropics as an ornamental. Poinsettias usually come into flower in our region (and in the northern hemisphere) about Christmas time, hence the common name flor de pascua. Well grown specimens are among the most attractive of ornamentals.

Garcia nutans Rohr, Skivt. Naturh. Selsk. Kjoebenhavn 2: 217, t. 9. 1792.

Piñoncillo, huevo de gato, pepito del indio, avellano, tlacualote.

Eckey reports (Vegetable Fats & Oils, p. 581-582. 1954) that the oil of this species has properties which makes it supe-

rior to tung oil, as a varnish oil. It has been suggested as a crop worth investigation for the region of the United States that is frost free. It might be well to investigate the possibilities of the plant for Central America. I had a tree growing in my yard in Honduras which grew well on rather poor soil but never produced much seed. Native from west central Mexico, the West Indies to northern South America.

Hevea brasiliensis Muell.- Arg. in Linnaea 34: p. 204. 1865.

Hule, caucho, hevea, Pará rubber, rubber.

The Pará rubber tree has been one of the important economic plants of the world. Up until the advent of synthetic rubber this plant supplied most of the needs for rubber throughout the world. Although the plant is native of the Amazon basin it has never been of great importance as a plantation crop in Brazil or any other country of this hemisphere. The great expansion of cultivation took place in what is now Indonesia and for many years most of the world's supply came from there and adjacent regions of the paleotropics. Currently the greatest new plantations are being put out in western Africa. Rubber has been suggested and studied as a plantation crop and as a peasant crop in Central America. It has not been successful in either category up to the present.

Natural rubber is superior to synthetic rubber for most uses. The greatest use for natural rubber is in tires and the better grades of these have an increasingly greater percentage of natural rubber. Most tires for use on high speed aircraft are about 100o/o natural rubber. Imle (Econ. Bot. 32: 274. 1979) estimates world production for the mid-1980s at about 6 million metric tons.

Hieronyma alchorneoides Allemão in Trab. Vell. Rio Janeiro, ill. 1848.

Curtidor.

The bark is used in Honduras in tanning leather. The wood finds use in constructions, posts, railroad ties and perhaps other purposes.

Hippomane mancinella L. Sp. Pl. 1191. 1753.

Manzanillo, manzanita de playa, manzanillo de la playa, manchineel.

Occasionally along the sea. The Spanish name means "little apples," due to the resemblance of the fruits to apples. The milky sap is poisonous if taken internally and causes irritation or even severe inflammation of the skin in some persons. Smoke from the wood may be dangerous to the eyes. The Carib Indians are thought to have used the latex as an arrow poison. Tales of persons being very ill or even dying after having slept beneath a manchineel are probably without foundation. The fruits are poisonous. The wood is said to be excellent for cabinet work.

Hura crepitans L. Sp. Pl. 1008. 1753.

Habillo, javillo, tronador, jabilla del diablo, box tree, white cedar, possum wood.

The latex of the tree is caustic to the skin and poisonous. It has been used, mixed with saw dust, as a barbasco in fishing. The seeds, or the oil from them, have been used as a purgative but are dangerous, even in small doses. The seeds are reported by Paul Allen to be relished by monkeys and macaws. Native in Costa Rica and Panama.

Hura polyandra Baill. Etud. Euphorb. 543. 1858.
Javillo, jabillo, tetereta, haba, arbol del diablo.

Like the latex of the preceeding species this is caustic to the skin, and also used as a barbasco. In Guatemala the seeds are ground up and said to be used as a purgative and as an anthelmintic, probably a dangerous proceedure. The species is one of the largest trees of Central America and may reach a height of more than 30 meters on the Pacific plain of Guatemala. Native from Mexico to Costa Rica.

Jatropha curcas L. Sp. Pl. 1006. 1753.
Piñón, tempate, yupur, sakilté, physic nut.

The seeds of this species contain some 30-40 percent of a pale yellow oil which is almost odorless when fresh. Commercial oil may be pale yellow to dark brown and have an unpleasant odor. The oil is a drastic purgative, 10 drops having about the same effect as a tablespoon of castor oil. The principal use of the oil is in soap making, as a lubricant for textiles and as

a medicinal oil. The seeds have such drastic purgative properties that they may be dangerous. Native from Mexico, the West Indies to South America.

Jatropha gossypiifolia L. Sp. Pl. 1006. 1753.

Frailecillo, arriba y abajo.

The seeds contain an oil which is a drastic purgative and emetic. Mexico to South America, the West Indies and perhaps naturalized in Africa.

MANIHOT: There are presumed to be two species of edible cassava in Central America, Manihot dulcis and esculenta. These species are difficult to tell apart unless flowers are present, but usually may be distinguished by the key given below. I am of the opinion that most of the cassava cultivated in Central America is bitter cassava, M. esculenta, however there are forms of this species apparently not poisonous. It seems likely that these non-poisonous forms have become the important ones due to selection. There are literally hundreds of named varieties of cassava in world agriculture, many of these to be found in Central America.

Cassava is American in origin. Both of the commonly cultivated species would seem to have originated in Brazil and certainly had been brought into the Caribbean region well before the time of discovery. Cassava is the most widely used of the starchy root crops in Central and South America and has become an important food crop in many tropical countries of the world. It probably yields more starch per hectare with less labor than any other crop.

Key to the cultivated cassavas.

Ovary 6-angled; the capsule winged; anthers short. . . Manihot esculenta.

Ovary not angled; capsule not winged; anthers elongated. . M. dulcis.

Manihot dulcis (J. F. Gmel.) Pax, Pflanzenr. IV. 147. 2: 71. 1912.

Yuca, yuca dulce, cicitsin, cassava, sweet cassava, manioc.

The roots are said to be "sweet" and not to possess the "poisonous" properties of some forms of M. esculenta. This species is probably unusual in Central America. The uses are the same as those of the following species.

Manihot esculenta Crantz, Inst. Herb. 1: 167. 1776. M. utilissima Pohl, Pl. Bras. 1: 32, t. 24. 1827.

Yuca, yuca amarga, yuca brava, yuca blanca, cazabe, manioc, cassava, mandioca (in Portuguese.)

Cassava and sweet potatoes were perhaps the two most important root crops in tropical America before the time of discovery, and still are today. Cassava is the more important of the two.

In Central America the root is usually boiled and eaten as a vegetable. It may be fried in deep fat although this is uncommon in our region. Cooking, heating or leaching with water removes the bitter or poisonous principle.

The roots are the source of much of the starch produced locally in our region. Most all markets have the starch available for it is used in cooking and in starching clothes. I have never seen it made into tapioca but this may occur. The starch is used in bread making, especially in Brazil, but in Central America most bread is made from cereals. Beer may be made from cassava but again not in Central America so far as I know.

Cassava starch is used in industry for sizing textiles, in laundry starch, in food preparations, in making sugars, alcohol and acetone.

Cassava is easy to grow in warm regions of the tropics, mostly below 1,500 meters. It is seen above that altitude but usually does not do well. Propagation is vegetative. The stems are cut into sections, called "seed" and partially buried in the field. These cuttings soon root and usually produce a crop within 12-18 months.

The leaves of cassava are commonly used as pot herbs in the Congo basin and elsewhere in Africa.

Manihot glaziovii Muell.- Arg. in Mart. Fl. Bras. 11,2:446. 1874.

Caucho de Ceará, caucho blanco, Ceará rubber.

Planted (Guatemala, Costa Rica) as a source of rubber or as a curiosity. Formerly, and during World War II, an article of commerce. The species was planted also in the East Indies as a source of rubber but was not competitive with rubber from Hevea brasiliensis. Native in the dry region of northeastern Brazil.

Omphalea oleifera Hemsl. Pharm. Jour. Trans. XV.13: 301. 1882.

Palo de queso, hoja de queso, chirán, palo de chirán, palo de jabón, tambor, castanete.

The immature fruits are cooked and eaten, as are the boiled seeds after the removal of the embryo. The seeds are rich in oil said to be used in El Salvador for cooking and in soap making. The oil is said to have purgative properties. The large thin leaves are used to wrap cheeses, hence some of the common names. Known only from El Salvador.

Phyllanthus acidus (L.) Skeels, U. S. Dept. Agr., Bur. Pl. Ind. Bull. 148: 17. 1909.

Guinda, grosella, wild plum, otaheite gooseberry, West Indian gooseberry.

Introduced into Central America and sparingly cultivated. Preserves or pickles may be made from the fruits. The true gooseberry, or grosella, is a species of Ribes and is not grown in our area.

Ricinus communis L. Sp. Pl. 1007. 1753.

Higuerilla, higuerillo, higuerillo blanco, higuerillo rojo, aceite de higuerillo, aceite de castor, castor, koch, ixcoch, raxten, castor bean, castor oil.

The castor bean, native of Africa, has become widely naturalized in the American tropics in an endless number of varieties. The crop is occasionally cultivated in our region. Brazil is perhaps the largest producer in the hemisphere and in the world.

Castor beans, or perhaps better castor seeds (for they are not beans) contain from 35-55 percent of oil, the average is near 50 percent. Castor oil is one of the most useful of the vegetable oils in spite of the unpleasant memories many people have of it. The principal use of the oil, contrary to the opinion of small boys of my generation, is in the production of paint, varnish and similar products, in the making of plasticizers and dibasic acids. It is used in a multitude of other products especially where high viscosity and solubility in alcohol are important.

The castor plant has been used as shade in new coffee plantations.

The seeds contain, in additional to oil, a toxic material, ricin. Dust from the seeds contains allergens which may affect people working in plants where castor products are made.

SAPIUM. Most of the trees of this genus have acrid sap which may cause eye damage or even burn the skin. When clearings are made these trees often are not cut because of the evil reputation that they have. The seeds are said to be poisonous and cathartic.

Sapium lateriflorum Hemsl. in Hook. Icon. sub t. 2690. 1901.
Chimalate.

The latex, perhaps mixed with saw dust, is said to be used as a barcasco in Guatemala.

Sapium macrocarpum Muell.- Arg. Linnaea 32: 119. 1863.
Chilamate.

The sap may cause painful "burns" and lesions on the skin. Native from Mexico to El Salvador.

Sapium sebiferum (L.) Roxb. — This species is not known to be in cultivation in Central America. A thick layer of hard fat forms on the seeds. The fat may be used in the manufacture of candles and soap. The tallow or fat is known in the trade as "Chinese vegetable tallow." The plant might be useful in Central America.

Sebastiania adenophora Pax & Hoffm. in Engler, Pflanzenr. IV. 147. V: 145. 1912.

Chechem blanco, sacchechem, canchynup.

The latex of this plant, and related species, is reported poisonous and to cause a skin dermatitis like that of Rhus radicans. Mexico, Belize, possibly in Central America at low elevations.

FAGACEAE

Evergreen (most of ours) monoecious trees with entire, serrate, lobed or cleft alternate leaves. Male flowers in pendolous catkin-like racemes; pistillate flowers solitary or few; the fruit a characteristic 1-seeded nut (acorn, bellota) subtended by a cupule or involucre.

Small but important family of about 6 genera and perhaps as many as 600 species of which half belong in the genus Quercus. Most abundant in the northern hemisphere but there are many to be found in the southern hemisphere.

QUERCUS: The oaks are important in Central America for in many places they make up a large part of the forest cover on the highlands. Oaks extend in elevation from some 400 meters to well over 3,000 meters, from the dry and hot hills to the continuously moist cool smmits of Central America's highest mountains. Oaks are good indicators of elevation and a species may be quite specific in altitudinal range, - thus if several species are present and the altitudinal range of each is known then it is possible to estimate the altitude quite closely.

There are about 50 species of oaks in Central America and certainly more to be discovered as the still unexplored high and isolated volcanic mountains become better known.

Oaks are the preferred fuel for kitchen use wherever they grow in Central America. It is likely that most species have been used for this purpose. Charcoal is made from many of them. Oaks, in temperate climates, are the source of some of the best lumber for flooring. Most Central American species that have been tried do not produce lumber of good quality and most have wood so hard that they cannot be readily sawn in the usual

mills. A few other uses are recorded for oaks, among them the use of the bark as a tanning agent and the galls in the making of ink, neither of great importance today. The oaks are usually not distinguished by names that refer to one or another specific oak. The words encino and roble are usually generic ones to include all species of Quercus. Sometimes, in a given region, certain kinds are called encino while others are called roble but there is no consistent use of these words.

Quercus peduncularis var. sublanosa (Trel.) Miller, U.S.D.A Miscl. Publ. 477: 34. 1942.

Roble (big trees), encino (small trees), malcote.

This species I have seen felled and stripped of its bark in Honduras, to be used in tannin. Galls may have been used in colonial times in the manufacture of ink. Galls often weigh to one kilogram or more.

FLACOURTIACEAE

Trees or shrubs with simple, alternate coriaceous leaves, monoecious or sometimes dioecious; flowers actinomorphic, usually bisexual, in lateral or terminal cymes; sepals 2-10 or more and occasionally not distinguishable from the petals; petals when distinctive usually the same number as the sepals, sometimes more; stamens usually many, distinct or in bundles opposite the petals; ovary superior (rarely inferior or partly so), with 2-10 carpels; fruit a loculicidal capsule or a berry, seeds often with an aril or comose.

A rather large and complex tropical or subtropical family with some 80 genera and perhaps 1,000 species. The family is not a natural one and Henri Pittier is reported to have suggested that any tree for which the family could not be found should be looked for in the Flacourtiaceae.

Dovyalis caffra (Harv. & Sond.) Warb. in Engler & Prantl, Naturl. Pflanzenf. III. 6a: 44. 1893.

Kei-apple.

Used as a hedge and also for the fruit which it produces. The fruit is bright yellow and quite acid. Native of south Africa.

Dovyalis hebecarpa (Gardn.) Warb. in Engler & Prantl, Naturl. Pflanzenf. III. 6a: 44. 1893.

Aberia, Ceylon gooseberry.

Occasionally cultivated as a hedge, and for the fruits which are quite good in preserves but too acid to be used as a fresh fruit. The berry is maroon-purple and velvety. Native of Ceylon or India.

Flacourtia indica (Burm. f.) Merr. Interpr. Rumph. Herb. Amboin. 337. 1917.

Governor's plum, ramontchi, espina de bagre.

Introduced into Central America for the fruits or as a hedge plant. The plant is covered with spines. Probably native of southern Asia.

Macrohasseltia macroterantha (Standl. & L. Wms.) L. Wms. Fieldiana, Bot. 29: 364. 1961. Hasseltia macroterantha Standl, & L. Wms. Ceiba 3:53. 1952.

Areno amarillo.

This is perhaps one of the most sought after timber trees of Nicaragua and doubtless also of Belize. The tree has been found also in Guatemala, Costa Rica and Panama but nothing is known about its use in these countries. The lumber is exported from Nicaragua as areno amarillo, the name derived from the yellow sand-like stone cells in the bark. It was not until 1974-75 that I finally determined fruiting specimens from Nicaragua with the previously known flowering specimens from Costa Rica. Millions of board feet of the lumber from this tree are exported annually from Nicaragua. The tree has been almost exterminated in the Cordillera Central Between Matagalpa and Jinotega. It will become rare in the rain forests in the Cordillera Isabelia, which was the main source of logs as late as 1976. A big tree cut into three sections often requires three logging trucks to transport it from the forest to the mill. Probably, after mahogany, the largest tree of the Central American rain forests.

GERANIACEAE

Herbaceous or sometime suffruticose plants with alternate or opposite, simple of compound leaves; flowers perfect, regular

or irregular; inflorescence cymose or umbellate; sepals usually 5; petals usually 5, often with alternating nectiferous glands; stamens 5-15; ovary superior with 3-8 locules or carpels; fruit a capsule.

A small family of about a dozen genera and perhaps 800 species. Economic importance is limited to those used as ornamentals and a few cultivated for the production of essential oils.

Pelargonium hortorum Bailey, Stand. Cyclop. Hort. 2531. 1916.

Geranio, geranium.

Geraniums are commonly grown as ornamentals in Central America and the plants will continue to grow for several years in favorable locations. Propagation is vegetative. Bailey considered the plant to be of hybrid origin, from two or more south African species.

GRAMINEAE

Annual or perennial herbaceous plants or sometimes woody, with rounded or flattened, hollow or solid stems; leaves usually parallel-veined, usually 2-ranked and usually many times longer than broad, consisting of a sheath enveloping the culm and a usually flat, linear or sometimes broader blade; flowers perfect or rarely unisexual, arranged in spikelets consisting of a shortened axis (rachilla) and 2- to many 2-ranked bracts, the lowest two (glumes) empty, each succeeding one or more (lemmas) bearing in their axils a single flower (one or more of the lower lemmas sometimes barren, and the upper one or more often reduced and sterile), between the flower and the rachilla a 2-nerved bract (palea), the lemma, palea and included flower constituting the floret; stamens one to many, usually 3, with delicate filaments and 2-celled anthers; pistil 1 with 1-celled 1-ovuled ovary, 2 styles (rarely 1 or 3) and usually plumose stigmas; fruit a caryopsis, the grains rarely free from the pericarp.

The Gramineae, sometimes called Poaceae, is one of the large families of flowering plants, perhaps being exceeded in number of genera and species only by the Compositae, the Orchidaceae and the Leguminosae. There are some 500 genera

and perhaps as many as 10,000 species. The Gramineae, in land surface covered and number of individuals, is by far the most abundant of the kinds of flowering plants.

The grasses economically are perhaps the most important of the families of flowering plants. Grasses provide food and drink for man; fodder for domesticated and wild animals; shelter for man; they are the sources of an endless number of industrial and manufactured products; ornamental and turf grasses are of importance; they are the most useful of plants in land conservation.

Grasses are the prime source for food and drink for man in our region, maize, rice and sugar cane. The cereal grasses, wheat, oats, barley and sorghum while important in the food economy of the world are of lesser importance than maize, rice and sugar cane in our region and throughout the tropics.

Arthrostylidium pittieri Hack. Oesterr. Bot. Zeitschr. 53: 75. 1903.
Carrizo.

The culms of this bamboo and another species of the genus are used in Guatemala for the walls and partitions of houses. Used also to make flutes and fire-blowing tubes. Native from Guatemala to Panama.

Arundinella deppeana Nees in Steud. Syn. Pl. Glum. 1: 115. 1854.
Cola de venado, cola de caballo, zacate amargo.

The inflorescences are reported to be used in El Salvador on the roofs of creches used to adorn churches at Christmas time.

Arundo donax L. Sp. Pl. 81. 1753.
Caña de Castilla, carrizo, giant cane, Donax cane.

The stems of the giant cane are used for house divisions and for the walls. The stems are flattened and woven into mats called acapetates which are used as ceilings in some houses. Split stems are often used to make baskets. Small stems or the tips of stems are used commonly to hold sky rockets or other

types of fireworks. The stems are the sources of fine reeds for musical instruments and may be used for industrial cellulose. Native of the Mediterranean region and now widely naturalized in the New World.

Avena sativa L. Sp. Pl. 79. 1753.
Avena, oats.

Oats occasionally are planted in the highlands of Central America but usually do not do well. The best fields that I have seen were in the mountains above Totonicapán in Guatemala. The breakfast cereal "rolled oats" is commonly imported as a manufactured product. It is called avena.

Bambusa arundinacea Willd., sensu Gamble in Ann. Roy. Bot. Gard. Calcutta 7: 51, 5. 48. 1896.

Bambú, Giant thorny bamboo.

Introduced at Lancetilla, Honduras and now established at several places. Useful as a living barrier and for structural material. The sprouts have been used for food in Honduras. Native of India.

Bambusa textilis McClure, Lingnan Univ. Sci. Bull. 9: 14. 1940.

Introduced into El Salvador, native of southern China. McClure states that this species is one of the most useful of the species of the genus for withes, for basket weaving and for matting. It is used to make furniture and as an ornamental.

Bambusa vulgaris Schrad. ex Wendl. Coll. Pl. 2: 26, t. 47. 1810.

Bambú.

The common bamboo in Central America, perhaps native of India or of Madagascar. It is used for buildings and for banana props. The young shoots are eaten and Chinese residents of Nicaragua have canned them for the local trade. Widely grown as an ornamental [illegible]rma vittata A. & C. Riv. with green stripped culms is an occasional form, or in some places more abundant than the green form.

CENCHRUS. The grasses of this genus can hardly be called useful but because they are nuisances attention is called to them. The burs of all of the species stick to clothing, or the hair of animals, and are difficult to dislodge. The stiff bristles on the spiklets may penetrate the skin. Cenchrus brownii Roem. & Schult. and C. echinatus L. are two species commonly encountered.

Chusquea longifolia Swallen, Jour. Wash. Acad. Sci. 30: 310. 1940.

Cañito.

Coffee baskets are made from this bamboo in Guatemala.

Chusquea pittieri Hack. Oesterr. Bot. Zeitschr. 53: 89. 1903.

Caña brava.

The culms of this bamboo are used in Costa Rica and perhaps elsewhere in rockets and other fireworks.

Coix lacryma-jobi L. Sp. Pl. 972. 1753.

Lágrimas de San Pedro, lágrimas de Job, zacate de perla, Jacob's tears.

Rarely cultivated for ornament or used in times of scarcity as a cereal, escaped and naturalized in moist places throughout the tropics. The large, hining grayish seeds are used in making necklaces, bracelets, rosaries and other articles.

Cymbopogon citratus (DC.) Stapf, Kew Bull. Misc. Inf. 1906: 322. 1906.

Zacate limón, zacate de té, té limón, té de caña, sontol, lemon grass.

Lemon grass has been cultivated at several places in Central America. In the 1950s lemon grass was grown near Escuintla, Guatemala for the essential oil which it produced. The residue from distillation was used in paper making by a small paper mill at that locality. Fifty drums of oil were exported in 1959. The rhizomes have been used in Costa Rica for flavoring tobacco.

Cymbopogon martinii (Roxb.) Wats. in Atkins, Gaz. N. W. Prov. India 10: 392. 1882.

Palmarosa, palmarosa oil, oil of palmarosa.

This species has been grown as an experimental crop for an essential oil in Guatemala. The grass was imported from the Comore Islands and grown out. The results were not satisfactory and the acreage not expanded. The oil is the source of a high grade geraniol used in cosmetics, especially soap, to which it gives a distinctive and lasting odor.

Cymbopogon nardus (L.) Rendle, Cat. Welw. Afr. Pl. 2: 155. 1899.
Citronella grass, citronella oil.

Citronella grass has been grown in most of the Central American countries. The crop was rather important on the north coast of Honduras until the price of the oil dropped to a level that did not permit continuing with the crop. Guatemala is reported to have exported as much as 324 tons of Citronella oil to the United States in 1948. The plant is from the old world but it is known only as a cultivated plant.

Cynodon dactylon (L.) Pers. Syn. Pl. 1: 85. 1805.
Zacate Bermuda, Bermuda grass.

One of the best lawn grasses for the dry tropics for it withstands long dry periods and will remain green. It is, however, an indomitable pest when it invades agricultural lands. Native of Europe or Asia, now widely dispersed in the tropics and subtropics of the world.

Dendrocalamus strictus (Roxb.) Nees, Linnaea 9: 476. 1834.

An Indian bamboo introduced into Guatemala, at Chocolá. It is believed to be the most universally used species of bamboo in India.

Digitaria decumbens Stent. Bothalia 3: 150. 1930.
Pangola, pangola grass.

Pangola is one of the most promising grasses for Central America. The grass has been introduced into Guatemala and El Salvador and perhaps elsewhere. Dr. Mario Lewy wrote that the

grass had proven to be one of the best forage grasses introduced to El Salvador. Tests have shown it to be superior to most grasses for both milk and beef production. Propagation is vegetative for the seeds rarely germinate. Native of southern Africa, widely distributed in the tropics and subtropics of the world.

Eleusine coracana (L.) Gaertn. Fruet. 1: 8, t. 1. 1788. African millet, finger millet.

This millet does quite well in the tropics at quite high elevations. I saw it in Zaire and Rwanda Burundi at about 2,000 meters cultivated on ridges and slopes in fairly wet country. This millet is reported to produce 850-1100 kg. of grain per hectare. I have not seen this millet in Central America but it might be a useful crop for the highlands.

Euchlaena mexicana Schrad. Ind. Sem. Hort. Goettingen 1832; Linnaea 8: Litt. 25. 1833. Zea mexicana Reeves & Mangelsdorf, Am. Journ. Bot. 29: 817. 1943.

Teosinte, maíz silvestre, maíz café.

A large maize-like annual grass native of Mexico and Central America sometimes cultivated for forage. In Honduras, perhaps elsewhere also, the seeds are roasted and mixed with coffee or used as a substitute for coffee.

Gigantochloa apus (Schult.) Kurz, Ind. Forester 1: 344. 1876.

A bamboo with strong durable culms much used in Indonesia for houses, bridges, basketry and other woven articles. The species has been introduced into Guatemala and perhaps other countries.

Gigantochloa aspera (Schult.) Kurz, Ind. Forester 1: 221. 1876.

This bamboo has been introduced into Central America for its strong and durable culms. It is cultivated extensively in India and elsewhere where strength is a factor of importance. Culms reach to 30 meters and to 20 cm. in diameter. Available and widely distributed from Escuela Agrícola Panamericana.

Gigantochloa verticillata (Willd.) Munro, Trans. Linn. Soc. 26: 124. 1868.

A large and useful Indonesian bamboo introduced to Guatemala and perhaps elsewhere. Used in construction, the flattened culms used as floor covering or partitions. Some forms have edible shoots. The culm reaches to 25 meters and to 10 cm. in diameter.

Guadua aculeata Rupr. ex Fourn. Mex. Pl. 2: 130. 1886. Tarro.

A bamboo native from Mexico to Panama and commonly used in construction and other farm needs. This species does not recover well from heavy cutting and as a result is becoming rare in much of its natural range.

Guadua angustifolia Kunth, Syn. Pl. Aequin. 1: 253. 1822. Guadua.

Native from Panama to northern South America where it is the most used bamboo for constructions and other farm needs. It has been introduced into Central America.

Gynerium sagittatum (Aubl.) Beauv. Ess. Agros. 138, t. 24, f. 6. 1812.

Caña, caña blanca, caña brava, caña de casa, caña de Castilla, vara de Castilla, uva grass.

An important, coarse grass used in the construction of houses, roofs, fences, basketry and many other things. The culms may be as much as 15 meters long and 3-8 cm. in diameter. A horticultural form with white stripes on the leaves is occasional. Native from Mexico to Paraguay. The use of the name of the Spanish province, Castilla, in the common name in this case and in many others merely indicates that it is good. Merchandise from Castilla was considered to be good, hence the words de Castilla in a common name are taken to mean that the object is good or useful, not necessarily that it originated in Castilla. The words de China have the same meaning for in the days of the galleons much fine merchandise came to Mexico and Central America from China.

Hordeum vulgare L. Sp. Pl. 84. 1753.
Cebada, barley.

A small amount of barley is grown in Central America, mostly in the highlands of Guatemala. It is used principally in preparing a beverage or "tea" by boiling the grain with water.

Hyparrhenia rufa (Nees) Stapf in Prain, Fl. Trop. Africa 9: 304. 1918.
Jaraguá.

Jaragua grass is native of Africa and was doubtless taken from Africa to Brazil as a forage grass. It is thought to have been introduced from Brazil to Honduras by Tiburcio Carías (president of Honduras 1932-1947) and sown as pasture grass on the government farm in the Zamorano valley, probably in the early 1930s. The grass was well established in the mid-1940s when I went there and had essentially driven out Panicum maximum Jacq., a much superior pasture grass also native of Africa. Panicum maximum, Guinea grass, was so common and widely known in Central America that the usual name for it was zacate or zacatón which translates simply as "grass" or "big grass." Jaraguá is a tall, rough, and when mature very tough grass that most animals can not eat. It has been the practice to burn over jaraguá pastures in the dry season to make available the tender young grass as the rainy season starts. The rhizomes of the grass are resistant to fire so that it is the surviving plant over millions of acres of Mexican and Central American pasture lands. The native grasses and forbs that are not resistant to fire are killed in the annual burnings. Jaraguá is now naturalized in most Central American pasture lands from a bit above sea level up to some 1,600 meters. It is the dominant cover in many places.

Melinus minutiflora Beauv. Ess. Agros. 54, t. 11, f. 4. 1812.

Zacate gordura, pasto de gordura, molasses grass. (In Brazil, capim gordura, calinguero).

A useful and beautiful forage grass introduced from Africa and now found in the grasslands or savannas of most of the American tropics. The grass is thought to be useful in keeping ticks off of cattle and people. The pubescence is viscid and the

viscid material may be insect repelling but there is no proof that it is insecticidal.

Melocanna baccifera (Roxb.) Kurz, Prelim. For. Veg. Pegu, Appendix B: 94. 1875.

A bamboo of India and Burma which was introduced to the hemisphere some 75 years ago, and some 25 years ago to Central America. It is used in India as a source of construction material, in weaving and as a source of paper pulp.

Merostachys argyronema Lindm. Svensk. Vet. Akad. Handl. 34: 22, t. 15. 1900.
Flauta.

A cloud forest bamboo used in Guatemala to make pan pipes or flutes, resonance tubes for marimbas and to weave baskets. Known also from Brazil.

Muhlenbergia macroura (HBK.) Hitchc. N. Am. Flora 17: 468. 1935.
Pajón.

A common bunch grass used for thatch in Guatemala. Pastured by sheep when forage is scarce.

Oryza glaberrima Steud. Syn. Pl. Gram. 1: 3. 1854.
Red rice.

This rice has not been reported from Central America but may be there. I have seen rice with red caryopses (seeds) in the markets of the region but have not seen the plant growing. Native of western Africa.

Oryza sativa L. Sp. Pl. 333. 1753.
Arroz, arroz del país, rice.

Rice, native of the old world, is now cultivated in the tropics and subtropics of the world as well as in some temperate regions. It is grown in our region mostly as upland rice or hill rice. Some paddy rice, grown in flooded fields is to be found in our region. In recent years paddy rice has become an important crop in the Río Viejo valley near Sebáco in Nicaragua.

Rice is one of the important cereal crops of the world. It is usually the important cereal grain of Asia where populations are dense. More cereal food can be produced on a given area from paddy rice than from any other cereal crop. Rice is an important crop and food in many parts of the American tropics but in only a few areas is it more important than maize. The principal use of rice in Central America is as a food for man and it is almost always the most expensive of the cereal grains. The second most important use of rice in our area is for the brewing of beer. Some very fine rice beers are produced here, perhaps the best from Honduras and Costa Rica. Few other uses are made of rice because of its cost.

A wild or perennial rice Oryza latifolia Desv. occurs in our area but I have found no record of its use nor have I seen it offered in markets.

Panicum maximum Jacq. Coll. Bot. 1: 76. 1786.

Zacate Guinea, zacate Pará, Guinea, zacatón, Guinea grass, Pará grass.

Guinea grass, one of the important pasture grasses of Central America, is often taller than the cattle that feed on it. It is found mostly at low and middle elevations but in both moist and dry areas. Guinea grass is not so fire resistant as jaraguá (Hyparrhenia rufa, which see) and is being replaced by it. Guinea grass is usually considered to be the better pasture grass of the two. Native of Africa.

Pennisetum clandestinum Hochst. Annuar. Istit. Bot. Roma 8: 41. 1903.

Kikuyú, kikuyu.

An African grass introduced into our region where it is expected to be a useful pasture grass because it contains a higher percentage of protein than most grasses. I have seen the plant used as a lawn grass in southern Africa, for which purpose it was excellent. The grass is propagated vegetatively.

Pennisetum purpureum Schum. in Schum. & Thonn. Beskr. Guin. Pl. 64. 1827.

Yerba elefante, zacate elefante, merkeron, elephant grass, napier grass.

An African grass cultivated for fodder and ensilage. Ease of propagation, high yield and nutritive value make this a promising fodder plant for our region. It is best adapted to coastal and lowland regions. Possibly naturalized in some places.

Phragmites communis Trin. Fund. Agrost. 134. 1820.
Carrizo, reed.

The culms of this grass are used in basketry, in making fire works and a number of other things. The large grass grown along rivers, swamps or lakes but is not common in Central America.

PHYLLOSTACHYS. McClure, in the Flora of Guatemala (Fieldiana, Bot. 24, 2: 308-316. 1955) reports that six species of the genus of bamboos have been introduced into Guatemala all having some economic use in the countries of origin. These species and their suggested uses are: Phyllostachys aurea A. & C. Riv., the culms make good fish poles, the young shoots are edible; P. bambusoides Sieb. & Zucc., the culms are used for paper making, the young shoots are edible; P. nidularia Munro is of value principally for its edible shoots, the branches make good brooms; P. nuda McClure has very palatable young shoots, the culms are used in temporary structures in the garden; P. rubromarginata McClure has edible shoots, culms are used for temporary garden constructions, for making flutes and pan pipes; P. viridiglaucescens A. & C. Riv. with edible shoots, the culms used for temporary constructions.

Saccharum officinarum L. Sp. Pl. 54. 1753.
Caña, caña de azúcar, sugar cane.

Sugar cane is native somewhere in southeastern Asia but is now grown around the world in the low tropics and even into the edge of the temperate zone. Sugar cane is one of the major crops of the world and the sugar made from it is economically important to many countries. It is a crop in every Central American country, from large plantations to a few canes in a kitchen garden to be used for chewing. Refined sugar is made in most of our countries and is often of poor quality with high moisture content. Crude sugar, known as panela or tapa de dulce is made in sugar mills to be found on nearly every large ranch in the areas where sugar cane will grow. Centrales, central sugar mills,

are becoming more common in the good growing areas. Most sugar produced in our area is used in the area either directly as food or in processed foods. Some crude sugar is used in most of our countries to produce the local rums. The best Central American rum is produced in Quetzaltenango, Guatemala and very poor ones are distilled in other places. Distilling of alcohol is a government monopoly in most countries. Bagasse, the waste from sugar mills, has been suggested as the raw material for paper mills.

Crude sugar (panela) is a rather satisfying food and a source of quick energy. In the days of travel by foot or by horse it was often carried since it provides a great amount of energy in small space and weight. Confections of excellent taste are made from it.

Schizostachyum pseudolima McClure, Lingnan Sci. Journ. 19: 537, tt. 39-40. 1940.

A Chinese bamboo introduced into Honduras about 1925, and from there to other areas. May be useful in temporary constructions, withes split from the culms are used to make flutes or pan pipes.

SETARIA. The millets which are used in many parts of the world are not used for food in Central America so far as I have observed, even in times of scarcity.

Sorghum vulgare Pers. Syn. Fl. 1: 101. 1805.

Maicillo, alboroto, maíz de Guinea, triguillo, maíz de millo, sorghum, Kafir corn, broomcorn.

Sorghum for grain is one of the common crops of Central America and is found over much of the area where the elevation and the rainfall are not too great. It is especially useful where the summer rains are not more than 500-600 mm. Sorghum is often interplanted with maize in dry areas where there is not always enough rain to mature maize. If rains are adequate the maize will mature and be harvested long before the sorghum is ready. Should the rains be too little for maize then usually there will be enough for sorghum and at least something will be produced from the field.

Most country people insist that grain sorghum is planted to provide feed for chickens and for other domesticated animals, that it is never used for human food. Almost certainly, however, a great deal of the grain is used for food for man especially when maize is in short supply. Food grains are in short supply in many areas of Central America almost every year and in the foreseeable future (from 1978) this situation will doubtless deteriorate.

Broomcorn (Sorghum vulgare var. technichum (Koern.) Jav.) is sometimes grown and from it brooms for the local markets are made.

Sorghum vulgare Pers. I think is not the correct name for the sorghums. If the grain sorghums, sweet sorghums, and the broomcorns all belong to the same species, as I would treat them, then the correct name for this aggregate is Sorghum bicolor (L.) Moench, Meth. Pl. 207. 1794.

Stipa ichu (R. & P.) Kunth, Rev. Gram. 1:60. 1829.
Ichú, pajón, zacatón.

This grass is common, and occasionally abundant, in the high cold mountains of Guatemala where it is used as thatch, and possibly also as a fuel. Ichu is apparently not palatable to stock for everywhere that I have seen it, Mexico, Guatemala, Costa Rica, Colombia and Ecuador it is untouched by sheep and other grazing animals. It probably invades lands overgrazed by sheep in the highlands of Guatemala, and doubtless elsewhere, and becomes the dominant cover over extensive areas.

Stipa tenacissima L. Cent. Pl. 1: 5. 1755.
Esparto.

This grass of the Mediterranean region has been reported to be introduced into El Salvador (Guzman, Fl. Salv. 28. 1952). In Europe it is the source of esparto wax and is used to make a special paper.

Trachypogon montufari (HBK.) Nees, Agrost. Bras. 342. 1829.

Brushes used in whitewashing walls at Tonacatepeque, El Salvador are said to be made from this grass.

Trachypogon plumosus (HBK.) Nees, Agrost. Bras. 344. 1829.
Paja.

Said to be used as thatch in El Salvador.

Tricholaena rosea Nees, Fl. Afr. Austr. 1: 17. 1841.
Illusion, zacate de seda, zacate rosado.

An attractive African grass introduced as a forage plant. now widely naturalized in Central America.

Tripsacum latifolium Hitch. Bot. Gaz. 41: 294. 1906.

Occasionally cultivated for use as a green fodder or ensilage. Native to Guatemala, Belize and Honduras. Cultivated in the West Indies and elsewhere.

Tripsacum laxum Nash, No. Am. Fl. 17: 81. 1909.

Guatemala, zacate Guatemala, pasto Guatemala, arrocillo, maicillo, caña de casa, caña de la India, hierba prodigiosa, Guatemala grass.

Guatemala grass is cultivated for green fodder and given to dairy cattle during the dry season as a green supplement. It is useful in making ensilage. The plant, a large one similar to maize is propagated vegetatively.

Presumed to be native from Mexico to El Salvador but there is a question whether or not the Central American material is conspecific with that of Mexico, from whence the type.

Triticum aestivum L. Sp. Pl. 85. 1753.
Trigo, wheat.

Wheat, although one of the important food crops of the world, is of relatively little importance in Central America. It is grown in the vicinity of Totonicapán and Quezaltenango in Guatemala and does fairly well at an elevation of about 2,000 up to almost 3,000 meters. It is usually grown on terraces in the mountains and the entire process of cultivation, from turning the soil and preparing the terraces to harvesting is done

by hand. Some Government regulations require that a certain amount of Guatemalan wheat be used in making flour. The result has been to increase the market value of Guatemalan wheat to a point where it is profitable to cultivate it. Guatemalan grown wheat may bring twice as much, or more, than a better grade of imported wheat due to the demand for Guatemalan grown wheat needed to comply with the regulation. In a free market wheat growing in Guatemala would not be profitable. The deterioration of the lands currently used to grow wheat in Guatemalan mountains probably will turn these lands into a montane desert by the end of this century.

Small quantities of wheat were grown in Honduras and perhaps elsewhere in Central America. Wheat is typically a crop of cold climates where the annual rainfall is less that 750 mm., a combination of conditions but rarely to be found in the tropics.

Vetiveria zizanioides (L.) Nash in Small, Fl. Sutheast U.S. 67. 1903.

Valeriana, Vetiver, vetiver oil.

Vetiver was grown in Honduras for production of the essential oil, perhaps is no longer cultivated. Propagation is by cuttings, or in some areas by seed.

Zea mays L. Sp. Pl. 971. 1753.

Maíz, the plant, or the grain when mature.

Milpa, the field where maize is grown.

Jilote, elote, maíz elote, maíz maicena and elote de apante are words commonly used in Central America for green corn and include the ears just beginning to form to those beginning to mature.

Guate and huatera are words used for maize when it is planted very thick in the field and is intended to be used as fodder for animals whether cut or pastured.

Masa de tortilla or masa are the almost universal designations for the dough made from maize and intended for tortillas, tomales and similar foods.

Tortilla is the unleavened, unsalted pancake-like bread from maize which is a basic food nearly everywhere in our region.

Maicena may be either the starch made from maize or a pudding-like dish made from corn starch.

In addition to the commonly used words given above there are many others that have to do with maize, or the products from it, used by Spanish speaking persons. In Guatemala the many Mayan dialects used are rich in words that apply to maize, in addition to those above.

Maize is the most important subsistance crop of Central America and is grown from near sea level to well up on the highest mountains and volcanoes. Among the country people no meal is complete without tortillas or other products of maize.

The ears of maize are used for food just as soon as they begin to form and are used as "green corn" until the grain is almost mature. When the grain is mature it is used immediately for making tortillas or tamales.

The grain of maize is used but rarely for any purpose other than as human food. There is never enough grain produced in Central America so that the supply does not become short sometime during the year. When the grain is in short supply the market cost may go up to a half dollar (1977 in Honduras) a pound. It is quite obvious that grain which is so expensive can not be used economically as animal feed. Central Americans say that maize imported from the United States does not have the proper flavor for the making of tortillas.

The grain of maize finds only minor uses other than as direct food for man. Some small amount of sweet, black, brewing corn is grown to make beer (chicha) especially by the Indians of Guatemala. Such beer is illegal in Guatemala and it is perhaps unwise to press Indians for information about it.

Maize is American in origin but exactly where is not known, perhaps some place in Mexico or Central America. It is a cultigen and could not persist without the intervention of

man. Maize, in innumerable variety, was spread over the Americas by the time of discovery and several prominent centers of development and domestication in both North and South America are recognized. The autonomous civilizations of Mexico, Central America and in the Andes of South America could not have developed without maize, and of course without beans which, with maize, balanced the diet of these pre-Columbian peoples. These two American foods are still the most important foods for millions of people in the American tropics and without them civilizations would not have developed and could not persist.

The progenitors of maize are not known. Many theories have been proposed concerning the origin of maize and the number of papers written on the subject are nearly endless. The last word has not been said!

GUTTIFERAE

Trees or shrubs with resinous sap, sometimes epiphytic; leaves simple, opposite or whorled or sometimes alternate: flowers usually unisexual, rarely perfect; sepals 2-10; petals 4-12, sometimes imbricated; stamens few to many; anthers 2-called, dehiscing longitudinally; pistil 1; stigmas as many as the cells of the ovary, usually peltate or radiating; fruit baccate or capsular; seeds often arillate.

A difficult family of some 45 genera and 500 species or more distributed in the tropics of the world.

Clusia odorata Seem. Bot. Voy. "Herald" 89. 1852.
Copel, copey, azahar, azahar de monte.

The yellow latex is said to be used in Costa Rica in boot making, as a cathartic and as an unguent.

Clusia utilis Blake, Contr. U.S. Nat. Herb. 24: 14, t. 4. 1922.

Manzanita de ratón, quiebra muelas, hoja de tortilla, hubuche, mermela.

The yellow latex is said to have been used in the adulteration of chiclé, placed on cotton and applied to an aching tooth it is said to allay pain.— The name Clusia flava Jacq. I used for

this plant in the Flora of Guatemala but it is probably distinct from the West Indian species.

Garcinia mangostana L. Sp. Pl. 443. 1753.
Mangosteen.

There is or was a small plantation of mangosteens at Lancetilla in Honduras and a few trees were near Lake Izabal and at Quiriguá in Guatemala. The fruit is considered by many to be the world's best, and certainly it is very fine. The tree is difficult to grow for it requires a continuously warm climate, low elevation, protection from wind, abundant moisture evenly distributed and soil high in organic matter.

Mammea americana L. Sp. Pl. 512. 1753.
Mamey, zapote mamey, mamee apple, muc, chacalhaaz.

The mamey is native or naturalized and cultivated in all of our region below 1,000 meters. The fruit is eaten out of hand or cooked, made into jam or used to make refreshing drinks. A tincture made from the latex and alcohol is said to be useful in killing fleas and other parasites. The fruit has a definite antibiotic action but whether or not this has any effect on the intestinal flora, when eaten as a raw fruit, is not known. The fruit is considered to be very fine by some people but I find it less desirable than many other tropical fruits. The flesh is yellow to apricot-color, sweet, usually very firm.

Rheedia edulis Triana & Planch. Ann. Sci. Nat. IV. 14: 310. 1860.

Mameyito, arrayán, chaparrón, caimito, caimito de montaña, sastra, madroño, jocomico, waika plum.

The fruits are 3 cm. or more long, yellow or orange and with an agreeable flavor. Sometimes planted for the fruits but not common, perhaps native or naturalized in most of our area.

Symphonia globulifera L. f. Suppl. Pl. 302. 1781.

Barillo, leche amarilla, pimientilla, corbán, cera, cerillo, botoncillo, bogum, sambogum.

The tree produces a small brownish fruit about 2 cm. in diameter which is eaten. A sticky, yellow latex may be extracted from the bark. The latex becomes black and pitch-like when exposed to the air and may be used to caulk canoes and boats, and to make torches. The latex has been reported to be waxlike and hence the common names cera or cerillo, the last name sometimes applied to wax matches.

HALORAGACEAE

The spelling used is conserved but Haloragidaceae and Halorragidaceae are sometimes found. The only species in our area are sometimes put into a separate family, Gunneraceae.

Large terrestrial herbs (ours, but also in the family small aquatic herbs); leaves opposite or alternate, with ochreate sheaths, in ours the leaves very large; plants monoecious or polygamodioecious; flowers actinomorphic, usually unisexual, solitary or (in ours) in corymbs, panicles or axillary clusters.

A small family with 6-8 genera and perhaps 100 species.

Gunnera killipiana Lundell, Phytologia 1: 452. 1940.
Capote, sechó, Santa María.

A well-known and occasionally abundant plant in the high wet, forested mountains in western Guatemala. The large leaves with blades 1-1.5 meters long are often used as protection against the rain.

Gunnera insignis (Oerst.) A. DC. Prodr. 16, pt. 2: 597. 1868.
Higuera, Gunnera.

A Costa Rican species found in the wet forests, usually in ravines, and used by the foot-travelers just as the Guatemalan species is.

HAMAMELIDACEAE

Deciduous or in the tropics sometimes evergreen shrubs or trees with mostly alternate, simple, pinnately or palmately nerved leaves; stipules usually in pairs; calyx 4-5 lobed, connate

at the base and often adnate to the ovary; corolla of 4-5 petals or absent; stamens 2-8; ovary half inferior to inferior, with two carpels diverging at the apex, fruit a capsule.

A small family of about 20 genera and some 100 species. Mostly in Asia but a few in North America as far south as Nicaragua. Two additional genera are found in our area, both named for outstanding botanists: Mutudaea Lundell commemorates the well-known Mexican botanist Eizi Matuda. Molinadendron Endress is named for Antonio Molina R., eminent Central American botanist.

Liquidambar styraciflua L. Sp. Pl. 999. 1753.

Liquidambar, diquidambo, liquidamber, lesquín, styrax, storax, balsam, sweet gum.

A resin or balsam called storax is collected from this tree and exported. The quantity is probably not great. Belize and Honduras are the principal sources of the resin, which is used in medicines.

Trees of enormous size, to 1.5 meters DBH and perhaps to 40 meters tall, are to be found in Nicaragua's Cordillera Central. The wood is so hard that it quickly dulled saw blades,- the sawyer at the mill near Matagalpa told me that it "struck sparks" from the blade. In Alta Verapaz the Indians use small trees for corner posts for houses. In Honduras the wood has been used for match sticks because of the even grain.

HYDROPHYLLACEAE

Annual, perennials to suffrutescent plants, ours with stinging hairs; leaves alternate or opposite, entire (ours); inflorescence cymose; flower perfect, regular; calyx usually 5 lobed, the lobes distinct; corolla 5 lobed, the lobes imbricate; stamens 5, usually inserted on the base of the corolla; ovary superior to half inferior; fruit usually a capsule, bilocular.

A small family of some twenty genera distributed over most of the temperate and tropical world, except Australia.

Wigandia urens var. caracasana (HBK.) Gibson, Fieldiana, Bot. 31: 353. 1968.

Chichicaste, chichicaste de caballo, mata pulga, ortiga, ortiga de montaña, chocón, tabaquillo.

The plant is a weak shrub to a small tree and is often one of the first plants to invade the sides of new roads. The stems, especially of younger plants, and twigs are usually covered with stinging hairs which may cause considerable discomfort for they penetrate the skin easily. Some plants may lack stinging hairs, or seem to be without them. Very attractive when in full flower.

ICACINACEAE

Trees or shrubs; leaves alternate, entire; inflorescences corymbs, panicles or spikes; flowers small, perfect or unisexual, calyx lobate or dentate, valvate; petals 4-5, valvate; stamens as many as the petals and opposite them; fruits drupaceous, seeds with copious endosperm.

A small family of the neotropics with about 15 genera, 4 of them in Central America.

Calatola costaricensis Standl. Journ. Wash. Acad. Sci. 16: 416. 1926.

Duraznillo, erepe, papa de palo, palo azul.

Costa Rican. Standley says that the people on Poás and Barba volcanoes roast and eat the seeds and also grind them into a coarse meal which they make into a kind of tortilla. I have not seen the tree nor the seeds. Similar species are to be found in Mexico, Belize and Guatemala.

IRIDACEAE

Perennial herbs from rhizomes, bulbs or corms and the roots produced from these; leaves basal or mostly so, linear to ensiform, usually equitant; inflorescence racemose or paniculate; the perianth of six tepals, often in two sets of three; stamens 3, opposite and usually adnate to the outer tepals; ovary inferior, trilocular; style 1, stigmas 3.

About 50 genera and perhaps 1,500 species in this predominantly African family. The are several native kinds in Central America. Many fine ornamentals in the family.

Tigridia pavonia (L. f.) Ker in Konig & Sims, Ann. Bot. 1: 246. 1805.

Cebollín, cochol, chispa, tigridia.

The corms have been used for food in Mexico and perhaps also in Central America which may explain the rarity of the species. The mucilaginous sap from the corm is used as glue in Guatemala. An allied species from the Atlantic rain forest of Costa Rica, which I was not able to determine, is eaten by the Indians, or the eyes from the corms are eaten when they begin to sprout.

JUGLANDACEAE

Monoecious or dioecious trees or shrubs; leaves alternate or opposite, pinnate, usually with resinous dots below or on young leaves; flowers unisexual, inflorescence variable, a panicle of several catkins with the central one pistillate, solitary pistillate catkins; fruit a nut, usually with a fibrous exocarp and a bone-like mesocarp (Alfaroa, Juglans) or winged nutlets (Oreomunnea).

A small family of about 6 genera and perhaps 100 species in temperate and tropical regions of both hemispheres. Although often large trees most of the Central American kinds have been discovered only in recent years. Fine cabinet woods come from this family.

ALFAROA. Six species of this Central American genus are distributed from Guatemala to Costa Rica. Useful timber trees are among those known but none of them are now known to be abundant and with the accelerating destruction of the forests in our area probably little more than is now known will be known about them. The known Central American species, with common names and ranges are: Alfaroa costaricensis Standl., gualín or goalín, campano chile, is known from several localities in Costa Rica; A. guanacastensis Stone, is known from the province of Guanacaste, Costa Rica; A. guatemalensis (Standl.) Williams & Molina, from Guatemala; A. hondurensis L. Wms., known only from the north of Honduras; A. manningii León, gavilán colorado, from Costa Rica; A. williamsii Molina, Nicaragua and Costa Rica.

Oreomunnea pterocarpa Oersted, Vid. Medd. Dansk Nat. Foren Kjbenhavn 3: 34. 1856. Engelhardtia pterocarpa Standl. Trop. Woods 12: 15. 1927.

Gavilán, gavilán blanco, campana.

The wood is used for construction, interior finish cabinet work and perhaps for other purposes.

Juglans olanchana Standl. & L. Wms. Ceiba 1: 76. 1950. J. guatemalensis Manning, Fieldiana, Bot. 24: 356. 1952.

Nogal.

The nuts are edible, the husks from the fruits are used locally in tanning leather, the lumber is one of the best and most expensive cabinet woods from Central America. A large saw mill near Matagalpa, Nicaragua, has sawn millions of board feet of lumber from this tree for exportation, mostly to New Orleans. The tree is now becoming scarce in that region. The tree is known from Guatemala, El Salvador, Honduras and Nicaragua.

A curious circumstance is that there is no word in the Quecchí language (Guatemala) for this common and valuable tree. I suspect that there must have been a word, other than the Spanish generic word "nogal," but that it like many others was lost when in 1917-1918 influenza decimated the Quecchís, especially the older people.

Juglans regia L. Sp. Pl. 1415. 1753.

Nogal, palo de nuez, walnut, Persian walnut, English walnut.

I have never seen this tree in Central America although it may be grown in Guatemala where it has been reported.

Juglans steyermarkii Manning, Fieldiana, Bot. 24: 358. 1952.

Nogal.

The nuts of this Guatemalan tree are edible although the amount of meat is little. The wood probably is used in cabinetry as is that of most black walnuts.

JULIANIACEAE

Small dioecious trees or shrubs; leaves alternate, unifoliolate or compounded; flowers small, the staminate in slender, axillary panicles; perianth with 6-8 parts, the pistillate flowers with usually 4 parts, the outer two often abortive; fruit indehiscent, with the dilated and compressed pedicel forming a pseudowing.

A curious family with two genera and 4 or 5 species, one extending into Guatemala. The family is sometimes placed near the Juglandaceae but it seems to be more closely allied to the Burseraceae and Anacardiaceae, which also is indicated by the wood structure.

Juliania adstringens Schlecht. Linnaea 17: 746. 1843.
Caraño.

The bark contains tannin and also a red dye. I do not know of it being used in Guatemala but it may be.

JUNCACEAE

Rush- or grass-like herbs; stems short; leaves tufted and usually basal, filiform or linear, flat or terete; inflorescence a single flower, a head of flowers, a corymb or a panicle; flowers usually perfect but sometimes unisexual; perianth segments 6, in 2 series of 3 (or only one series present); stamens 6 or 3, opposite the perianth segments; pistil 1, ovary superior; fruit a capsule.

A small family of some 6 genera and about 300 species, usually found in moist or wet habitats. A few species used to make mats, some of use as forage plants.

Juncus effusus L. Sp. Pl. 327. 1753.
Tule, junco.

The culms are often used in weaving mats (petates) which are commonly used like mattresses. The variety solutus Fernald & Wiegand is used for the same purpose.