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ROGERS McVAUGH

FIELDIANA: BOTANY

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## Tropical American Myrtaceae

The following notes have been prepared as a general introduction to a formal treatment of the Myrtaceae of Peru which is now in the course of preparation. A large part of the present paper is devoted to the characterization and description of approximately 80 species and sub-specific taxa, mostly from Peru, which appear to be new to science. The keys which are set forth below are intended primarily for the student who wishes to place the newly described species properly among their congeners or to follow the lines of reasoning by which I became convinced that the specimens represented undescribed taxa. Both keys and descriptions have been abridged from those which were originally prepared for the *Flora of Peru*, so that extra-Peruvian species have not been included in the keys unless there seems reason to believe that ultimately they may be found in that country.

The American representatives of the Myrtaceae have long been considered a "difficult" group, and one in need of much systematic study. This is partly because of the undoubtedly very large number of species in the American tropics, and partly because of certain features inherent in the plants themselves (e.g., flowers and fruits of the same species are rarely obtainable at the same time). Distinctions between species and even between genera are sometimes nice ones, for flowers as well as vegetative structures are relatively uniform throughout the whole family. Identification of flowering material is difficult for the casual student because distinctions between genera have been made primarily on characters of the mature embryo. Embryo characters are not always easy to observe in dried material, even in specimens with mature fruit, and they are impossible to make out from flowering specimens.

One of the principal impediments in the way of serious work on the American Myrtaceae during the last century, paradoxically enough, seems to have been the existence of two important and indeed monumental treatises by Otto Karl Berg (1815-1866),

a Professor of Pharmacy at the University of Berlin.<sup>1</sup> Berg laid the foundations for all later taxonomic work on this family in the New World, but his monographs are difficult to use except after prolonged study and collation. Neither one was provided with a workable key to species, and the generic keys can be used for specimens in the fruiting condition only. Berg's taxonomic philosophy led him to believe that most species were sharply restricted in range to single phytogeographic regions, which in turn increased inordinately the number of species he described as new.

Probably the greatest obstacle confronting the would-be student has been the vast number of species involved. According to Berg himself,<sup>2</sup> the known American species in 1859 comprised a total of 1726, of which he personally had proposed 1008. The largest genera were *Eugenia* (537 species), *Aulomyrcia* (240), *Myrcia* (184) and *Psidium* (101). The published enumeration listed 696 species in Brazil, with the greatest concentration in the southeastern part of that country (390 species in Minas Gerais and Goiaz together, 265 in Rio de Janeiro, and 175 in Paraná and São Paulo). Only 161 species were listed from the whole Amazonian region, and only 54 from Peru and Bolivia together. Because of the large numbers of species in certain genera and in certain areas, and because of the way in which Berg organized his monographs, it is for any practical purpose impossible to identify an unknown specimen unless one already has some knowledge of the Myrtaceae, or unless the specimen is in good fruiting condition and comes from an area whence few species are known.

Berg's monographs—in spite of the difficulties attendant upon their use—were major contributions to systematic botany. His major theoretical work was perhaps the clarification of the taxonomy of the tribe Myrteae, which is discussed below. His generic concepts were probably somewhat narrower than those of most modern workers, but he was a keen and accurate observer. He recognized as new a great many species which were indubitably distinct, and a great many others which now appear to have been based upon rather trivial characters. When one considers that many of the

<sup>1</sup> Revisio Myrtacearum Americae, Linnaea 27: 1-472; index, op. cit. 786-795. 1855-1856 (also distributed as a separate, without index). Mantissa I. ad revisionem Myrtacearum Americae, op. cit. 29: 207-264. 1858. Mantissa II. ad revisionem Myrtacearum Americae, op. cit. 30: 647-713. 1861. Mantissa III. ad revisionem Myrtacearum Americae, op. cit. 31: 247-262. ?1862. Myrtaceae, in Mart. Fl. Bras. 14, pt. 1: 1-656, pls. 1-82. 1857-1859.

<sup>2</sup> Conspectus distributionis Myrtacearum Americae huc usque cognitarum, Mart. Fl. Bras. 14, pt. 1: 619-622. 1859.

species recognized by Berg were known to him only through single and often imperfect—even sterile—specimens, and that only rarely was he able to see both flowers and fruit in the same species, it is at once apparent that the quality of his work was extraordinarily good.

When the present work on the Myrtaceae of Peru was begun, it was soon apparent that the number of species native within the political boundaries of the country would approximate 150. This suggested that a large number of the species were new to science, as Berg had listed no more than 54 from Peru and Bolivia together, and subsequent authors had added hardly more than a score of species to the flora of Peru. Another alternative seemed possible, namely, that many of the Peruvian species would prove to be identical with others which had been described previously, by Berg or by others, from extra-Peruvian material. It therefore seemed necessary to undertake at least a cursory survey of all tropical American representatives of the family, in order to establish and delimit the principal patterns of distribution.

In the course of this survey I have examined most of the material which is available at the United States National Herbarium and at Chicago Natural History Museum; the latter is very rich in South American Myrtaceae and has many isotypes and type fragments from the classical collections. I have also had the privilege of studying selected specimens from the New York Botanical Garden; the Harvard University herbarium; the Naturhistorisches Museum, Vienna; and the herbarium of the Universidad Nacional Mayor de San Marcos, Lima. With the aid of a grant from the Horace H. Rackham School of Graduate Studies, University of Michigan, I was enabled to spend the months of July and August, 1954, in the study of these plants as they are represented in European herbaria. Most of Berg's types, or duplicates of these, are preserved at Munich (in the Brazilian herbarium of Martius), at Geneva (where are also the types of the DeCandolle *Prodromus*), at Paris, or at Brussels. Many isotypes are to be found at the British Museum (Natural History), or at Kew. I was able to visit each of the above herbaria at least for a short time, and I am especially grateful to the authorities at Geneva, at Paris, and at the two British herbaria, for permission to borrow certain critical material for further study. Although I was unable to visit Vienna, Dr. K. H. Rechinger very kindly located for me, and forwarded to me for study, most of the unique specimens which Berg had described from among the collections there. A few of Berg's types which were at Berlin, and apparently not represented

by duplicates elsewhere, were presumably destroyed in World War II.

The following generalizations relative to range patterns in tropical American Myrtaceae are presented as tentative, after study of the materials discussed above; it is thought that future work will not markedly affect the principal conclusions, but concepts of individual species may be radically changed after study of the groups to which they belong, and names applied to Peruvian species may on this account have to be changed in some instances.

### Distribution of South American Myrtaceae

1. The Chilean Myrtaceae are all endemic, and none of the species ranges as far north as Peru. This is not unexpected, in view of the peculiar isolation which Chile enjoys, and it is mentioned here chiefly because Berg wrongly attributed a number of Chilean species to Peru, and Peruvian species to Chile. This error came about because of lack of sufficient knowledge of the itineraries of certain collectors, particularly Dombey and Poeppig, who visited both countries. The Myrtaceae of Chile are probably better known than those of any other area of comparable extent in South America, thanks chiefly to the efforts of Eberhard Kausel of Santiago, who has published numerous papers on the subject.<sup>1</sup>

2. A majority of the species of southern Brazil (i.e., from south of an arbitrary line drawn at about 15° S. Lat., and including all of Brazil south of Minas Gerais, southern Goiaz and southern Mato Grosso) do not extend northward into the Amazon basin and are not likely to be found in Peru.

3. Species of the Bolivian lowlands, even the lowlands of northern Bolivia, have little in common with most Peruvian species but show strong affinities with species ranging from southern Brazil to Uruguay and northern Argentina. The line between Bolivian and Peruvian lowlands appears to be crossed by relatively few species.

4. Species from the northeastern states of Brazil (e.g., Bahia, Piauihy, and Ceará) are often distinct from those of southern Brazil

<sup>1</sup> Cf. Contribución al estudio de las Mirtáceas Chilenas, *Rev. Argent. Agron.* 9: 39-68. 1942; *op. cit.* 221-243. 1942; *op. cit.* 11: 320-327. "1944" (1945); *Notas mirtológicas*, *Lilloa* 13: 125-149. "1947" (1948). The first two papers comprise a revision of the Chilean genera and species; the third is in the form of a supplement incorporating some new information. The final paper presents miscellaneous new observations and is concluded with a new key to the Chilean genera.

and usually seem distinct from those of the Amazon region but may show affinities with both. This area is much in need of further study.

5. Some species of the Guiana lowlands, and most species of the Amazon lowlands, seem potentially wide-ranging and should be considered in any treatment of the Peruvian flora. At least a few, and probably more, species certainly range widely from the West Indies through the Guianas and most of lowland Brazil, Peru and Bolivia.

6. Most of the myrtaceous species found by early collectors on the upper Amazon and its tributaries, as far down as Ega (Teffé), have since been re-collected in Peru. A large number of distinctive species, however, have been collected along the Rio Negro and other rivers which drain into the Amazon from the north but have not been collected along the upper reaches of the Amazon itself. It appears that many species which range northward into Venezuela in the Rio Negro drainage, although they may reach the Amazon near the mouth of the Rio Negro, do not extend far up the Amazon and are not to be expected in Peru.

7. Plants of the inter-Andean valleys, and from high elevations up to near the limits of vegetation, seem in Peru to be mostly endemic, although the Peruvian species are often very similar to those of the more northern parts of the Andes.

In view of the above conclusions I have, in describing the following novelties from Peru and elsewhere, considered in the most careful detail all the species previously described from the entire Amazon basin; I have paid close attention to species described from northern South America, and more than casual attention to species described from eastern and southern Brazil. Further taxonomic studies of the very numerous published species from these latter areas, however, may bring about changes in concepts and in nomenclature which will affect some Peruvian species also. It is further possible that a few Peruvian species will prove to be identical with some of those described by Linnaeus, Jacquin, Lamarek, and other early workers.

### Generic Concepts

One of Berg's principal contributions to the taxonomy of the Myrtaceae was the documentation of the fact that the tribe Myrteae, including practically all the American members of the family, can be

divided into three coherent groups (subtribes) based on characters of the embryo. This had been discerned much earlier by DeCandolle, but the specimens available to that author were much too few in number to enable him to make the general conclusions which were set forth by Berg. Berg recognized three subtribes, which he called Myrcioideae, Eugenioideae, and Pimentoideae, and which included, respectively, 11, 12, and 17 genera.<sup>1</sup>

More recent workers have not always recognized all the genera admitted by Berg. Benthams (Benth. & Hook. f. Gen. Pl. 1: 712-720. 1865) reduced the numbers of genera in the subtribes to 3, 3, and 7, respectively. Niedenzu (Natürl. Pflanzenfam. III, pt. 7: 64-86. 1893) reversed the trend and admitted 5, 4, and 13 genera, respectively. Conservative modern opinion would agree upon the recognition of at least the following generic groups (Chilean genera not included):

1. MYRCIINAE. Cotyledons foliaceous, contortuplicate; radicle elongate.

(a) *Calyptranthes* Sw. Buds closed, calyx calyptrate.

(b) *Marlierea* Camb. Calyx closed or barely open in bud, splitting irregularly in anthesis.

(c) *Myrcia* DC. Calyx with 5 (rarely 4) distinct lobes.

Other genera proposed by Berg depend upon single characters of the anthers (*Cerqueiria*, *Gomidesia*) or of the calyx (*Aulomyrcia*, *Calycampe*, *Calyptromyrcia*, *Eugeniopsis*, *Rubachia*). None of these has been much studied or widely accepted except *Aulomyrcia*, which has been taken up in recent years by Miss Amshoff in her studies of the Myrtaceae of northern South America. The genus *Myrc-eugenia* Berg, with a disjunct range in Chile and Uruguay, is apparently a distinct group. The others mentioned above, however, are but doubtfully distinct from *Myrcia*. Most of the species are south-Brazilian, and proper elucidation of the genera must wait upon taxonomic studies in this region.

<sup>1</sup> According to the International Code (Article 29), these subtribes are properly known as Myrciinae Berg, Eugeniinae Berg, and Pimentinae Berg. The pertinent rule states: "When the name of a taxon . . . has been published with an improper termination . . . the ending must be changed to accord with the rule, without change of authority." The names of these three subtribes were first published with the proper termination by Niedenzu (Natürl. Pflanzenfam. III, pt. 7: 62. 1893) but that author substituted Myrtinae for Pimentinae, contrary to the provisions of Article 29. The names Myrciinae and Eugeniinae have usually been attributed to Niedenzu, e.g., in Dalla Torre & Harms (Gen. Siphon. 348. 1903), but are properly attributed to Berg.

2. EUGENIINAE. Cotyledons fleshy, distinct or conferruminate or the embryo undivided; radicle very short.

- (a) *Eugenia* L. Calyx-lobes usually 4, distinct; hypanthium not prolonged above the summit of the ovary; ovules numerous.
- (b) *Calycorectes* Berg. Buds closed, irregularly splitting; hypanthium prolonged; ovules numerous.
- (c) *Myrciaria* Berg. Calyx-lobes 4; hypanthium prolonged, circumscissile at base; ovules 2 in each locule.

Certain additional genera, not recognized by Berg, have been accepted by Amshoff (e.g., in *Fl. Suriname* 3: 56-158. 1951). These include:

- (d) *Plinia* L. Buds closed or nearly so, the calyx splitting irregularly; flowers glomerate, involucrate; hypanthium prolonged; ovules 2 in each locule.
- (e) *Catinga* Aubl. Calyx-lobes 4, thickened distally and coherent in the bud; hypanthium not prolonged; ovules numerous.

Of the remaining genera accepted by Berg, none has been widely accepted. Two of these (*Phyllocalyx*, *Stenocalyx*) depend upon a character of the inflorescence which is easily recognized but of doubtful importance. *Myrcianthes*, according to Bentham (op. cit. 715), was wrongly placed in the Eugeniinae and belongs rather with *Myrtus*; and *Mitranthes*, according to Bentham (l.c. 717) belongs with *Calyptranthes* in the Myrciinae. *Schizocalyx*, *Siphoneugena* and *Hexachlamys* are based on calyx characters which scarcely serve to distinguish the first from *Calycorectes* and the last two from *Eugenia*. *Acca* certainly belongs in the Pimentinae, and is treated below. In recent years it has been shown that *Aulacocarpus* probably belongs to the Melastomaceae.

3. PIMENTINAE. Embryo spiral or curved; radicle elongate; cotyledons very short.

- (a) *Campomanesia* R. & P. Ovary usually 6- to many-locular; calyx-lobes 5, membranaceous; embryo spirally involute, the testa membranaceous; ovules 2- or rarely 4-seriate.
- (b) *Psidium* L. Ovary 2- to many-locular; calyx closed in the bud or with 5 short lobes; embryo circinate; ovules many-seriate.

- (c) *Calycolpus* Berg. Ovary usually 4- to 5-locular; calyx-lobes 5, often foliaceous, spreading or reflexed in bud; embryo curved.
- (d) *Pimenta* Lindl. Ovary bilocular; calyx-lobes 4 or 5; embryo cyclic or sub-spiral; ovules 1-6, pendulous; inflorescence cymose-paniculate.
- (e) *Ugni* Turcz. Calyx-lobes 4 or 5; embryo arcuate; peduncles 1-flowered; anthers sagittate, the connective dilated.
- (f) *Myrteola* Berg. Calyx-lobes usually 4; embryo arcuate; peduncles 1-flowered; anthers subrotund, the filaments filiform.
- (g) *Blepharocalyx* Berg. Calyx-lobes 4, ciliate, deciduous; embryo sub-spiral or spiral, the testa membranaceous; peduncles dichotomous, mostly 3- or more-flowered.

The rest of the genera accepted by Berg have been little studied. The monotypic *Paivaea* differs from *Campomanesia* chiefly in the patelliform-dilated base of the young calyx. Also monotypic are *Calyptropsidium* and *Psidiopsis*, which differ from *Psidium* each by a single character of the calyx and which are difficult to defend as independent genera. *Pseudocaryophyllus* was scarcely known to Berg except from descriptions and illustrations and was founded at least in part upon a misunderstanding of the morphology of one species. *Amomis* has been placed by many authors, including Bentham and Niedenzu, in the synonymy of *Pimenta*. *Acrandra* appears to be distinct by virtue of its apiculate anthers. *Britoa*, *Abbevillea* and *Lacerdaea* were placed by Bentham in the synonymy of *Campomanesia*, from which they differ by calyx characters of doubtful significance.

The genus *Myrtus* is not included in the above list. Berg assigned 34 American species to *Myrtus*, in addition to 5 species about which he had some reservations. At least half the species included by Berg in *Myrtus* have been shown to belong to other genera, and the rest have not been critically studied. This matter will be discussed below, with reference to the Peruvian genera in particular.

### The Myrtaceous Inflorescence

Students of the Myrtaceae have to a considerable degree passed over the inflorescence in their search for characters which may be used in the delimitation of taxa. The subject of inflorescence



morphology was indeed discussed at some length by Bentham in an early paper<sup>1</sup> and before him by Grisebach, but it has been little stressed by more recent workers. It is therefore thought to be worth while to discuss the myrtaceous inflorescence here, and to follow this discussion by a summary of the features which seem to be of taxonomic significance.

Most of the species of the Myrciinae can be recognized as such, even in the absence of both flowers and fruit, from the inflorescence alone; it is even possible to make many identifications to genera on this basis. Most of the American genera of the Eugeniinae and Pimentinae can also be recognized by a combination of inflorescence characters with calyx characters which are apparent either in flowering or in fruiting material. Various markedly different inflorescences occur among the American Myrtaceae, but the differences are, at least to some extent, superficial. All known types are derivable from a single basic pattern. Branching patterns of vegetative stems are fundamentally similar to those of flowering and fruiting stems, and an understanding of each is essential to an understanding of the morphology of the inflorescence.

In the tribe Myrteae the leaves and branches are normally decussate; that is, in pairs at the nodes, with those at any one node standing at right angles to those at the nodes above and below it, and the leaves at alternate nodes standing directly above or below one another. This arrangement prevails not only in simple (unbranched) axes, but also in branching systems. Branching at the lowest node of an axillary branch, for example, will occur in the plane of the tangent at right angles to the plane of branching at the node from which the axillary branch arises. The sequence is readily observed in leafy branch-systems, in bracteate inflorescences devoid of ordinary foliar structures, and in transitions from vegetative to reproductive branches. The inflorescence is thus interpreted as an axillary branch of which the primary branchlets are normally decussate, exactly in the manner of sterile branches. Deviations from the usual pattern, e.g., the alternate branching sometimes seen in *Myrcia* near the tips of the panicles, an occasional unilateral panicle in *Calypttranthes*, or occasional solitary flowers in normally racemosely flowered species of *Eugenia*, are assumed to represent reduced or derived conditions.

It is sometimes difficult to recognize the proper limits of a single inflorescence. In some genera, e.g., *Myrcia*, almost any new branch

<sup>1</sup> Notes on Myrtaceae, Journ. Linn. Soc. Bot. 10: 101-166. 1869.

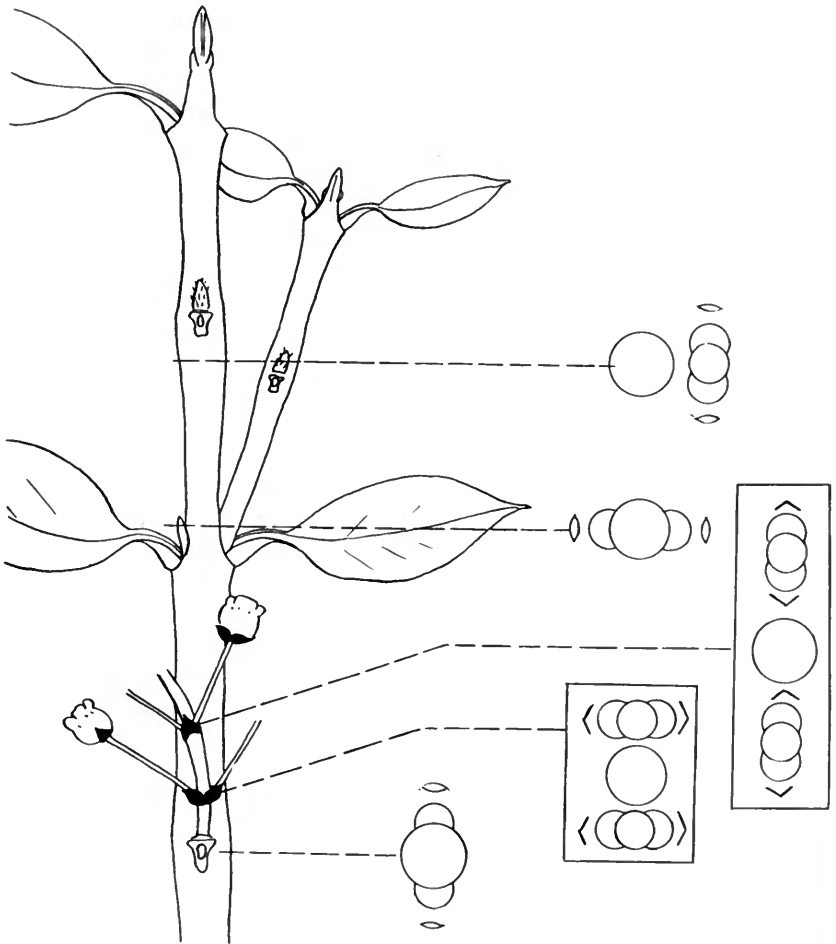


FIG. 1. Decussate leaves and branches in the Myrtaceae. Large circles represent the principal branch; small circles, subsidiary branching axes (i.e., a leafy branch, the axis of a raceme, or a pedicel); separate lenticular figures, petioles of ordinary leaves; angular lines, bracts. Bracts and bracteoles are in solid black.

arising from the axil of a foliage leaf may represent a potential inflorescence. At the one extreme the whole branch may be modified in the direction of flower production, all its leaves reduced to minute deciduous bracts and its secondary branchlets irregularly disposed; such a branch is readily defined as a single inflorescence. The same new axillary branch, on the other hand, may bear normal leaves at most of the nodes and miniature inflorescences from certain axils

only (e.g., the lower ones). The partly leafy branch is the homologue of the completely fertile branch; what, then, represents the inflorescence of this species? In practice this can usually be determined by correlation with leaves of a certain size, i.e., those occurring on permanent mature twigs; leaves are often reduced in size when occurring on temporary (inflorescence) branches.

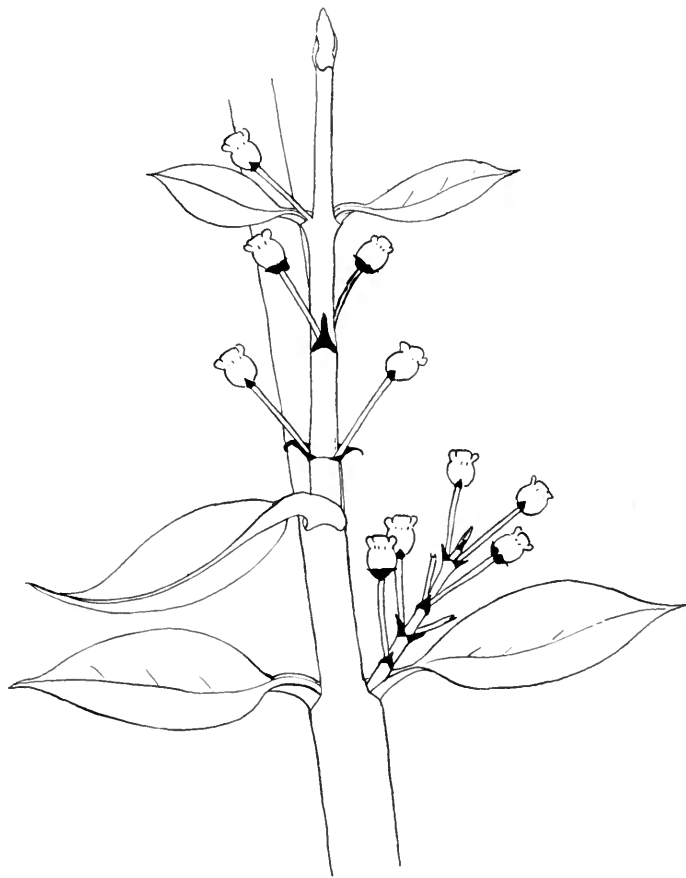


FIG. 2. Schematic representation of flowering in *Eugenia*. Leafless raceme from the lower node; partially fertile branch from the upper node. Bracts and bracteoles in solid black. See description in text.

In other genera, e.g., in *Eugenia*, the flowers may occur in a short leafless raceme (the whole subtended by a foliage leaf), or in the same species they may be solitary at the lowest (leafless)

nodes of a new branch which bears normally developed foliage leaves at the upper nodes. In the first case it may be assumed that the fertile branch failed to develop beyond the lower nodes; in the other case that the axis continued to grow and produce leaves. The short leafless raceme is the homologue of the leafy branch with flowers at the lowest (and leafless) nodes, but it is difficult to regard the latter as an "inflorescence."

Finally, it should be stated that the primitive myrtaceous inflorescence is assumed to be one in which the primary axis, and each of the subordinate axes, is terminated by a flower.

The inflorescence (or to put it perhaps more precisely, the potentially floriferous branch which develops from the axil of a leaf) may be modified in aspect and morphology in one or more of the following ways:

1. Reduction of leaves to small bracts which may be colored or scarious, persistent or deciduous.
2. Abortion of the terminal bud of the primary axis or those of the secondary axes.
3. Reduction in length of the primary axis, with or without a corresponding reduction in the number of nodes.
4. Termination of the primary axis by the formation of a flower at the first node (inflorescence a dichasium) or at one of the succeeding nodes.
5. Reduction of secondary axes to 1-flowered bracteolate peduncles (inflorescence a raceme).
6. Dehiscence of secondary axes from one or both sides of a node, with the production of irregularly branched panicles.
7. The regular reduction, from the base to the apex of the inflorescence, of internode length and number of nodes in all subordinate axes.

In the following paragraphs are described the principal modifications which result from combinations of the above:

1. The raceme. This type is characteristic of the subtribe Eugeniinae and occurs occasionally in genera of the Pimentinae. The raceme is an axillary and usually leafless inflorescence with a single primary axis and several or many nodes; the axis is theoretically indeterminate but usually aborts at the tip and lacks a terminal flower; the internodes may be elongated or much abbreviated; the

branches from the axis are in decussate pairs, all about the same length and reduced to bracteolate "pedicels" terminated each by a solitary flower. In exceptional cases the racemes are compound, e.g., in *Eugenia florida*, in which the individual flowers of the raceme are wholly or partly replaced by small racemously flowered branches, or in *E. stipitata*, in which each peduncle may bear a simple dichasium instead of a single flower.

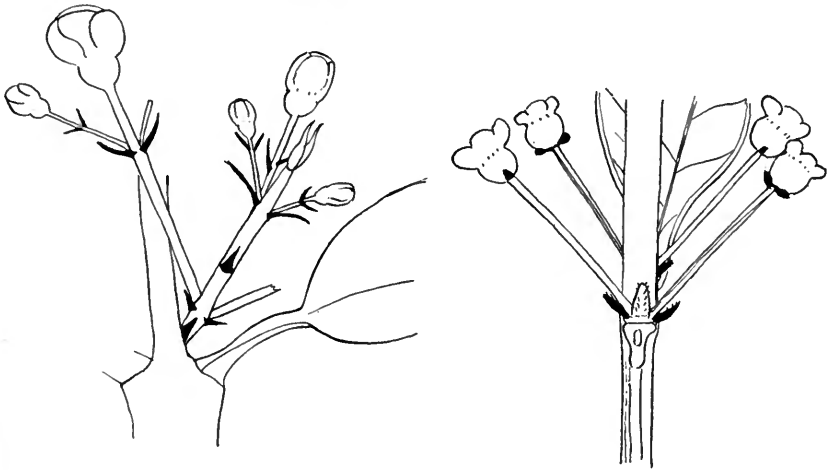


FIG. 3. Modified racemose inflorescences in *Eugenia*. Left, *E. stipitata* subsp. *sororia*: the fertile branch is a short raceme in which some of the peduncles are 3-flowered. Right, *E. puniceifolia*, in which the flowers are reduced to a single pair in each raceme. Bracts and bracteoles in solid black.

When the axis of the raceme is much reduced in length and the nodes are approximate, the number of nodes may be correspondingly reduced and the flowers may appear to be umbellate or glomerate. The most extreme reduction occurs in species like *Eugenia puniceifolia*, in which the flowers are a single pair in each axil, one arising from each side of the abortive axillary bud.

In some species of *Eugenia*, as mentioned above, a new leafy branch may have the lowest two or three nodes fertile and bracteate rather than leafy, but the upper nodes sterile and normally leafy; in such species the flowers may thus appear to be solitary at leafless nodes. In the same species, from other leafy nodes, there may arise abbreviated racemes in which the leaves are all reduced to small bracts and the axis is abortive.

A similar situation prevails in *Campomanesia lineatifolia* (Pimentinae), a species in which the flowers usually occur at the two lowest

nodes of an otherwise leafy branch but in which the branch may be reduced to a short leafless axis comprising only the two fertile nodes.

In any inflorescence of the racemose type each pedicel is subtended by a bract. If the number of flowers in a raceme is reduced to one, as may rarely happen, it is still ordinarily possible to observe the pedicellar bract, or at least the bract-scar, and usually possible in addition to observe the abortive terminal bud of the inflorescence. In species which normally bear solitary flowers in the axils of ordinary leaves (see discussion below), the pedicel bears no bract at base and the flower itself represents the termination of the axis.

2. The myrcioid panicle. With few exceptions this type is found in the principal genera of the Myrciinae, with some modifications as noted below. The axillary panicle is compound, or decomposed, with the primary axis and each of the subsidiary branches terminating in a flower. The principal branches are opposite and decussate, the lower ones elongate and usually themselves compound and many-flowered, and the ultimate branchlets of the panicle usually with the flowers aggregated in threes (i.e., in simple dichasia) near the tips. The transition between elongate basal branches and simple dichasia at the tips is accomplished by gradual reduction, in successive branches, of the number of nodes and the length of the internodes. Branching toward the tips of the panicle may be irregular because of abortion of one or both buds at a given node, or because of the dehiscence (at the point of origin) of one or both branchlets after the initiation of growth; either of these processes may result in, or be accompanied by, distortion or zigzag growth of the axis which remains.

Because of the irregular development of the myrcioid panicle it is usually not practicable to state the usual number of flowers in the panicle of a given species, except within broad limits. A large panicle may contain 300 flowers or even more; a small panicle in the same species may contain no more than 50. In some species the number of flowers may be reduced to 3, 2, or even one. On the whole it is a fair generalization that a "many-flowered" species will probably prove upon examination to be a member of the Myrciinae, whereas among the Eugeniinae an inflorescence with as many as 50 flowers is a rarity.

Usually the myrcioid panicle can be distinguished at a glance from a compound racemosely branched panicle (which may be "many-flowered," as in *Eugenia florida*) by the long lower branches. In a racemosely branched panicle the pedicels and the internodes

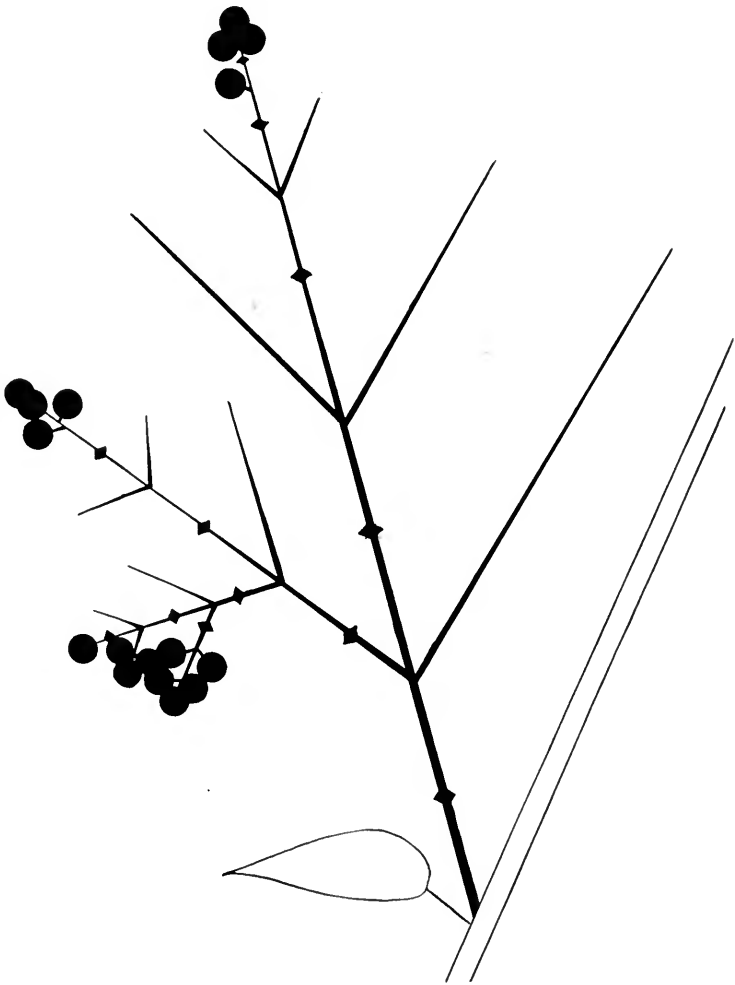


FIG. 4. Diagram of the myrcioid panicle. Position of flowers and branches indicated to the extent necessary to make clear the pattern of branching which is repeated in each part of the panicle. Branches in one plane are shown; those at right angles to this plane are omitted, but their positions are indicated by diamonds.

are essentially of uniform length, so that the flowers appear uniformly distributed in the inflorescence. In the myrcioid panicle, especially after anthesis, the observer receives the general impression of numerous elongated slender branches which bear short-stalked or sessile flowers or flower clusters at irregular intervals, and particularly near their tips.

Among the myrcioid genera in our flora it is possible to recognize two tendencies in the branching of the inflorescence. In the genus *Myrcia*, and in the segregate genera *Aulomyrcia* and *Gomidesia*, the principal axis of the inflorescence is as long as, or a little longer than, the primary lateral branches; the panicle, as a result of this, is about as long as wide. In *Marlierea* and *Calyptanthes* the principal axis may abort at the node where the lowest lateral branches emerge, so that the inflorescence as a whole appears to consist of paired spikes or panicles arising from the same axil. This condition is found regularly in some species, occasionally in others, and rarely or never in a third group. It is thus by no means consistent in the genera in which it occurs, but as far as I am aware it never occurs in *Myrcia*.

3. The dichasium. This type characterizes the Pimentinae and is found in certain genera of the Eugeniinae (e.g., *Anamomis* Griseb.). The primary axillary axis is immediately determinate; it terminates in a flower at the first node. The flowers may be thus normally solitary and subtended by normal foliage leaves. Invariably the flower is subtended by a pair of opposite bracteoles which indicate the potentiality of lateral branching at these points, and in various species solitary flowers are often found on the same plant with 3- or 7-flowered dichasia.

Branching of the primary axis may take place at the node just beneath the terminal flower (i.e., from the axils of the subtending bracteoles), with the production of a simple (3-flowered) dichasium. By further symmetrical development of the lateral branches, the inflorescence may become a 7-, 15- or rarely 31-flowered dichasium. In the forks of a compressed 15- or 31-flowered dichasium the terminal flowers may fail to develop to maturity.

In most species with predominantly solitary flowers or few-flowered dichasia, a majority of the mature leaves bear flowers in their axils, and there appears to be no marked restriction of fertility to the lower nodes of a shoot. When solitary flowers and dichasia occur on the same plant, the most vigorous nodes and leaves appear



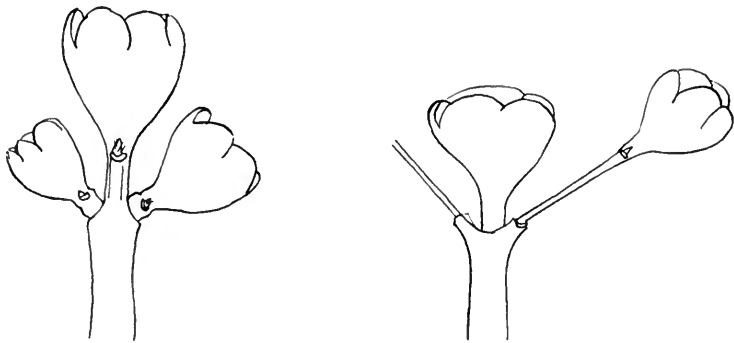


FIG. 5. Details of branching at the tips of the myrcioid panicle. Left, a cluster of three nearly sessile buds forming a "false dichasium," in which the lateral flowers arise from the second node below the terminal flower; the buds at the first node are abortive. Right, another species, in which the lateral flowers of the dichasium are borne on slender pedicel-like branches from the node immediately below the terminal flower.

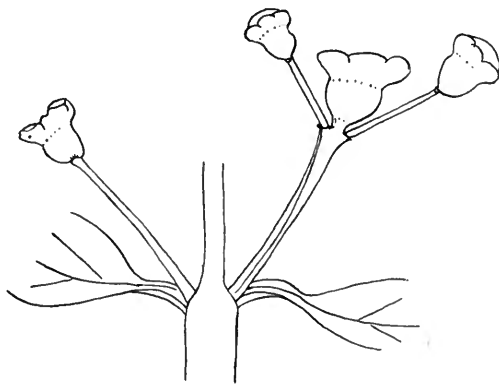


FIG. 6. A dichasium in *Eugenia*. In some species of *Eugenia* and *Psidium*, solitary flowers and 3-flowered dichasia may be found on the same plant.

to be correlated with inflorescences bearing the larger numbers of flowers. In certain species of *Psidium*, and perhaps in some species of *Eugenia* also, the dichasia may arise from leafy axils, or in the same species from leafless nodes at the bases of leafy shoots; this condition is apparently less frequent among species in which the flowers are borne in dichasia than among the racemose-flowered groups.

### The Myrtaceous Leaf

The keys and descriptions which follow include some terms which are used repeatedly in certain restricted senses; the following notes describe the ways in which these terms apply specifically to the Peruvian Myrtaceae:

The leaves of most American Myrtaceae have a straight *midvein* which extends the entire length of the blade; the leaves are pinnately veined, and the midvein is very markedly thicker than any of the *lateral veins*. The midvein almost without exception is conspicuous on the lower (dorsal) surface of the leaf, and considerably raised above the surface as a convex line; in some species it is elevated to such an extent that its diameter at right angles to the leaf is as great as the diameter in the plane of the leaf. The midvein on the upper (ventral) surface of the leaf may be conspicuous and somewhat elevated or at the other extreme nearly invisible. The vein proper may be convex, flat, somewhat concave, or with a narrow groove or channel running the entire length; in a few cases the midline of the vein may be elevated in a narrow ridge. In addition to the above modifications in the surface of the vein proper, the whole vein may be *impressed*; that is, depressed in a trough or furrow below the general surface of the leaf. In general, therefore, to say that a vein is impressed refers to the position of the whole vein in relation to the rest of the leaf, not to any modification of the vein itself.

The lateral veins arise at intervals from the midvein and extend toward the margin, forming usually an acute angle with the distal portion of the midvein. The lateral veins are said to occur in pairs, but this is something of a misnomer, because the veins on opposing sides of the midvein are more often alternate than opposite. The word "pairs" is used to avoid a longer and more clumsy expression; i.e., it is preferable to say "12 pairs" than "12 on each side of the midvein." The lateral veins are often nearly unbranched, that is, they lack major branches and appear to extend without interruption from the midvein to the margin or near it; in some species the lateral veins fork in the distal half or the distal third. The secondary veins which connect the laterals are often very small and appear to the eye as a small network between larger veins.

As a lateral vein approaches the leaf margin it invariably curves toward the apex of the leaf and joins the next succeeding vein. In this way are produced various kinds of *marginal veins* which are approximately parallel to the leaf margin. In some species the

lateral veins diminish gradually in thickness from base to apex and recurve markedly toward the midvein before joining the succeeding laterals. In this case no marginal vein, as such, can be distinguished, and in extreme cases the lateral veins become so much attenuated toward the tips that one can with difficulty make out the points of union with the succeeding veins. In other species the lateral veins are straight and of uniform diameter, but their distal ends are connected by a series of arches or loops which together comprise a marginal vein; this *arched* marginal vein may be thinner than the laterals, but in many species its diameter is as great as that of the laterals. In the species which are thought to present the most highly evolved vein pattern, the marginal vein is a characteristic and conspicuous feature of the leaf, arching almost not at all between the lateral veins and thus nearly straight except that it follows the curve of the leaf margin. When the marginal vein is of this kind, the laterals may extend directly from midvein to marginal vein and enter the latter almost at right angles, with little or no apparent tendency to turn toward the apex of the leaf.

The number of pairs of lateral veins is used in various instances to distinguish species. The number is constant within rather broad limits only, and the actual number present in a given leaf is often doubtful. A precise count can often be made in species which have strong rib-like veins and few or no intermediate veins, but such species are in the minority. Far more abundant are species in which the major pairs of veins are but little stronger than the numerous slender intermediates which may curve or branch or join another vein. In doubtful cases the difficulty can often be resolved by counting the number of arches in the marginal vein; as a general rule these arches extend in unbroken curves from one major lateral vein to the next, and small intermediate veins cause little or no break in the smooth curve of the arch. At best the numbers of veins as stated are mere approximations.

### The Genera of Myrtaceae Which Occur in Peru

The following key is intended as an indication of the taxonomic arrangement which is suggested by consideration of the morphological features of these plants. The key will not "work" for species which are in one way or another anomalous, e.g., for species of *Myrcia* with 4 calyx-lobes. It will suffice, however, to indicate generic affinities for a great majority of all species in the Peruvian flora.

1. Inflorescence myrcioid (i.e., compound, many-flowered, with the lower branches opposite and elongate; the upper branches progressively shorter and closer together; the uppermost often alternate because of abortion of one of a pair; the flowers tending to be aggregated toward the tips of the branchlets and often solitary or in simple dichasia at the tips); calyx-lobes, if developed, usually 5 (*Myrciinae*).
2. Calyx-lobes 5 (rarely 4), distinct even in the bud; principal axis of the panicle well developed, about as long as the primary lateral branches. . . . . *Myrcia*.
2. Calyx closed in bud, or only the tips of the lobes free, in anthesis circumscissile or splitting irregularly; principal axis of the panicle often abortive at the lowest node and the panicle bifurcate.
3. Calyx closed in bud, circumscissile, the calyptra often remaining attached at one side. . . . . *Calyptanthus*.
3. Calyx closed in bud, or the tips of the (usually 5) calyx-lobes free, the flower opening by irregular longitudinal slits between the lobes. . . . . *Marlierea*.
1. Inflorescence bifurcate (usually with sessile flowers in the forks), or racemose (the flowers or branches all in decussate pairs on an unbranched axis which aborts at tip), or the flowers solitary.
4. Inflorescence racemose (species with glomerate or subumbellate flowers should be sought here; inspection will usually show that these flowers are in approximate, decussate pairs on a much shortened axis); calyx-lobes 4 and distinct, or rarely the buds closed or merely the tips of the lobes free (includes most of *Eugeniinae*).
5. Hypanthium prolonged into a tube above the summit of the ovary; flowers mostly 4, sessile or nearly so, in conspicuously bracteate clusters; ovules 2 in each locule.
6. Calyx-lobes distinct, the tube circumscissile at base. . . . . *Myrciaria*.
6. Calyx splitting irregularly and longitudinally in anthesis, the bud completely closed or the tips of the calyx-lobes free. . . . . *Plinia*.
5. Hypanthium not prolonged above the ovary; calyx-lobes distinct; flowers few or many, rarely conspicuously bracteate (the *bracteoles* subtending individual flowers often persistent and evident); ovules usually numerous. *Eugenia*.
4. Inflorescence dichotomously branched, or the flowers solitary.
7. Inflorescence dichotomously branched.
8. Flowers 4-merous; calyx-lobes distinct and imbricate.
9. Flowers often on old leafless branches, in regularly thrice-dichotomous cymes with a sessile flower in each fork; bracts persistent, in cuplike pairs; calyx-lobes persistent; flowers red, the stamens and style much longer (6-15 times) than the hypanthium. . . . . *Myrrhinium*.
9. Inflorescence axillary, on new leafy branches; dichasia usually 3- or 7-flowered, the forking branches variable in number and length; bracts usually deciduous; flowers white or yellowish, the stamens and style proportionately much shorter.
10. Calyx-lobes deciduous. . . . . *Blepharocalyx*.
10. Calyx-lobes persistent. . . . . *Eugenia*.
8. Flowers 5-merous; calyx splitting irregularly in anthesis, the buds closed or the lobes short and widely separated. . . . . *Psidium*.
7. Flowers solitary.
11. Calyx-lobes 4.
12. Small-leaved shrubs (leaves less than 1 cm. long) of the high Andes; bracteoles foliaceous, elongate and persistent; anthers subrotund, the filaments filiform. *Myrteola*.

12. Shrubs or trees with larger leaves, of middle and low elevations; bracteoles mostly deciduous, never persistent and foliaceous. . . . . *Eugenia*.
11. Calyx-lobes 5, or the calyx opening irregularly.
13. Shrubs with small coriaceous leaves mostly less than 2 cm. long; high-montane Andean species; calyx-lobes 5, distinct; peduncles all 1-flowered; bracteoles foliaceous, elongate and persistent; anthers sagittate, the connective dilated. . . . . *Ugni*.
13. Shrubs of middle and low elevations, with larger leaves; flowers solitary or in dichasia, the bracteoles never foliaceous and persistent; filaments filiform, the anthers not sagittate.
14. Calyx-lobes distinct, membranaceous, spreading in flower and in fruit; leaves with 3-4 pairs of the lowest lateral veins closely grouped and the upper increasingly distant. . . . . *Campomanesia*.
14. Calyx closed in the bud, or with short appressed lobes, the tube splitting in anthesis along irregular longitudinal lines; veins nearly uniformly spaced.   
*Psidium*.

One Peruvian genus, *Acca*, has purposely been omitted from the above key because its inclusion would complicate the key and make it more difficult of comprehension. One species of *Acca* has the flowers solitary or in simple dichasia; the other species has the flowers solitary or in congested racemes. The calyx-lobes are 4 in number in each species, and so are anomalous in the Pimentinae. The genus is indeed of uncertain systematic position but is easily recognized by the villous or tomentose foliage and the large red flowers.

### Notes on Individual Peruvian Genera

The following conclusions have been reached after study of the criteria used by earlier workers, as set forth briefly above, and after the evaluation of these criteria in the light of new data, particularly from the inflorescence. Study of the vast myrtaceous flora of southeastern Brazil may demonstrate the wisdom of taking a somewhat less provincial point of view with respect to the submergence of such genera as *Abbevillea*, *Calyptromyrcia*, *Gomidesia*, *Rubachia*, *Siphoneugena*, and others. The notes below are based primarily on materials from the Amazon basin and the northern Andes and should be considered with this in mind.

1. The myrcioid genera. It seems clear that the Myrciinae are represented in Peru by three genera only. I cannot agree with Miss Amshoff that *Aulomyrcia* is a valid genus, even though it is possible to recognize certain species as members of the "genus." The characters of *Aulomyrcia*, which are readily observed in a series of small-flowered species typified by *A. multiflora* (Lam.) Berg, are two only: the hypanthium is prolonged above the summit of the ovary but is not constricted beneath the calyx; the disc and the

inner surface of the hypanthium are usually glabrous. Among the Peruvian species, in my opinion, the distinction between *Myrcia* and *Aulomyrcia* breaks down completely; depending upon the species selected, one can demonstrate almost any desired stage of the transition between the glabrous and prolonged hypanthium and calyx of *Aulomyrcia* on the one hand and the hairy ovary and short calyx of *Myrcia* proper.

The status of *Rubachia* is not entirely clear and must be clarified by study of the several Brazilian species. The one Peruvian species referred by Berg to this genus is known in immature flowering condition only, and its relationships appear to be with other Peruvian species of *Myrcia*. The genus *Gomidesia*, as far as I am aware, does not occur within or near the borders of Peru, although it has been reported from Bolivia; like *Rubachia* and *Blepharocalyx*, it is primarily a genus of southeastern Brazil.

The distinction between *Myrcia* and *Marlierea* is a somewhat nebulous one, and it is probable that *Marlierea* comprises a phylogenetically diverse assemblage of species which have been arbitrarily assigned to the genus because of the character of the irregularly splitting calyx. In spite of this doubt as to the monophyletic origin of *Marlierea*, its species are often recognizable as such by the persistent bracts and the abortion of the primary axis of the inflorescence. On the basis of the somewhat weak association of these characters of calyx, bracts and inflorescence, it seems best for the present to recognize the genus as distinct.

*Calyptanthes*, like *Marlierea*, shows some evidence of internal diversity, but the calyx-character is such a distinctive one, and is correlated in so many species with the presence of dibranchiate hairs, that the genus is one of the most readily recognized among the American Myrtaceae.

2. The eugenioid genera. The genera of the Eugeniinae are somewhat difficult to delimit, partly because of the paucity of material available for study and partly because of the many and morphologically diverse species. Whereas in the myrcioid groups the morphology of the inflorescence, the structure of the embryo, and the number of ovules in each locule remain essentially constant from genus to genus and even from species to species, in the eugenioid taxa quite the reverse is true. The number of species is large, and most of them have been assigned at one time or another to the genus *Eugenia*; any attempt at orderly classification of the whole group necessitates a decision as to which taxa shall be removed

from the inclusive *Eugenia*, and as to the ultimate circumscription of *Eugenia* itself.

The satisfactory partition of *Eugenia* on a worldwide basis has not yet been accomplished. It was thought at one time that the New World species could be separated from those of the Old World on the basis of floral characters. Merrill and Perry,<sup>1</sup> in their studies of Asiatic Myrtaceae, pointed out that such a separation was not practicable, but indicated that in their opinion the American species (*Eugenia sens. str.*) could be effectively distinguished from the Asiatic (the genus *Syzygium* Gaertn.) as follows:

*Eugenia*: Embryo apparently undivided, pseudomonocotyledonous; seed-coat smooth and free from the pericarp; inflorescence centripetal, with the pedicels 1-flowered; calyx-limb less prolonged.

*Syzygium*: Cotyledons distinct; seed-coat roughish, loosely or closely adhering to the pericarp; inflorescence usually centrifugal, with the panicles branching by threes or with secondary cymes; calyx-limb more prolonged.

An opposing point of view has been taken more recently by Henderson<sup>2</sup> in his study of *Eugenia* (*sens. lat.*) in Malaya. In this author's opinion little dependence can be placed on the seed-characters to which Merrill and Perry attached primary importance. Henderson maintains *Eugenia* as a single worldwide genus to include not only *Syzygium* (which contains the great majority of the Old World species) but also *Acmena* DC. and *Cleistocalyx* Blume, both of which were recognized by Merrill and Perry as independent genera. Henderson also suggests tentatively that "if the Old and New World species are to be separated, better characters might be found in the structure of the inflorescences and flowers."

Ingle and Dadswell,<sup>3</sup> in a paper on the wood anatomy of the Myrtaceae, support on anatomical grounds the view that at least two genera are probably represented in the inclusive *Eugenia*. A taxon which these authors call "*Eugenia* B" (that is, including *Acmena*, *Cleistocalyx*, *Syzygium*, and some Asiatic and Pacific species still referred to *Eugenia*) is shown to differ fundamentally from "*Eugenia* A" (that is, the New World species, plus the few Old World species referred to the genus *Jossinia*). Ingle and Dadswell examined

<sup>1</sup> Journ. Arnold Arb. 19: 99-100, 205-208. 1938; Mem. Amer. Acad. Arts, Sci. 18, pt. 3 [Mem. Gray Herb. 4]: 135-140. 1939.

<sup>2</sup> Gardens' Bull. Singapore 12, pt. 1: 1-17. 1949.

<sup>3</sup> The anatomy of the timbers of the south-west Pacific area. III. Myrtaceae. Austral. Journ. Bot. 1: 353-401. pls. 1-10. 1953.

wood-samples of seven species of *Eugenia* thought to be tropical American in origin, and numerous samples of various species from the southwest Pacific. Although these authors do not support Merrill and Perry in the recognition of the small genera *Acmena*, *Cleistocalyx* and *Jossinia*, all are in general agreement that there is a notable hiatus between two great groups of species, one primarily of the Old World and the other of the New, that have been in the past indiscriminately assigned to *Eugenia*.

The separation of "*Eugenia* A" and "*Eugenia* B" has received additional, if somewhat inconclusive, support from studies in the comparative morphology of pollen, by Kathleen M. Pike.<sup>1</sup> Miss Pike found the pollen of three species of "*Eugenia* A" (none of which was American) to be quite distinct from that of "*Eugenia* B." She was unable to distinguish the pollen of *Cleistocalyx* from that of *Syzygium*, but could distinguish these genera from *Acmena* on the basis of pollen morphology.

An increasing body of evidence thus points to the conclusion that the New World eugenioid species are generically distinct from most of the Old World species formerly referred to *Eugenia*. It is probable that the name *Syzygium* Gaertn. will be conserved for the principal group of these Old World species, and it may be that *Syzygium* will attain general recognition as an independent genus. The propriety of such a course, as pointed out by Henderson, cannot be determined with much certainty unless someone is willing to undertake the thankless and difficult task of a worldwide revision of *Eugenia*. In the meantime it seems clear that the American species can profitably be studied apart from their Old World relatives, since as far as I am aware no one has suggested any close relationships at the specific level.

Within the large group of American eugenioid species are several distinctive sub-groups which some authors have recognized as genera:

(a) *Eugenia sens. str.* This is the group which includes the type of the genus, *E. uniflora* L. In the approximately 70 species recognized by Berg (as members of his genera *Phyllocalyx* and *Stenocalyx*), the hypanthium is not prolonged beyond the ovary, the ovules are numerous, and the embryo is undivided; the calyx-lobes are often elongated and foliaceous or subfoliaceous, and the flowers occur partly in short racemes and partly in bracteate axils at the

<sup>1</sup> Pollen morphology of Myrtaceae from the south-west Pacific area, Austral. Journ. Bot. 4: 13-53. pl. 1. 1956.



bases of new shoots. Berg based the genera *Phyllocalyx* and *Stenocalyx* on the characters of calyx-lobes and flower arrangement. It does not seem desirable to recognize these segregate genera (aside from the fact that one of them, *Stenocalyx*, was illegitimate when published for it included the type species of *Eugenia*), because the inflorescence character on which they are primarily based is one which occurs occasionally in racemose-flowered species of *Eugenia*. It is possible to demonstrate various intermediate conditions between the one extreme, in which all flowers are in the axils of bracts at the bases of new shoots, and the other, in which the flowers are normally in short racemes (as in *Eugenia egensis* DC.). *Phyllocalyx* and *Stenocalyx* together, however, form a somewhat doubtfully recognizable taxon, already designated by Niedenzu (Natürl. Pflanzenfam. III, pt. 7: 81. 1893) as *Eugenia*, subgenus *Macrocalyx*. The range of the group is from the West Indies southward throughout the lowlands of eastern South America. As yet no species has been found in Peru.

(b) Typical *Eugenia* in the sense of most authors, not of Linnaeus. A large group of species with multiovulate ovary, the hypanthium little or not at all prolonged beyond the ovary, and the flowers in short or long racemes or apparently glomerate because of extreme reduction of the raceme axis. These include most of the Biflorae, Corymbiflorae, Glomeratae, Racemosae, Racemulosae and Umbellatae of Berg, a total according to him of about 360 species in America. The embryo, as far as known, is undivided, as in typical *Eugenia*; most species are known from flowering material only, however, and it is not possible to make a general statement about embryo structure in this group.

(c) The genus *Anamomis* Griseb. A group of 40 to 50 species, ranging from the West Indies southward, chiefly along the Andes, to Bolivia and Argentina. The ovary is multiovulate, the hypanthium is little or not at all prolonged, the flowers are solitary or in simple or compound dichasia, and the cotyledons as far as known are 2 and distinct. The species of this taxon were included by Berg in his group *Dichotomae*, of *Eugenia*. On the basis of geographical restriction, the structure of the inflorescence, and the morphology of the embryo, *Anamomis* seems to be more deserving of independent generic status than *Plinia*, *Myrciaria* or *Catinga*. A revision is needed, however, of the entire group of taxa including *Anamomis*, the south-Brazilian *Myrcianthes* Berg, and the Chilean genera *Reichea* Kausel and *Myrceugenella* Kausel. *Myrceugenella*, for

example, differs from *Anamomis* chiefly in having the radicle about as long as (instead of about one-third as long as) the cotyledons. *Reichea* and *Myrcianthes* have pentamerous rather than tetramerous flowers, but otherwise seem to differ little from *Anamomis*. At present, moreover, most of the species of *Anamomis* are unknown in the fruiting condition (mature fruits have been seen for 5 of the 19 known species which occur in Peru), and in view of the importance which has been attached to the myrtaceous embryo as an indicator of relationship, it seems unwise to transfer numerous species to this genus, on the basis of the inflorescence alone, before the taxonomy of the group has been carefully studied.

The nomenclature of the group is somewhat involved. If study indicates that but a single genus should be recognized, the oldest name for this is apparently *Luma* A. Gray, published in 1854 and thus antedating any of the generic names published by Berg. If *Myrcianthes* and *Anamomis* prove to be congeneric, the former name has priority. If *Anamomis* proves to be distinct from all the others, the name is valid for the Andean-West Indian group of species which is considered here.

There appears to be little more than superficial similarity between the species of *Anamomis* and those of the Old World genus *Syzygium* Gaertn. The inflorescence in *Syzygium* is often terminal; if lateral it may be strictly racemose (with the terminal flower developed, not abortive as in most American *Eugenias*), or more often it may simulate the myrcioid panicle, with the principal branches opposite, elongate, and terminating in single flowers or small dichasia. The consistent occurrence of a regularly dichotomous dichasium is apparently unique in *Anamomis* and its relatives (cf. similar inflorescences in *Pimentinae*).<sup>1</sup>

<sup>1</sup>Since the above was set in type I have received, through the kindness of Dr. Carl Skottsberg, a copy of a very recent paper in which the whole matter of generic segregations in the American Myrtaceae is discussed by Dr. Eberhard Kausel (Beitrag zur Systematik der Myrtaceen, Ark. Bot. 3: 491-516. 1956). Kausel proposes to erect a new family, Leptospermaceae, for the capsular-fruited genera usually assigned to Myrtaceae, and to restrict the use of the name Myrtaceae to those fleshy-fruited genera which comprise the tribe Myrteae DC. The Myrtaceae in this narrower sense are divided by Kausel, on the basis of characters of the seed and embryo, into the following taxa, which are presumably intended as subfamilies, although apparently not formally designated as such: Eugenioideae, Plinioideae, Cryptorhizoideae, Myrtoideae, and Myrcioideae. Five new genera are proposed, of which one is assigned to Eugenioideae, three to Plinioideae, and one to Myrtoideae. In the Plinioideae Kausel recognizes *Anamomis* Griseb. and four other genera which have the inflorescence an axillary dichasium, viz., *Pseudanamomis* Kausel, *Reichea* Kausel, *Myrcianthes* Berg, and *Amyrsia* Raf. with type species *Myrtus foliosa* H.B.K. The superficially similar *Pseudomyrcianthes* Kausel is assigned to the Eugenioideae and *Myrcu-genella* Kausel to the Myrcioideae.

(d) The genus *Myrciaria* Berg. A group probably of about 40 species with few (usually 2) ovules in each locule of the ovary, the hypanthium markedly prolonged beyond the ovary and circumscissile at the base, the flowers subsessile in small (racemose) clusters and the cotyledons distinct or nearly so. According to Berg the genus included 65 species; Bentham pointed out (Benth. & Hook. f. Gen. Pl. 1: 720. 1865) that several of the original species probably belonged to some myrcioid genus. After the removal of these anomalous species the genus *Myrciaria* appears to comprise a coherent and natural group, which ranges from Panama southward, chiefly in the lowlands east of the Andes. *Siphoneugena* Berg is a very small south-Brazilian genus of uncertain status which differs from *Myrciaria* chiefly in having the ovary multiovulate.

(e) The genus *Plinia* L., in the sense of Urban (Repert. Sp. Nov. 15: 412-413. 1919). A small assemblage of species in which the locules of the ovary are 2-ovulate, the hypanthium is prolonged, the calyx is partially or completely closed in bud and splits longitudinally at anthesis, the flowers are usually in sessile bracteate clusters, and the cotyledons are distinct. About half a dozen closely related species are known from northern continental South America; Urban described in his later years a considerable number of species of *Plinia* from the West Indies, but most of these are small-leaved plants with little apparent similarity to the South American species. On the basis of the distinctive calyx and the small number of ovules, the South American species are readily recognized as members of this group, and I have assigned several Peruvian species to it.

(f) A heterogeneous group of perhaps 15-20 species, in which the ovary is multiovulate, the hypanthium is mostly not or scarcely prolonged beyond the ovary, the buds are closed or the calyx-lobes coherent in the bud, the flowers are in short axillary racemes, and the embryo is undivided. Except for the united or coherent calyx-lobes, any of these species could pass for a member of the genus *Eugenia*, and many of them have been attributed at times to that genus. The taxon characterized above includes *Calycorectes* Berg (with buds closed) and probably also *Schizocalyx* Berg, and in Peru and Amazonian Brazil the genus *Catinga* Aubl. (in the sense of Amshoff, in Fl. Suriname 3: 105. 1951). The status of *Catinga* is not clear to me, and I hesitate to recognize it as an independent genus. It differs from *Eugenia* in one character only, namely, that the four calyx-lobes are coherent in the bud for part or all of their length and

are usually thickened and cucullate at the tips.<sup>1</sup> The species assigned to *Catinga* presumably differ from *Calycorectes* because in the former the lobes are loosely coherent along narrow lines near the edges but separate cleanly at anthesis into symmetrical thin-edged lobes, instead of rupturing irregularly as in *Calycorectes*. To me this is not a convincing character upon which to base a genus, especially since the supposed species of *Catinga* are not otherwise very different from the many species of *Eugenia* which have similar foliage and similar inflorescences. The genus *Calycorectes* itself is not well understood; it is indeed restricted by Amshoff (op. cit. 104) to a single species, although more than 15 species have been described.

In summation, the Peruvian eugenioid species belong for the most part to *Eugenia*, which is understood to include *Phyllocalyx* Berg and *Stenocalyx* Berg, and, for the present at least, *Ananomis* Griseb. and *Catinga* Aubl. *Myrciaria* Berg is apparently a distinct genus, and *Plinia* L. (in the sense of Urban) is recognized.

3. The pimentoid genera. The genera of Pimentinae which have membranaceous seed-coats, namely *Blepharocalyx* and *Campomanesia*, are represented in Peru by a single species each; evaluation of their generic limits should be undertaken only after study of the species of eastern and southeastern Brazil, where these genera are represented by additional species. The remaining genera, those with hard or bony seeds, fall into two principal groups, namely, *Psidium* and *Myrtus* and their respective segregates. The separation between these two has been traditionally upon the basis of calyx morphology. *Myrtus* has been a form-genus including especially all small-leaved species (like the type species, *M. communis* L., of Europe) with 1-flowered peduncles, 2- to 3-locular ovary and 5 (rarely 4) distinct calyx-lobes. *Psidium* was originally a form-genus including mostly larger-leaved species (like the type species, *P. guajava* L., the guava) with 1- or 3-flowered peduncles, the ovary usually more than 2-locular, and the calyx closed or nearly closed in bud and splitting irregularly in anthesis.

In tropical America *Psidium* is a relatively "good" genus, with numerous and distinctive species, but unfortunately the character of the closed and irregularly breaking calyx applies to relatively few of these. Many species described by DeCandolle, Berg, and later authors have an open, lobed calyx. The lobes are usually small, and

<sup>1</sup> For additional notes on the status of *Catinga*, see below (p. 203), in the discussion of *Eugenia acrensis*.

the hypanthium splits longitudinally in the sinuses as the flowering period passes and the fruit expands; this constitutes, in fact, one of the principal ways in which a species of *Psidium* may be recognized. *Calyptrropsidium* Berg and *Psidiopsis* Berg differ in minor features of the calyx and are not convincingly distinct from *Psidium*.

Seemingly intermediate between *Psidium* and *Myrtus* is *Calycolpus*, which according to Riley<sup>1</sup> contains 12 species. This is a genus which has almost no characters. According to Riley it may be distinguished from *Campomanesia*, *Myrtus* and *Psidium* by its calyx-lobes, "which are patent in the flower-bud, whereas in *Campomanesia* and *Myrtus* they are appressed to the corolla when in bud, and in *Psidium* they form a closed calyx which splits into segments as the flower expands." It is true that a species of *Calycolpus* can usually be recognized as such by the rather large flowers which are solitary in the axils, by the calyx-lobes which are disposed as noted above, and by the coriaceous leaves, which usually blacken in drying. Superficially, however, a small *Calycolpus* looks not unlike a large specimen of *Myrtus communis*, and if any revision of *Myrtus* is undertaken the status of *Calycolpus* should be considered at the same time. As far as I am aware, no species of this genus ranges as far southwest as the borders of Peru; the Rio Negro forms the approximate limit of the group in this direction.

The genus *Myrtus* itself is in need of study. Bentham (Benth. & Hook. f. Gen. Pl. 1: 714. 1865) stated that the genus as he knew it contained probably about 50 species, mostly American but occurring on all major land areas except possibly tropical Asia. Actually *Myrtus* in the sense of Bentham was something of a catch-all. It included the small Andean groups now generally referred to the genera *Myrteola* Berg and *Ugni* Turcz.; *Ananomis* and *Myrcianthes* of the Eugeniinae; *Myrceugenia* of the Myrciinae; the Bergian genera *Blepharocalyx* and *Pseudocaryophyllus* of the Pimentinae; additional Chilean genera now regarded by Kausel as completely distinct; and various additional American plants, practically all of which have since been referred to genera other than *Myrtus*.

At least one recent author has retained a few American species in *Myrtus*,<sup>2</sup> but an opposing point of view has been taken by Burret,<sup>3</sup> who has transferred most of the described species (from both Old

<sup>1</sup> Kew Bull. 1926: 145-154. 1926.

<sup>2</sup> Legrand, D. Las Mirtáceas del Uruguay, An. Mus. Hist. Nat. Montevideo, ser. 2, 4, pt. 11: 21-24. 1936.

<sup>3</sup> Myrtaceen-Studien, Notizbl. Bot. Gart. Berlin 15: 479-500. 1941.

and New Worlds) to other genera, retaining in *Myrtus* no more than the original *M. communis*, one African species and about 14 species in Florida and the Greater Antilles.

Pending further revision of the whole group as it exists in America, I have chosen to recognize *Ugni* and *Myrteola* as local, independent genera. These appear well founded when judged by ordinary criteria of morphological distinctness, homogeneity, and well-defined geographical range. It is by no means clear that *Myrtus* is represented in the American flora by any species whatsoever, and it seems unwise to attempt to force the several *Myrtus*-like American groups into a generic concept based so largely upon a single European species.

Finally, a word should be said about *Acca*, which Berg placed among the Eugeniinae. Bentham stated his opinion that the genus belonged rather with *Psidium*, and the seed-characters of the two species of *Acca* confirm this disposition. The genus is well marked, with style and androecium unlike anything known in the Myrteae unless it be *Feijoa* Berg, which Burret (Repert. Sp. Nov. 50: 49. 1941) has relegated to the synonymy of *Acca*.

## Systematic Treatment of Genera and Species

### 1. MARLIEREA Camb.<sup>1</sup>

1. Midvein flat or convex on the upper surface of the leaf, up to 1-1.5 mm. broad at base, if sulcate this at base of blade only.
2. Inflorescence, including the hypanthium, strongly velutinous or at least with numerous loosely ascending reddish or reddish-yellow silky hairs up to 1 mm. long.
3. Inflorescence strongly velutinous; flowers large, the buds 7 mm. long; calyx-tips free; leaves acute or acuminate, 13-18 cm. long. . . . . *M. velutina* McVaugh.
3. Inflorescence loosely silky-hairy; flowers small, the buds 2.5 mm. long, closed, apiculate; leaves caudate-acuminate, 4.5-7 cm. long.  
*M. caudata* McVaugh.
2. Inflorescence glabrous or essentially so; at least the tips of the calyx-lobes evident in the bud.
4. Leaves 9-14 cm. long, 2-3.5 times as long as wide; lateral veins 12-15 pairs, the transverse veins obscurely reticulate; leaves finely and obscurely dark-dotted; calyx-lobes in bud minute, ciliate. . . . . *M. scytophylla* Diels.
4. Leaves 7.5 cm. long or less, 1.7-2.2 times as long as wide; lateral veins 6-8, the transverse veins prominently and coarsely reticulate; leaves with 1-3 large translucent dots per square millimeter; calyx-lobes in bud distinct, the inner ones broadly scarious-margined, 2.5 mm. wide. . . . . *M. areolata* McVaugh.

<sup>1</sup> One species, *Marlierea insignis*, is described below but is not included in the key; it is known from Amazonian Colombia (Río Apaporis) and is probably not a member of the Peruvian flora.

1. Midvein sharply and narrowly impressed on the upper surface, or in one species concave or broadly sulcate.

5. Inflorescence, including buds, with numerous ascending lustrous yellowish-white hairs up to 1 mm. long; buds 4-5 mm. long, mostly concealed by the hairs; midvein concave or sulcate; hypanthium tomentose within.

*M. spruceana* Berg.

5. Inflorescence pubescent, often sparsely so, with short, pale or reddish hairs 0.5 mm. long or less; buds glabrous or essentially so, 1.5-3.5 mm. long; midvein sharply and narrowly impressed; hypanthium glabrous within.

6. Leaves cordate-auriculate, nearly sessile, the petioles 3-4 mm. long; inflorescence finely hispidulous with minute stiff erect hairs; buds closed, with a prominent narrow apiculum; staminal ring short-hairy.

*M. subulata* McVaugh.

6. Leaves acute to cuneate or somewhat rounded at base, on petioles 4-10 mm. long; inflorescence pubescent with appressed or ascending hairs; buds closed or the calyx-lobes distinct; staminal ring glabrous.

7. Petioles transversely rimose, the reddish-brown or whitish papery layers separating but persistent; calyx in bud with 4 very small separate deltoid tips; lower branches of the panicle straight and elongated, spikelike, with numerous sessile flowers and short squarrose bracts.

*M. umbraticola* (HBK.) Berg.

7. Petioles smooth and with unbroken surface, usually dark in color; buds closed, or with 5 distinct calyx-lobes; inflorescence various.

8. Inflorescence thinly pubescent with pale hairs; bracts and bracteoles deciduous before anthesis; lateral veins of the leaves not impressed above; buds 3-3.5 mm. long, closed at apex. . . . . *M. imperfecta* McVaugh.

8. Inflorescence pubescent with lustrous rufous hairs; bracts and bracteoles persistent, squarrose; lateral veins impressed above; buds 1.5-2 mm. long, with 5 distinct calyx-lobes. . . . . *M. squarrosa* McVaugh.

### *Marlierea areolata* McVaugh, sp. nov.

Subglabra, multiflora, foliis 7.5 cm. longis; venis utroque latere 6-8, venulis reticulatis; laminis utrinque crebro pellucido-punctatis; nervo medio supra plano vel convexo; calycis lobis liberis 4, hypanthio demum explanato, ad germinis verticem partito.

A shrub or tree with elliptic, bluntly acuminate leaves and relatively few lateral veins, the foliage distinctive also because of the prominently reticulate veinlets and the numerous large translucent glands; calyx-lobes in unequal pairs, the inner ones broadly scarious-margined, about 1.7 mm. long and 2.5 mm. wide; style 4 mm. long; stamens 75-100.

The large and distinct calyx-lobes, and the deciduous bracts and bracteoles, suggest that this species may have some affinity to the genus *Myrcia* (*Aulomyrcia*). It is here referred, however, to *Marlierea*, because of the flattening of the hypanthium after anthesis, and the accompanying distortion and splitting of the calyx. As an additional minor character may be mentioned the terminal or falsely terminal inflorescence in this species; this character recurs throughout the genera *Calyptranthes* and *Marlierea*, whereas in *Myrcia* the panicles are more often from the lower axils.

Peru, Loreto: Stromgebiet des Ucayali von 10° S. bis zur Mündung, *G. Tessmann 3264*, anno 1923 (G, type). This specimen was determined in the herbarium by Burret as a new species of *Myrcia*, but as far as I can learn this has never been published. F.M. Neg. 23474.

***Marlierea caudata* McVaugh, sp. nov.**

Arbor, ramulis paniculisque ferrugineo-sericeis; foliis parvis, usque ad 7 cm. longis, longe acuminatis; paniculis paucifloris, alabastra 2.5 mm. longa, clausa, apiculata.

A tree up to 7 meters high, the pubescence of reddish or reddish-yellow silky hairs; leaves 4.5–7 cm. long, 2–3 times as long as wide (including the narrow acuminate tip 1–2 cm. long); principal branches of the inflorescence 3–5 cm. long, each with 20 flowers or fewer; calyx splitting irregularly into 4 oblong lobes; style 4.5 mm. long; stamens about 100; fruit subglobose, 8–11 mm. in diameter.

Peru, Loreto: Mishuyacu, near Iquitos, elev. 100 meters, forest, *G. Klug 235*, Oct.–Nov., 1929 (F 624286, type; NY; US); forest between [lower] Río Nanay and Río Napo, June 6, 1929, *L. Williams 718* (F).

***Marlierea imperfecta* McVaugh, sp. nov.**

Arbor, pubescens, foliis 12–25 cm. longis acuminatis, petiolis 5–8 mm. longis canaliculatis; nervo medio supra impresso, venis lateralibus non impressis; paniculis multifloris, bracteis bracteolisque deciduis; alabastris clausis, 3–3.5 mm. longis.

A small tree, thinly pubescent with pale or reddish-based hairs; leaves elliptic, 2.5 times as long as wide, with 10–15 pairs of lateral veins; inflorescence 3 times compound, the principal branches 8–14 cm. long; calyx splitting irregularly into 4 lobes; style 4–4.5 mm. long; stamens about 100.

Peru, Loreto: Mishuyacu, near Iquitos, elev. 100 meters, forest, Jan., 1930, *G. Klug 787* (US 1455778, type; NY; F).

***Marlierea insignis* McVaugh, sp. nov.**

Arbor mediocris, insigniter velutina; ramulis, petiolis paniculisque, pilis rigidis erectis usque ad 1 mm. longis, aureo-fulvis, dense obtectis; foliis ellipticis 15–25 cm. longis acuminatis; venis utroque latere 12–15, planiusculis vel impressis; calyce in alabastro ut videtur clauso, ad florendi tempus irregulariter rumpente; paniculae ramis 4–6 cm. longis crassis, paucifloris; fructu globoso, diametro 1.5–2 cm.

Tree up to 10 meters high, densely velutinous with golden-brown hairs, the hairs stiff, erect, up to 1 mm. long, completely covering the branchlets, vegetative buds, inflorescence (including the fruit), and midvein at least beneath; lower leaf-surface loosely hirsute with similar hairs; leaves broadly elliptic, 7–13 cm. wide, 15–25 cm. long, rounded to apex and then abruptly short-acuminate, the



acumen acute with concave sides, 5–15 mm. long; base of blade rounded, the margins at very base decurrent on the petiole, which is up to 4 mm. thick (including hairs) and 10 mm. long; midvein flat or concave above, velutinous or glabrate, prominent beneath; lateral veins 12–15 pairs, plane or impressed above, prominent beneath; marginal vein about equaling the laterals, strong and little arched between them, 3–6 mm. from margin; leaves dull and pale green above, yellow green beneath and there obscurely and minutely dark-dotted; inflorescence branches 3–6 cm. long, 3 mm. thick (including the hairs), solitary in the axils or the fertile branch aborting at the first node and producing a pair of nearly equal lateral branches; individual branches spike-like, with up to 7 nearly sessile flowers; flowers not seen; fruit globose or nearly so, about 1.5 cm. long, 1.3–2 cm. in diameter; calyx apparently closed in bud, with a conical top, glabrous within this, and breaking irregularly in anthesis; inner disc at base of style 2 mm. in diameter, the hypanthium produced 1–1.5 mm. above the summit of the ovary and hairy within, the numerous (probably 150–200) stamens produced near the summit of the bud in a ring 1.5 mm. wide; anthers 0.3 mm. long; style 5 mm. long; ovules 2 in each of 2 locules.

Colombia, Amazonas-Vaupés: Río Apaporis, Soratama, elev. ca. 250 meters, June 21, 1951, *R. E. Schultes & I. Cabrera 12766* (US 2220050, type; MICH); Aug. 24, 1951, *Schultes & Cabrera 13722* (US).

### *Marlierea squarrosa* McVaugh, sp. nov.

Frutex, rufo-pubescentis; foliis 9–13 cm. longis acuminatis, venis supra impressis, petiolis 5–7 mm. longis levibus; floribus subspicatis, bracteis divaricatis persistentibus; alabastris 1.5–2 mm. longis glabris; calycis lobis 5 valde inaequalibus.

A shrub 2 meters high, with elliptic leaves 2.5 times as long as wide, and many-flowered panicles; flowers small, the calyx splitting irregularly from the base of the lobes to the summit of the ovary; style 3.5 mm. long; stamens about 50.

This species, like *Marlierea areolata*, seems to cross the supposed generic lines between *Marlierea* and *Myrcia* (*Aulomyrcia*). It has the irregularly splitting calyx, persistent bracts and explanate disk of *Marlierea*, but the coppery color (when dry) and free calyx-lobes of some species of *Myrcia*. It might conceivably be a hybrid involving *Marlierea umbraticola*, which also has impressed veins, but as yet *M. umbraticola* has not been collected within the borders of Peru. The following is the only known collection of *M. squarrosa*.

Peru, Loreto: Mishuyacu, near Iquitos, elev. 100 meters, forest, *G. Klug 169*, Oct.–Nov., 1929 (US 1455168, type; NY; F).

### *Marlierea subulata* McVaugh, sp. nov.

Arbor, hispidula; foliis subsessilibus, 13–18 cm. longis, ovatis lanceolatisve; nervo medio supra impresso; paniculis angustis paucifloris; alabastris subglabris, 3 mm. longis, clausis, apiculatis; disco staminali pubescente.

A tree 5 meters high, with cordate-auriculate nearly sessile leaves about 3 times as long as wide; bracts subulate, up to 3 mm. long, more or less persistent through anthesis; calyx splitting irregularly into 4 lobes; style 6 mm. long; stamens 75-100; fruit up to 1 cm. long and 1.5 cm. in diameter.

Peru, Loreto: Mishuyacu, near Iquitos, elev. 100 meters, forest, May, 1930, *G. Klug 1341* (F 627613, type; NY; US).

### *Marlierea velutina* McVaugh, sp. nov.

Fulvo-brunneo-velutina, foliis 13-18 cm. longis acuminatis, nervo medio supra plano vel basi sulcato; paniculis multifloris; floribus grandis, alabastris ut videtur 7 mm. longis; hypanthio circiter 8-sulcato; calyce irregulariter rumpente.

A shrub or tree, densely beset with coarse yellowish-brown hairs up to 1 mm. long; leaves elliptic to lanceolate, about 3 times as long as wide; inflorescence 6-10 cm. long, 2 or 3 times compound; calyx-lobes 4, at first united except the free tips 1 mm. long; style 7 mm. long; stamens probably about 200.

A distinctive species suggesting some of the members of the genus *Gomidesia* because of the color and character of the pubescence.

Brazil, Guaporé: Falls of Madeira, *H. H. Rusby 2683*, Oct., 1886 (F, type; US). Univ. of Mich. Neg. 449.

## 2. CALYPTRANTHES Sw.

1. Flowers very large for the genus, the buds 7-8 mm. long, convex or nearly flat at the apex, lacking a narrow apiculum; inflorescence pale-scurfy and also appressed-puberulent with minute brownish dibranchiate hairs 0.1 mm. long; leaves 25-39 cm. long, narrowly elliptic, appearing cordate-auriculate at base, nearly sessile, the stout petiole 4 mm. long. . . . *C. maxima* McVaugh.
1. Flowers smaller, the buds if 5 mm. long or more fusiform and apiculate, or noticeably hirsute or velutinous; inflorescence glabrous to hairy; leaves usually smaller and slender-petiolate, if sessile or essentially so the buds not as above.
2. Leaves sessile, with veins impressed on the upper surface; blades cordate at base, or the margins much produced and puckered.
3. Leaves ovate, cordate, 9-12 cm. long; inflorescence glabrous, the buds fusiform, 6-7 mm. long. . . . . *C. sessilis* McVaugh.
3. Leaves obovate, with the margins near base produced into puckered folds, the blades 30-38 cm. long; inflorescence appressed-hirsutulous, the buds obovoid, 3.5 mm. long. . . . . *C. plicata* McVaugh.
2. Leaves petiolate, cuneate to acute or somewhat rounded at base, the veins usually not impressed above.
4. Inflorescence of paired spikes, the individual flowers sessile along the axis, or the lowest in sessile or very short-peduncled groups of three.
5. Buds glabrous; leaves 2.5-6 cm. long, often obovate with rounded or sometimes short-acuminate tips; flowers 3-5 (-11) in each spike. . . *C. pulchella* DC.
5. Buds strigose or hirsute; leaves 7-16 cm. long, elliptic or ovate, usually prominently and often narrowly acuminate; flowers more numerous.

6. Branchlets and inflorescence, including the buds, thickly rufous-hirsute; buds broadly obovoid to nearly globose, 5-6 mm. long, concealed by the hairs; flowers 8-13 in each spike. . . . . *C. krugioides* McVaugh.
6. Branchlets and inflorescence with appressed yellow or brown dibranchiate hairs; buds obovoid or broadly fusiform, 2-2.5 mm. long, rather sparingly hairy.
7. Spikes mostly 8-12 cm. long, the numerous flowers in several sessile clusters of 10-20 flowers each; leaves short-acuminate, the lateral veins not impressed above, slender and closely parallel. . . . . *C. densiflora* Berg.
7. Spikes 3-5.5 cm. long, the flowers 25 or fewer in each, in small sessile clusters of 1-3 each; leaves with narrow acumen 1.5-2 cm. long; lateral veins impressed above, the principal ones prominent beneath and contrasting with the less conspicuous intermediates. . . . . *C. brevispicata* McVaugh.
4. Inflorescence of paired panicles or compound dichasia, the basal branches elongate and again branched, or occasionally 1-flowered only.
8. Branches of the inflorescence variously pubescent (sometimes thinly so) with appressed or erect hairs; hypanthium variously strigose to tomentose except in *C. multiflora*.
9. Hypanthium glabrous; inflorescence loosely pubescent with numerous erect or somewhat appressed soft pale rufous hairs; midvein convex above; buds 2-2.5 mm. long. . . . . *C. multiflora* Berg.
9. Hypanthium strigose or variously velutinous or tomentose, if nearly glabrous the midvein sulcate or narrowly impressed above.
10. Inflorescence a compact umbelliform cyme 2-5 cm. long with 15 flowers or fewer, the ovate boat-shaped bracts sub-foliaceous, persistent; inflorescence, including the flowers, thickly hirsute with coarse sessile dibranchiate hairs up to 1.5-2 mm. long and attached near one end. . . . . *C. longifolia* Berg.
10. Inflorescence paniculate or by reduction racemose, often 3 to 4 times compound and many-flowered (if short and few-flowered not hirsute as above); bracts all deciduous before anthesis, or a few (usually the basal ones) persisting; hairs of the inflorescence various, mostly sessile and less than 1 mm. long.
11. Hairs of the inflorescence golden-yellow, dibranchiate, up to more than 1 mm. long, the basal stalk of the hair erect and often as long as the spreading or ascending branches; leaves 6 cm. long or less, rounded to obscurely acuminate at tip; branchlets 2-winged; flowers mostly 10 or fewer on each branch.  
*C. tridymantha* Diels.
11. Hairs of the inflorescence sessile and, if abundant, usually red or rusty, all somewhat appressed and mostly less than 0.5 mm. long, or with very short hairs intermixed, or the inflorescence velutinous or tomentose.
12. Leaves large, mostly more than 15 cm. long (often 20-30 cm.), with 20-35 pairs of lateral veins; inflorescence with abundant rufous pubescence; buds obovate or obconic, scarcely apiculate, 3-5 mm. long.
13. Blades tapering from the middle or below, to a slender apex; lateral and marginal veins scarcely apparent on the lower leaf surface, which is covered with very numerous closely appressed pale hairs up to 0.2 mm. long; inflorescence 5 cm. long or less, few-flowered. . . . . *C. macrophylla* Berg.
13. Blades abruptly and narrowly acuminate; lateral and marginal veins forming a conspicuous pattern on the lower surface, which is glabrous or sparingly appressed-pubescent; inflorescence 6-10 cm. long, many-flowered.  
*C. gigantifolia* McVaugh.
12. Leaves of moderate size, usually less than 20 cm. long or, if longer, the lateral veins 15 pairs or fewer, or the buds 2-2.5 mm. long; buds and pubescence various.

14. Flowers small, the buds 2–2.5 mm. long, obovoid, the apex rounded or shortly apiculate; panicles mostly 3 times compound, many-flowered, the branches sparingly covered with appressed pale or sometimes reddish hairs; hypanthium strigose, sometimes very sparingly so; paired panicles from an abortive flattened axis 1 cm. long or less.
15. Lower leaf surfaces with few dark hairs and usually with rather numerous persistent nearly colorless appressed hairs; leaves elliptic, broadest at the middle, 5–10 cm. long, with 12–15 pairs of lateral veins; style 4–4.5 mm. long.  
*C. ruiziana* Berg.
15. Lower leaf surfaces glabrous except for a few dark hairs; leaves ovate or lanceolate, usually widest somewhat below the middle, 9–15 (–25) cm. long, with 20–25 pairs of veins; style 5–6 mm. long. . . . . *C. simulata* McVaugh.
14. Flowers larger, the buds 3–6 mm. long, variously shaped; panicles compound, or by reduction racemoid, the branches and the hypanthium usually conspicuously appressed-hairy, velutinous, or tomentose, with ferruginous or dark reddish hairs; panicles paired or with a central axis.
16. Inflorescence a pair of spikes with all flowers sessile, or the lower branches 1–2 cm. long and 1-flowered, or with 3 sessile flowers at the tip; buds 5–6 mm. long, abundantly hirsute, the hypanthium hairy within.  
*C. krugioides* McVaugh.
16. Inflorescence paniculate, usually many-flowered and 3 times compound; buds 3–4 mm. long, appressed-hairy to tomentose, the hypanthium glabrous within.
17. Midvein impressed above; hypanthium appressed-hairy, the hairs of the inflorescence rusty-brown; buds fusiform, 3–3.5 mm. long; panicle narrow, the lowest branches about 1.5 cm. long. . . . . *C. tessmannii* McVaugh.
17. Midvein convex above (and then sometimes sulcate) or raised in a narrow ridge; hypanthium loosely velutinous or tomentose; buds obovoid or ellipsoid; lower branches of the panicle relatively long.
18. Leaves 15–21 cm. long, about 4 times as long as wide, the straight marginal vein and the 10–15 short divaricate lateral veins prominent beneath; petiole very stout, 3 mm. thick and 7 mm. long; buds broadly ellipsoid, heavily tomentose with dark red hairs, the hypanthium urceolate in anthesis.  
*C. rufotomentosa* McVaugh.
18. Leaves 10–16 cm. long, about 2.5 times as long as wide, the marginal vein not well defined, or consisting of a series of loops or arches between the 8–12 pairs of arcuate laterals; petiole 1 mm. thick, 8–10 mm. long; buds obovoid, sparingly or rather densely velutinous with rusty brown or reddish hairs, the hypanthium probably turbinate in anthesis. . . . . *C. cuspidata* DC.
8. Branches of the inflorescence, and the hypanthium, completely glabrous or with a very few scattered hairs about the base and the nodes of the panicle.
19. Panicles with 20 flowers or fewer, sometimes reduced and raceme-like or spike-like; peduncle and rachis filiform or very slender, often terete and nearly straight, usually less than 1 mm. thick; branchlets narrowly 2-winged.
20. Flowers mostly sessile, only the lower clusters pedunculate; wings of the branchlets often 0.5 mm. high; buds 4–7 mm. long, obtuse or obscurely apiculate. . . . . *C. pulchella* DC.
20. Flowers mostly on very long slender pedicels; wings of the branchlets scarcely higher than thick; buds 2–3 mm. long, narrowly and conspicuously apiculate.  
*C. bipennis* Berg.
19. Panicle many-flowered, 3 to 4 times compound, the peduncle usually somewhat angular near summit and 1–1.5 mm. thick, the rachis often irregularly enlarged and zigzag; wings, if produced on branchlets, not persisting through a growing season.

21. Lower leaf surface obscurely gland-dotted, the dots about 15 per square millimeter; leaves relatively narrow, mostly 2.5 times as long as broad, or longer; panicle branches irregularly alternate. . . . . *C. paniculata* R. & P.
21. Lower leaf surface prominently dark-dotted, the dots more than 50 per square millimeter; leaves broader, mostly 2.3 times as long as broad, or less; panicle branches, both large and small, often verticillate or fasciculate.  
*C. crebra* McVaugh.

### *Calyptranthes brevispicata* McVaugh, sp. nov.

Arbor pubescens, foliis longe acuminatis, venis supra impressis, subtus prominulis, venulis interjectis tenuioribus; spicis 3–5.5 cm. longis binis, floribus usque ad 25 sessilibus, fasciculatim 1–3-nis e nodis oriundis.

A small tree with elliptic-lanceolate leaves 11–15 cm. long, sparingly pubescent with yellowish brown hairs; a species superficially suggesting *C. densiflora* Berg, but the spikes shorter and with far fewer flowers than in that species; buds fusiform, about 2.5 mm. long; style 6 mm. long; stamens about 50.

Peru, Loreto: Florida, Río Putumayo, at mouth of Río Zubineta, elev. 200 meters, forest, March–April, 1931, *G. Klug 2040* (NY; US 1456699, type).

### *Calyptranthes crebra* McVaugh, sp. nov.

Arbor subglabra, floribus paniculatis, paniculae ramis ramulisque verticillatis vel fasciculatis; foliis ellipticis vel ovatis, 1.8–2.3-plo longioribus quam latioribus, subtus creberrime atro-punctatis.

A tree 4–10 meters high, nearly glabrous, with leaves 8.5–10.5 cm. long; a species superficially like *C. paniculata* R. & P., but readily distinguished from that species by the key characters. Buds obovate, apiculate, about 2 mm. long; style 5 mm. long; stamens 60–75; fruit globose, about 5 mm. in diameter.

Peru, Loreto: Near Iquitos, in forest, elev. 100 meters, Oct.–Nov., 1929, *G. Klug 77* (F; NY; US), 78 (F 624362, type; NY; US), 607 (F; NY; US).

### *Calyptranthes gigantifolia* McVaugh, sp. nov.

Arbor grandis, foliis 14–38 cm. longis acuminatis, subtus glabris vel parce pilis appressis pubescentibus, venis prominentibus; paniculis pilis appressis rufis vestitis, 6–10 cm. longis multifloris; alabastris 3–5 mm. longis.

A tree up to 20 meters high, resembling *C. macrophylla* Berg, but that species having the leaves more coriaceous, acute rather than acuminate, and less prominently veined; the marginal vein in *C. macrophylla* is close to the margin and not impressed above; the lower surface in *C. macrophylla* is densely pubescent with minute appressed pale hairs and with numerous intermixed dibranchiate hairs; in this last respect *C. macrophylla* agrees precisely with *C. speciosa* Sagot, of the Guianas, and it may be identical with that species, as already suggested by Amshoff.

Colombian specimens collected by Mutis (nos. 1940, 2234, 2951, 3961, and 5754) appear to be conspecific with the Peruvian specimens cited below.

Peru, San Martín: Juanjuí, *G. Klug 4277* (A; F; US 1458692, type). Loreto: Florida, *Klug 2332* (F; G; GH; NY; US), *2347* (F; G; GH; NY; US).

### ***Calyptanthes krugioides* McVaugh, sp. nov.**

Arbor grandis, ramulis inflorescentibusque rufo-hirsutis, foliis 10–16 cm. longis, floribus 8–13, ultimis solitariis, infimis ternis, alabastris 5–6 mm. longis obovoideis vel subglobosis.

A tree up to 20 meters high, named for its superficial resemblance to *Krugia ferruginea*, a native of the West Indies and northern South America. The few-flowered paired spikes, 5–6 cm. long, are conspicuously rufous-hirsute, and the buds completely obscured by the hairs; style 8 mm. long; stamens 125–150; petals 3, 4 mm. long in the bud.

Amazonian Brazil: Basin of Rio Juruá, *B. A. Krukoff 5041* (NY; US). Peru, Loreto: Iquitos, edge of lake, elev. 120 meters, Oct. 11, 1929, *L. Williams 3675* (F 618382, type). Univ. of Mich. Neg. 465.

### ***Calyptanthes maxima* McVaugh, sp. nov.**

Arbor parva, puberulenta; ramulis paniculisque sparsiuscule pilis adpressis minutis, 0.1 mm. longis dibranchiatis, obsitis; foliis ellipticis maximis, 25–39 cm. longis, acuminatis; petiolo incrassato, 3 mm. diametro, 4 mm. longo; nervo medio supra elevato sulcatoque; paniculis paucifloris, floribus puberulentis furfuraceisque, maximis; alabastris 7–8 mm. longis; calyptra explanata, vix apiculata; staminibus circiter 200.

A tree with leaves thin but extremely large for the genus, and the flowers large and coarse; leaves narrowly elliptic, acuminate, 3.5–4 times as long as wide, with 25–35 pairs of slender lateral veins; petiole 4 mm. long, its thickened portion extending also 5–6 mm. beneath the cordate-auriculate base of the blade; flowers up to 10 on each main branch of the panicle, arising from a stout flattened axis up to 3.5 mm. wide; stamens relatively short for the flower, 5 mm. long, fringing the summit of the hypanthium.

Colombia, Amazonas: Trapecio amazónico, Loretoyacu River, elev. about 100 meters, Oct., 1946, *R. E. Schultes & G. Black 8526* (US 1996504, type).

### ***Calyptanthes plicata* McVaugh, sp. nov.**

Frutex, foliis maximis obovatis, 30–38 cm. longis, sessilibus, marginibus ad basin decurrentibus plicatisque; paniculis tenuibus usque ad 7 cm. longis, pilis appressis rufis, partim dibranchiatis obtectis; paniculae bracteis divaricatis persistentibus, 2–3 (–5) mm. longis; alabastris 3.5 mm. longis, obovoideis, acutis, sessilibus; staminibus circiter 60.

A shrub about 4.5 meters high, with stem 5 cm. in diameter, nearly glabrous except the appressed-pubescent divaricately branched panicle which bears 50-100 flowers; leaves 10-12 cm. wide, 2.5-3 times as long as wide, with 20-25 pairs of conspicuous lateral veins; a distinctive species because of the large sessile leaves with broadly decurrent and puckered basal margins.

The inflorescence, with its persistently bracteate nodes, divaricate branches and relatively few sessile flowers, suggests that of *Calyptranthes longifolia* Berg but is more slender and elongate; vegetatively, the two species are dissimilar. Known only from the type, which bears one inflorescence in young bud, and a second, detached inflorescence with very much younger, undeveloped buds.

Brazil, Amazonas: Municipality São Paulo Olivença, near Palmares, on terra firma, low land, high forest, Sept. 11-Oct. 26, 1936, B. A. Krukoff 8432 (NY, type).

### *Calyptranthes rufotomentosa* McVaugh, sp. nov.

Frutex, panícula rufo-tomentosa et foliis elongatis glabris; foliis oblanceolatis, 15-21 cm. longis, nervo medio supra elevato, petiolo incrassato; panícula circiter 50-flora, 6-7 cm. longa; hypanthio urceolato, ad florendi tempus 4 mm. longo.

A shrub, glabrous except for the heavy dark red tomentum which completely covers the inflorescence; leaves narrow, and narrowly acuminate, 4-5 cm. wide, 4 times as long as wide, the straight marginal vein and the rather widely spaced 10-15 pairs of lateral veins conspicuous on the lower surface; flowers clustered toward the tips of the panicle branches; stamens about 75; style apparently undeveloped in the flowers examined; calyptra conic, apiculate, 1 mm. long.

Brazil, Amazonas: São Paulo de Olivença, caatinga de arvores baixas em areia branca, quasi pura, Oct. 15, 1942, A. Ducke 2240 (NY, type).

### *Calyptranthes sessilis* McVaugh, sp. nov.

Frutex, glaber, foliis sessilibus ovatis 9-12 cm. longis acuminatis; venis supra impressis; floribus in paniculis angustis perpaucis; alabastris fusiformibus 7 mm. longis.

Buds 2 mm. thick, the operculum 4-4.5 mm. long; style 8.5 mm. long; stamens 60-75; fruit globose, 7 mm. in diameter.

This species is similar to *C. spruceana* Berg, but in that species the buds are said to be globose and 5 mm. in diameter, the leaves are obtusely rounded at the tips, the veins are not impressed on the upper surface, and the fruits are more clustered toward the tips of the inflorescence.

Peru, Loreto: Yurimaguas, L. Williams 4583 (F 623440, type), Killip & Smith 27603 (NY; US). Univ. of Mich. Neg. 446.

***Calyptranthes simulata* McVaugh, sp. nov.**

Frutex vel arbor, pubescens; foliis ovatis lanceolatisve 9–15 (–25) cm. longis subglabris; venis utroque latere 20–25; paniculis binis e ramo compresso abortivo 1 cm. longo oriundis; paniculae ramis infimis usque ad 3–5 cm. longis; alabastris 2–2.5 mm. longis obovatis, apice rotundatis vel brevi-apiculatis; hypanthio strigoso.

A shrub or tree to 9 meters high, belonging to the group of species with middle-sized and nearly glabrous leaves and many small flowers in much-branched panicles. The calyptra is explanate, 1.3–2 mm. wide; style 5–6 mm. long; stamens 40–50.

Known only from specimens in which the flowering panicles are borne in the terminal axils of the twigs, on old wood. The normal size and shape of the leaves on sterile twigs cannot be determined with certainty, nor can the presence or absence of wings on the branchlets be verified. It is possible that *Calyptranthes simulata* and *C. tessmannii* are conspecific, but on the basis of the flowering specimens at hand the two species are readily separable by the use of the key characters.

Peru, Loreto: Iquitos, Aug. 2–8, 1929, *Killip & Smith 27352* (NY; US), *26916* (F; NY; US); Iquitos, *G. Tessmann 5372* (G; NY). Peru–Colombia boundary: forest near Río Putumayo, Sept. 26–Oct. 10, 1930, *G. Klug 1614* (F; GH; MICH, type; NY; US).

A collection from Tarapoto, San Martín, Peru, *Williams 6539* (F), may be the same species. It bears immature globose or oblate fruits about 1 cm. in diameter; the pubescence is exactly that of *C. simulata* and the leaves are similar in shape to those of that species. The specimen suggests *C. tessmannii*, however, in that the lateral veins hardly exceed 15 in number, and the panicle arises laterally from the base of a leafy shoot.

***Calyptranthes tessmannii* Burret, in herb., ex McVaugh, sp. nov.**

Arbor vel frutex, pubescens; foliis ellipticis, 8–11.5 cm. longis, subglabris, venis utroque latere ca. 15; paniculis duabus solitariis, oppositis, e nodo infimo rami lateralis foliosi oriundis; paniculae ramis infimis 1.5 cm. longis; alabastris 3–3.5 mm. longis fusiformibus, apice conspicue apiculatis; hypanthio strigoso.

A species which appears distinctive because of the narrow panicles arising from the lowest node of a leafy shoot; the relatively narrow and fusiform buds with long-apiculate tips are also characteristic. The style is about 6 mm. long; stamens about 50. Flowering specimens are readily distinguished from *Calyptranthes multiflora*, *C. ruiziana* and *C. simulata* by the key characters.

Peru, Loreto: Stromgebiet des Marañón von Iquitos... am Pongo de Manseriche, *G. Tessmann 4832* in 1924 (G, type). F.M. Neg. 23395.



## 3. MYRCIA DC.

1. Leaves sessile, cordate.
- 1a. Leaves ovate, 13–17 cm. wide, 1.7–2 times as long as wide, the veins impressed above; inflorescence decomposed, stout, 20 cm. long or more; buds 7 mm. long or more; northeastern Peru (Loreto). . . . . *M. obumbrans* (Berg) McVaugh.
- 1a. Leaves lanceolate, 3.5–5 cm. wide, 2.5–4 times as long as wide, the lateral veins not impressed above; inflorescence few-flowered, 4–7 cm. long; buds 4–6 mm. long; northern Bolivia (La Paz). . . . . *M. connata* McVaugh.
1. Leaves definitely petiolate, cuneate or rounded at base or occasionally subcordate.
2. Inflorescence at anthesis (and usually in fruit) conspicuously bracteate, the bracts ovate, pointed, 6–12 mm. long; calyx-lobes 2.5–6 mm. long, lanceolate or ovate, much longer than wide; branchlets long-hirsute.
3. Hairs of the branchlets reddish brown, up to 3.5 mm. long; calyx-lobes 4, the larger ones 6 mm. long. . . . . *M. huallagae* McVaugh.
3. Hairs of the branchlets yellowish brown, up to 2 mm. long; calyx-lobes 5, rarely 4, the larger ones 2.5–4 mm. long. . . . . *M. bracteata* (Rich.) DC.
2. Inflorescence with small inconspicuous bracts which are deciduous usually before the flowers open; calyx-lobes 3 mm. long or usually much less, rounded to subtruncate or triangular, mostly as wide as, or wider than, long; branchlets various.
4. Summit of the ovary and interior of the prolonged and cuplike hypanthium glabrous; fruit usually globose, 5–6 mm. in diameter. [This includes 7 species which were assigned by Berg to *Aulomyrcia*, and one additional species, *Myrcia bipennis* (Berg) McVaugh, which is treated below.]
4. Summit of the ovary and usually the interior of the hypanthium hairy; hypanthium variously or not at all prolonged beyond the ovary, the center of the flower thus flat or variously depressed; fruit various.
5. Outer surface of the hypanthium glabrous, the entire plant glabrous or nearly so; fruiting hypanthium prolonged into a neck 2 mm. long at the apex of the fruit. . . . . *M. subglabra* McVaugh.
5. Outer surface of the hypanthium hairy, usually strongly so; fruiting hypanthium, as far as known, not prolonged into a neck.
6. Inflorescence slender, the axis often terete or, if compressed, mostly less than 1.5 mm. wide (measured just below the lowest branches); small-flowered species, the disc 1–2 (rarely to 2.5) mm. wide; fruit ellipsoid or oblong, 5–9 mm. long. [This includes *M. poeppigiana* Berg, *M. paivae* Berg, *M. splendens* (Sw.) DC., *M. sylvatica* (Mey.) DC., and slender forms of *M. fallax* (Rich.) DC.]
6. Inflorescence relatively stout, the axis and branches compressed or strongly flattened; axis at least 1.5 mm. wide and often 2.5–4 mm. wide (measured just below the lowest branches); flowers small or large; fruit various.
7. Calyx in bud and in fruit truncate, the lobes one-third to one-half as long as wide, together forming a nearly straight-margined band or crown encircling the summit of the hypanthium; hypanthium prolonged up to 2 mm. beyond the summit of the ovary. [Includes 2 species, both referred to *Aulomyrcia* by Berg: *A. chilensis* Berg, *A. neesiana* (DC.) Berg.]
7. Calyx-margin not truncate, the lobes together not forming a recognizable unit but individually spreading, with evident sinuses between them; individual lobes broadly rounded or triangular, as long as wide, or a little wider than long; hypanthium various, usually not prolonged.

8. Inner surface of the calyx-lobes glabrous or with a few scattered hairs, often with large glandular dots; small-flowered species, the disc 1.3-2 (rarely 2.5) mm. wide; style (as far as known) 5 mm. long or less.
9. Upper leaf surface with 5-8 large convex glandular dots per square millimeter; principal veins impressed . . . . . *M. pertusa* DC.
9. Upper leaf surface without apparent glands, or with minute impressed glands; veins not impressed, or the laterals or midvein somewhat so.
10. Upper leaf surface thickly but minutely impressed-punctulate; lateral veins (15-) 20-25 pairs; inflorescence often with the principal branches from near the base . . . . . *M. fascicularis* Berg.
10. Leaves not impressed-punctulate; lateral veins 10-15 pairs; inflorescence usually not branching from near the base.
11. Lateral veins impressed, 10-12 pairs, much stronger than the intermediate ones; midvein hairy, flat or somewhat convex above; inflorescence hirsute with yellowish hairs up to 1 mm. long; hypanthium elongate in bud, with about 10 narrow longitudinal ridges . . . . . *M. ambivalens* McVaugh.
11. Lateral veins not impressed, often slightly elevated in drying, about 12-15 pairs, these often little stronger than the intermediate ones; midvein glabrous or pubescent, sulcate or slightly impressed; inflorescence sparingly short-pubescent (rarely hirsutulous); hypanthium narrowly conic in bud, not ridged. [Includes *M. fallax* (Rich.) DC., and vigorous forms of *M. splendens* (Sw.) DC.]
8. Inner surface of the calyx-lobes appressed-pubescent; small- or large-flowered species; style various.
12. Lower leaf surface finely bullate; pubescence of inflorescence soft, ochraceous or rusty . . . . . *M. deflexa* (Poir.) DC.
12. Lower leaf surface smooth or verruculose, not bullate; pubescence various.
13. Branches of the inflorescence, and the hypanthium, abundantly tomentose or hirsutulous with reddish hairs.
14. Inflorescence rufous-tomentose; leaves 10-15 cm. long, broadly and bluntly acuminate, or obtusely pointed, lustrous and nearly glabrous beneath, with prominent large glands . . . . . *M. atrorufa* McVaugh.
14. Inflorescence pale rufous-hirsutulous with hairs of different lengths intermixed; leaves 12-26 cm. long, abruptly acuminate, dull and pale beneath, eglandular but with numerous appressed hairs . . . *M. egensis* (Berg) McVaugh.
13. Branches of the inflorescence, and the hypanthium, with white or yellow, appressed or spreading, mostly straight hairs; hairs sometimes confined to the hypanthium and then occasionally reddish or tawny.
15. Lateral veins, and often the marginal vein also, impressed on the upper leaf surface [see also *M. madida*, a large-leaved species in which the lateral veins may dry as fine lines slightly below the surface level].
16. Leaves hirsute beneath, at least on the veins, with soft yellow hairs up to 1 mm. long; inflorescence similarly hirsute with spreading or ascending hairs; lateral veins about 10 (rarely -15) pairs; disc 3-3.5 mm. wide.  
*M. mollis* (HBK.) DC.
16. Leaves sparingly appressed-pubescent beneath, or with a few long hairs on the veins; inflorescence sparingly hispidulous to appressed-pubescent with short hairs; lateral veins mostly more than 15 pairs.
17. Leaves rounded, obtuse, or emarginate at apex, middle-sized (mostly less than 15 cm. long), relatively broad (mostly not more than twice as long as wide).
- 17a. Calyx-lobes about 1 mm. long; leaves rounded or emarginate at apex, 1.3-1.5 times as long as wide; inflorescence and branchlets sparingly hairy.  
*M. fasciata* McVaugh.

- 17a. Calyx-lobes 2–2.5 mm. long; leaves rounded to obtuse or obscurely apiculate, about twice as long as wide; inflorescence and branchlets velutinous.  
*M. dispar* McVaugh.
17. Leaves markedly acuminate or acute, mostly larger (16–27 cm. long), relatively narrow (mostly 2–4 times as long as wide).
18. Leaves bullate above, between the 15–20 pairs of ladder-like veins; petiole 1.5–2 mm. long; lateral veins prominent beneath near the midvein only; small-flowered species, the disc 1.5–2 mm. wide. . . . . *M. fenestrata* DC.
18. Leaves flat or nearly so in drying; petioles 3–8 mm. long; lateral veins prominent their whole length; large-flowered species, the disc 3–4 mm. wide.
19. Leaves appressed-pubescent beneath; midvein sulcate above; flowers aggregated on very short angular branchlets; hypanthium strongly angled in drying, whitened by thick felted hairs. . . . . *M. pentagona* McVaugh.
19. Leaves nearly glabrous and markedly verruculose beneath; midvein forming a narrow ridge above; inflorescence loosely branched, the flowers mostly in threes on slender branchlets; hypanthium conic, strigose.  
*M. crassimarginata* McVaugh.
15. Lateral and marginal veins not impressed on the upper surface, usually slightly raised in drying.
20. Leaves hirsute beneath, at least on the veins, with soft yellow hairs up to 1 mm. long; inflorescence similarly hirsute with spreading or ascending hairs; disc (2.5–) 3–3.5 mm. wide; lateral veins about 10 (rarely –15).  
*M. mollis* (HBK.) DC.
20. Leaves appressed-pubescent or nearly glabrous beneath; inflorescence appressed-pubescent or short-hirsutulous with hairs less than 0.5 mm. long; disc and veins various.
21. Flowers aggregated near the tips of the panicle branches, those of the terminal clusters sessile or on very short pedicels up to 1 mm. long and nearly as thick; disc 3 mm. wide or less; lateral veins 15–20 pairs.
22. Hypanthium whitened with very short pale felted hairs; disc 2.5–3 mm. wide; leaves 18–23 cm. long; buds 4–4.5 mm. long. . . . . *M. madida* McVaugh.
22. Hypanthium covered thinly by appressed short silky hairs; disc 2–2.5 mm. wide; leaves 7–14 cm. long; buds 3 mm. long. . . . . *M. concava* McVaugh.
21. Lateral flowers of the terminal clusters on slender pedicels 2–6 mm. long; disc 3–4 mm. wide; leaves 16 cm. long or less, with 10–15 pairs of lateral veins.
23. Branches of the inflorescence short-hirsutulous; marginal vein about as strong as the laterals and strongly arched between them.  
*M. albobrunnea* McVaugh.
23. Branches of the inflorescence appressed-strigose or nearly glabrous; lateral veins diminishing distally and usually not forming a distinct marginal vein.  
*M. dichasialis* McVaugh.

### *Myrcia albobrunnea* McVaugh, sp. nov.

Arbor, ochraceo-hirsutula, foliis acuminatis 9–16 cm. longis; venis supra vix manifestis; nervo marginali prominente; paniculis multifloris, rhachi valida 1.5–2.5 mm. lata, floribus ultimis tenuiter pedicellatis; calycis lobis intus extusque pubescentibus; germine hirsuto, disco 4 mm. lato.

A tree 3–8 meters high, the ovate leaves with 10–15 pairs of lateral veins; flowers large, the style 7.5–8 mm. long, the stamens more than 200. Flowers (according to Klug) white and brown. The center of the flower is much depressed (i.e., the hypanthium is prolonged about 1 mm. beyond the summit of the ovary), as in the supposed genus *Aulomyrcia*.

This species strongly resembles *M. dichasialis*, which is a native also of the vicinity of Iquitos, and it is with some hesitancy that I describe them both as new. *Myrcia albobrunnea* differs from *M. dichasialis* in having the branchlets markedly hirsutulous instead of glabrous or sparingly appressed-strigose. The flowers in *M. albobrunnea* are slightly larger, the leaves are less markedly reticulate on the upper surface, the midvein is hairy above, and the marginal vein is well defined although strongly arched between the laterals; the lateral flowers of the terminal triads are somewhat more conspicuously pedicellate in *M. dichasialis*.

Peru, Loreto: Iquitos, elev. 100 meters, woods, *Killip & Smith 27006*, Aug. 3-11, 1929 (F; US); Mishuyacu, elev. 100 meters, forest, Feb.-Mar., 1930, *G. Klug 1030* (F; US 1456120, type).

### *Myrcia ambivalens* McVaugh, sp. nov.

Frutex, ramulis paniculisque pilis flavidis, flexuosis, usque ad 1 mm. longis obsitis; foliis 5-12 cm. longis, acuminatis; paniculis multifloris validis; nervo medio supra plano vel vix elevato; venis utroque latere 10-12, supra impressis; calycis lobis intus glabris; disco piloso, ut videtur 2 mm. lato; hypanthio circiter 10-sulcato.

Leaves ovate, elliptic or obovate, nearly concolorous and eglandular, slightly lustrous above. The type is in bud; the flowers are small: buds 4 mm. long, the calyx-lobes 1-1.5 mm. long, the stamens about 200.

A distinctive species because of the indument, the comparatively strong and few veins of the leaves, and the elongate and sulcate hypanthium.

Peru, Loreto: Yurimaguas, in forest, Nov. 7, 1929, *L. Williams 4706* (F), *4737* (F 624825, type). Univ. of Mich. Neg. 473.

### *Myrcia atrorufa* McVaugh, sp. nov.

Frutex, rufo-pubescentis vel -tomentosus; foliis obtuse acuminatis vel obtusis, subtus lucidis, conspicue glandulosis; paniculis validis, rhachi usque ad 2.5 mm. lata; calycis lobis intus pubescentibus; disco 2.5-3 mm. lato, piloso, concavo.

A shrub 2 meters high with ovate leaves 10-15 cm. long, the foliage distinctive because of the usually bluntly pointed tips of the blades, the coarse reticulum formed by the small veins on the upper surface, and the prominent large glands beneath. The crisped rufous hairs of the branchlets and inflorescence are unlike those of other Peruvian species. Style probably 4 mm. long; stamens 125-150; fruit subglobose, about 1 cm. in diameter.

Peru, Huánuco: Between Huánuco and Pampayacu, *R. Kanehira 17*, Jan. 30, 1927 (A; F; GH). Puno: Prov. Carabaya, trail from Santo Domingo to Chabuca mine, elev. 1,900 meters, moist open

places with dense vegetation, much fog and rain, *R. D. Metcalf* 30671, May 30–June 1, 1942 (US 1876047, type).

***Myrcia bipennis*** (Berg) McVaugh, comb. nov. *Myrciaria bipennis* Berg, *Linnaea* 31: 259. ?1862.

A most distinctive species, but quite out of place in the genus to which Berg assigned it. The seeds in the recent collections made in Amazonian Brazil by Holt & Blake (no. 556) and in Venezuela by Williams (no. 14763) are definitely myrcioid. No flowering material was available to Berg, and apparently none has been collected since his time; the immature buds on the type specimens (Spruce, no. 3770) suggest the genus *Marlierea*, and the morphology of the inflorescence suggests *Marlierea* more than *Myrcia*. The hypanthium on the mature fruit, however, is straight-sided within and with a definite rim (as in the *Aulomyrcia* group of *Myrcia*), and the calyx-lobes are well formed, not irregularly split at base as in *Marlierea*.

***Myrcia concava*** McVaugh, sp. nov.

Arbor, paniculis multifloris, strigosis, 7–11 cm. longis, rhachi valida, usque ad 2 mm. lata; foliis acuminatis, 7–14 cm. longis; venis utrinque prominulis, non impressis; floribus subsessilibus, germine piloso, disco 2–2.5 mm. lato, hypanthio extus sericeo-strigoso, calycis lobis intus pubescentibus.

A tree 6–8 meters high with elliptic or ovate leaves about 2.5 times as long as wide; buds 3 mm. long; hypanthium-base not attenuate, but abruptly contracted into the pedicel; style 4.5 mm. long; stamens about 150.

A species which is separated by no very obvious characters from those of the *Myrcia fallax-splendens* complex, but which differs from these in its short, stout inflorescence, its conspicuous calyx-lobes, which are pubescent within and concave and spreading as the petals fall, and its sparingly strigose and broad-based hypanthium.

Peru, Loreto: Mishuyacu, near Iquitos, forest, elev. 100 meters, *G. Klug* 454 (F; NY; US), 800 (F; NY; US 1455791, type).

***Myrcia connata*** McVaugh, sp. nov.

Frutex 5–6 m. altus, strigosus; foliis sessilibus lanceolatis, 9–16 cm. longis, cordatis; nervo medio supra impresso; venis utroque latere 12–15, inconspicuis; paniculis paucifloris validis; calycis lobis intus pilosis; disco 3 mm. lato, piloso, depresso.

A shrub 5–6 meters high, the branchlets, leaf-buds and inflorescence (especially the calyx and hypanthium) strigose with straight yellowish hairs up to 0.5 mm. long; at least the young leaves sparingly strigose beneath; leaves sessile, lanceolate, 3.5–5 cm. wide, 9–16 cm. long, about 2.5–4 times as long as wide, acute

or obscurely acuminate, blunt at very tip, cordate at base, the auricles of opposite pairs overlapping; midvein impressed above, prominent beneath; lateral veins 12-15 pairs, slender, inconspicuous on both sides, more prominent beneath; marginal vein about equaling the laterals and arched between them, 3-5 mm. from the margin; small veins markedly reticulate in prevailing right-angled patterns; blades somewhat lustrous above, paler and dull beneath, the glandular dots scarcely apparent; inflorescence a panicle 4-7 cm. long, about 12-flowered, once- or twice-compound, the peduncle 2.5-4.5 cm. long, 2 mm. wide below the first node; lower branches of the panicle up to 1.2 cm. long; flowers sessile; buds 4-6 mm. long, the hypanthium about 2 mm. long, heavily appressed-hairy; calyx-lobes 5, broadly rounded, appressed-hairy on both sides, 1.3-1.5 mm. long, 2.5 mm. wide; disc about 3 mm. wide, sunken, the hypanthium prolonged 1-1.5 mm. beyond the summit of the ovary; style probably about 10 mm. long; stamens 150-200, 7-8 mm. long, the anthers 0.6 mm. long; petals hairy outside, about 7-8 mm. long and 5 mm. wide; fruit fleshy, about 1 cm. in diameter, a little longer than wide.

Bolivia, La Paz: Prov. S. Yungas, basin of Río Bopi, San Bartolomé (near Calisaya), elev. 750-900 meters, July 1-22, 1939, *B. A. Krukoff 10382* (NY, type; US; Y).

***Myrcia crassimarginata* McVaugh, sp. nov.**

Arbor, ramulis paniculisque pilis brevibus ochraceis puberulentis, ramulis novellis velutinis; foliis acuminatis, subtus minute siliceo-verruculosis, venis impressis; nervo marginali prominente, nervo medio supra elevato planiusculo; paniculis multifloris validis, rhachi usque ad 3 mm. lata; floribus ultimis tenuiter pedicellatis; germine piloso; disco 3-4 mm. lato; calycis lobis intus strigosis.

A tree 5 meters high, the leaves elliptic, 16-20 cm. long, 2-2.5 times as long as wide; the foliage is characteristic because of the prominent and strongly impressed veins, and the ridge formed by the midvein on the upper leaf-surface. Flowers large, the buds 5 mm. long; style 6-8 mm. long; stamens about 300.

A collection made by Tessmann (no. 4319), at the mouth of Río Santiago, on high land, is apparently the same species, but in the specimen seen (at NY) the leaves are appressed-pubescent and smooth beneath (not verruculose).

Peru, Loreto: Fortaleza, near Yurimaguas, forest, elev. about 140 meters, Dec., 1932, *G. Klug 2821* (A, type; F; G; GH; NY; US).

***Myrcia dichasialis* McVaugh, sp. nov.**

Arbor, foliis ovatis brevi-acuminatis 8-15 cm. longis, venis supra non impressis, longiori a margine distantia arcuatim unitis; paniculis multifloris validis, rhachi 2-2.5 mm. lata, ramulis appresse-strigosis vel subglabris, floribus ultimis tenuiter pedicellatis; germine hirsuto; disco 3-4 mm. lato; calycis lobis intus pubescentibus.

Perhaps a shrub, or a tree up to 10 meters high, with ovate leaves 2-3 times as long as wide, the marginal vein usually not distinct from the laterals which diminish distally as they arch inward and fuse with the next succeeding ones. Flowers large; style about 7 mm. long; stamens about 200.

The distinctions between this species and *M. albobrunnea* are mentioned above, in the discussion following the description of that species.

Peru, Loreto: Iquitos, *Mexia* 6508 (F; G; US). Gamitanacochoa, Río Mazán, *J. M. Schunke* 134 (A; F 997268, type; US), 188 (A; F; US). Stromgebiet des Ucayali von 10° S. bis zur Mündung, *G. Tessmann* 3411 (G). Along Río Itaya, *L. Williams* 91 (F).

### *Myrcia dispar* McVaugh, sp. nov.

Arbor velutina, paniculis ramulisque dense pilis aureo-flavidis usque ad 0.8 mm. longis obtectis; foliis obtusis vel breve apiculatis, 10–15 cm. longis, subtus minute siliceo-verruculosis strigosisque; venis impressis; nervo marginali supra non impresso; paniculis circiter ut videtur 20-floris, validis, rhachi usque ad 2.5 mm. lata; floribus sessilibus; germine piloso; disco 3 mm. lato; calycis lobis intus strigosus, 2–2.5 mm. longis.

A tree said by Krukoff to be 45 feet high; leaves coriaceous, elliptic to ovate or obovate, very inconspicuously if at all acuminate, about twice as long as wide; panicles stout and few-flowered, notably shorter than the leaves, even in fruit retaining considerable amounts of the indument which covers the branchlets; fruit globose, 1–1.5 cm. in diameter, crowned by the erect calyx; flowers not seen but apparently large for the genus.

Differs from other known species in the short, stout inflorescence, relatively large and few flowers, coarsely veined blunt leaves, and copious distinctive indument. It is associated in the key with *Myrcia fasciata*, but it bears little resemblance to that species except in the key characters. Its actual relationships are not apparent to me.

Brazil, Acre: Basin of Rio Juruá, upper Rio Jurupary, Lat. 8°–9° S., Long. about 70° W., on terra firma, July 15, 1933, *B. A. Krukoff* 5232 (NY, type).

*Myrcia egensis* (Berg) McVaugh, comb. nov. *Aulomyrcia egensis* Berg, in *Mart. Fl. Bras.* 14, pt. 1: 99. 1857. *A. macrophylla* Berg, in *Mart. l.c.*

The type of *A. egensis*, Poeppig's no. 2551, from Ega, Brazil, bears immature fruit. Except for somewhat shorter petioles it seems not to differ significantly from a flowering specimen collected by Klug (no. 3569) in Peru. I have not made a direct comparison between the type of *A. macrophylla* and more recently collected materials, but from notes made upon the type in Munich in 1954, and from a photograph of it (F.M. Neg. 19818), I believe it to be conspecific with the other two collections cited above.

***Myrcia fasciata* McVaugh, sp. nov.**

Arbor strigosa, foliis rotundo-ovatis, coriaceis, venis impressis; paniculae ramulis compressis, pedunculo superne usque ad 3-4 mm. lato; germine piloso; disco circiter 2.5 mm. lato; hypanthio pilis plurimis atro-fuscis obsito; calycis lobis intus pubescentibus.

A tree to 12 meters high, with lustrous coriaceous broad leaves which are rounded or emarginate at apex; flowers about 25, in small groups near the tips of the much-flattened panicle branches; mature flowers not seen, but the buds 2 mm. long; fruit subglobose, about 1 cm. in diameter.

Known only from the following collections, one of which bears very immature buds, and the other nearly mature green fruit.

Ecuador, Azuay: Forested slopes between Cruz Pamba and Loma de Canela, in region of Río Sadracay, tributary of Río Mehuir, north of Molleturo, elev. 2,315-2,500 meters, June 12, 1943, *J. A. Steyermark 52969* (F 1391179, type), *52961* (F).

***Myrcia huallagae* McVaugh, sp. nov. *M. lanceolata*  $\gamma$  *grandifolia* Berg, in Mart. Fl. Bras. 14, pt. 1: 155. 1857.**

Frutex debilis, hirsutus, pilis rufis erectis usque ad 3.5 mm. longis obsitus; foliis elliptico-lanceolatis, basi subauriculatis; floribus paucis, bracteis bracteolisque persistentibus, ovatis, usque ad 12 mm. longis, suffultis; calycis lobis 4, exterioribus majoribus; disco concavo, 3.5 mm. lato; *M. bracteatae* maxime affinis.

A shrub or woody vine up to 3-4 meters high, with leaves 8-12 cm. long, often 3 times as long as wide; the raceme-like inflorescences are up to 4 cm. long, much shorter than the leaves; style 6 mm. long; fruit ellipsoid, 13 mm. long.

Closely akin to *Myrcia bracteata* and scarcely to be distinguished from that species except by the characters given in the key and by the somewhat larger size of most vegetative and reproductive parts. It is here recognized as a species because it is separated from *M. bracteata* by a series of tangible though perhaps minor features, and because it occupies a restricted geographical range.

Peru, Loreto: Yurimaguas, *Killip & Smith 27976* (US), *28188* (US), *L. Williams 3837* (F), *3888* (F), *4715* (F). In sylvis ad Huallagam, Feb., 1831, *Poeppig 2267* (W, type, and type of *M. lanceolata*  $\gamma$  *grandifolia*).

***Myrcia madida* McVaugh, sp. nov.**

Arbor, minute puberula, foliis acuminatis, 9-23 cm. longis; venis utrinque prominulis, non impressis; paniculis multifloris, validis, rhachi compressa, usque ad 3.5 mm. lata; floribus subsessilibus, germine piloso, disco 2.5-3 mm. lato, hypanthio extus basin versus pilis brevissimis incano-sympilematis obtecto, calycis lobis intus pubescentibus.

A tree to 12 meters high, nearly glabrous but with very small appressed pale hairs which are numerous and densely aggregated on the leaf-buds and the base



of the hypanthium, whitening the surface and in drying somewhat felted together as if from moistening (*madida*, drenched, sodden). Leaves elliptic to ovate or obovate, about 3 times as long as wide; style 6 mm. long; stamens about 125; fruit black, ellipsoid, 10–13 mm. long.

Known only from the following collections:

Peru, Loreto: Río Napo near Mazán, elev. 110 meters, overhanging river, *Mexia* 6448, Jan. 27, 1932 (F 718476, type; G; US). Manfina, upper Río Nanay, *L. Williams* 1088 (F).

*Myrcia obumbrans* (Berg) McVaugh, comb. nov. *Rubachia obumbrans* Berg, in Mart. Fl. Bras. 14, pt. 1: 28. 1857. *Marlierea obumbrans* (Berg) Niedz. in Natürl. Pflanzenfam. III, pt. 7: 76. 1893.

Berg assigned this species to *Rubachia* because of his observation that after anthesis the calyx split longitudinally below the sinuses. I have not been able to confirm this, but the plant bears marked resemblances to other Peruvian species of *Myrcia* and seems to have little in common, either morphologically or geographically, with the 6 south-Brazilian species of *Rubachia*. The genus *Rubachia* is indeed of doubtful validity; Bentham (Benth. & Hook. f. Gen. Pl. 1: 717. 1865) relegated it to the synonymy of *Marlierea*; Niedenzu, as noted above, made the formal transfer of *Rubachia obumbrans* to *Marlierea*. On the basis of the material which I have seen (*Killip & Smith* 28180; *Williams* 4581), I judge that the calyx in this species is that of *Myrcia*, not of *Marlierea*. These specimens, however, are in bud only, and additional collections in flower or young fruit are needed to confirm these observations.

### *Myrcia pentagona* McVaugh, sp. nov.

Arbor, ramulis, paniculis et praesertim hypanthio, pilis mollibus sympilematis, albicatis; foliis acuminatis, 20–30 cm. longis, venis impressis; paniculis multifloris, validis, rhachi usque ad 4 mm. lata; floribus sessilibus, e ramulis subtetragonis; germine piloso, 3–4 mm. lato; hypanthio 5-gono; calycis lobis intus pubescentibus.

A tree 5 meters high, with elliptic leaves 3–4 times as long as wide and 18–25 pairs of strong lateral veins and a strongly impressed marginal vein. The peculiar indument and the strongly angled hypanthium are characteristic. Flowers large: style 6–7 mm. long; stamens about 150.

Peru, Loreto: Florida, Río Putumayo, mouth of Río Zubineta, elev. 180 meters, forest, May–July, 1931, *G. Klug* 2152 (F 668840, type; G; GH; NY; US).

*Myrcia splendens* (Sw.) DC., var. *chrysocoma* McVaugh, var. nov.

Arbor, *M. splendens* maxime affinis, sed distincta: Indumento densiore, longiore, pilis appressis vel ascendentibus, lucidis, sericeis, fulvis vel ochraceis, usque ad 1 mm. longis, calycis lobos superantibus.

This is the silky-pubescent extreme of the forms of *Myrcia splendens*; a somewhat less pubescent form is *M. sericea* Berg, and another is the silky-strigose *M. saxicola* Berg. The present variety is known only from the type collection:

Peru, San Martín: Pongo de Cainarachi, Río Cainarachi (a tributary of the Río Huallaga), elev. 230 meters, in forest, Sept.-Oct., 1932, *G. Klug 2622* (A; F; G; GH; NY; US 1457061, type).

### *Myrcia subglabra* McVaugh, sp. nov.

Arbor, subglabra (gemmis petalisque exceptis), foliis 8–20 cm. longis, apice graduatim acuminatis, basi marginibus decurrentibus; nervo medio supra impresso, venis 15–18 supra planiusculis vel elevatis; laminis utrinque lucidis, grosse pellucido-punctatis; paniculis multifloris validis, rhachi 2 mm. lata; germine pallide piloso; hypanthio glabro, supra germen valde (2 mm.) producto, urceolato; calycis lobis utrinque glabris.

A tree 6 meters high, with strongly flattened branchlets and leaves elliptic-lanceolate or narrowly ovate, 2.5–4 times as long as wide. The plant is readily identified by the prominently glandular and reticulately veined leaves and by the narrowly prolonged neck of the hypanthium, which exceeds in length those of all other species of *Myrcia* known to me. Flowers relatively large: disc 2.5–3 mm. wide; style 6–7 mm. long; stamens about 200; fruit ellipsoid-oblong, about 1 cm. long.

Thus far known only from the Mapiri region of northern Bolivia, where it has been collected several times in the subtropical forested areas, at elevations of 570–850 meters.

Bolivia, La Paz: San Carlos, Nov. 18, 1926, *O. Buchtien 956* (F 928708, type; GH; NY; US), *942* (F; GH; NY; US), *943* (F; MICH; US), *944* (US), *957* (US); Charopampa, *Buchtien 74* (F; G), *1909* (G); San Antonio, *Buchtien 1909* (US); Copacabana, *Krukoff 11099* (F).

## 4. EUGENIA L.<sup>1</sup>

1. Leaves ternate, or opposite at some nodes, 2 cm. long or less; flowers solitary, axillary; northern Peru (Cajamarca) to Colombia . . . . . *E. triquetra* Berg.
1. Leaves opposite, or occasionally sub-opposite.
2. (See second "2," p. 200.) Principal axis of the inflorescence racemously branched, the branches or flowers in decussate pairs or groups; terminal flower of the axis usually wanting; axis elongate to extremely shortened, so

<sup>1</sup> Three species, extra-Peruvian in range, are described below but are not included in the key. These are *Eugenia percrenata* (Mato Grosso, Brazil), *E. valvata* (central Ecuador) and *E. variareolata* (eastern Colombia).

that the flowers may appear to be racemose, or in axillary fascicles, umbels or glomerules; flowers, if occasionally solitary, arising from the base (the lowest radial node) of an abortive axillary bud or from the basal bracteate nodes of new branchlets which are leafy above; bracteoles at base of flower usually broad and persistent, often connate.

3. Racemes irregularly compound, the primary branches cymosely 3 (or rarely 7)-flowered, or 1-flowered; hypanthium on a slender stipe (pseudostalk) often longer than itself, the linear deciduous bracteoles thus well below the flower, and the central flower of the cymose clusters apparently pedicellate. . . . . *E. stipitata* McVaugh.
3. Racemes simple, the primary branches (pedicels) 1-flowered; rarely the racemes racemosely compound, or with 2-3 flowers arising together from a node of the axis, or with 1-2 additional, subordinate racemes arising from the lowest (tangential) nodes of the primary one; hypanthium not slender-stipitate, the bracteoles close to and often surrounding the base of the flower.
4. (See second "4," p. 196.) Axis of the raceme relatively slender and elongate, 3-5 cm. long or more; if shorter, then the internodes much longer than the diameter of the axis, and some or all of them 5 mm. long or more.
5. Axis of the raceme 1.5 cm. long or less, the ascending slender pedicels often as long as, or longer than, the axis; inflorescence appressed-strigose or -silky. [Includes *E. biflora* (L.) DC., *E. inundata* DC., and *E. macrocalyx* (Rusby) McVaugh.]
5. Axis of the raceme 2 cm. long or more or, if shorter, the pedicels 4-7 mm. long, widely spreading and much shorter than the axis; pubescence and foliage various, the leaves neither mucronate nor small and obovate-cuneate.
6. Hypanthium glabrous without, the plants nearly glabrous, usually finely pubescent in the inflorescence; small-flowered species with slender, loosely flowered racemes.
7. Lateral veins of the leaves 12-15 pairs, wide-spreading and nearly straight, the marginal vein nearly straight between the laterals and amply differentiated from them, 2-4 mm. from the margin; inflorescence closely appressed-pubescent, the calyx-lobes and bracteoles fimbriate-ciliate.  
*E. calva* McVaugh.
7. Lateral veins 10 pairs or fewer, curved and ascending, at least the basal ones diminishing distally and not forming a definite marginal nerve; inflorescence glabrous, or finely hispidulous, or with minute appressed dibranchiate hairs; calyx-lobes and bracteoles sparsely short-ciliate. . . . . *E. florida* DC.
6. Hypanthium, at least the base, thickly strigose or pubescent without; plants variously pubescent, the inflorescence usually markedly so; flowers and racemes various.
8. Leaves rounded or obtuse at tips, broadly elliptic-ovate, 7 cm. long or less; plants densely ferruginous-tomentose; flowers up to 4 pairs in a stout raceme 2 cm. long, or some flowers solitary near the base of new leafy shoots.  
*E. racemiflora* Berg.
8. Leaves usually markedly acuminate, relatively narrow and more than 7 cm. long; plants various, not ferruginous-tomentose (in *E. atroracemosa* rufous-velutinous); flowers all racemose.
9. Bracts, bracteoles and calyx-lobes thickly beset with dark raised rounded glands, but inconspicuously if at all pubescent.
10. Pubescence of appressed reddish-brown, partly dibranchiate hairs, intermixed with shorter erect hairs; connate bracteoles forming an involucre-like cupule 2.5 mm. across; larger calyx-lobes 2.5 mm. long; style 5-6 mm. long; stamens about 100; coastal Ecuador (and Peru?) . . . . . *E. pustulescens* McVaugh.

10. Pubescence of appressed grayish-white hairs; cupule 4 mm. across; calyx-lobes 4 mm. long; style 8 mm. long; stamens 250-300; Amazonian Peru.  
*E. polyadena* Berg.
9. Bracts, bracteoles and calyx-lobes not at all glandular or inconspicuously so, but variously and often conspicuously pubescent.
11. Midvein elevated above in a narrow median line; inflorescence slender, the axis mostly not more than 1 mm. thick, closely appressed-pubescent with reddish brown mostly dibranchiate hairs . . . . . *E. dibranchiata* McVaugh.
11. Midvein impressed; inflorescence various.
12. Axis of the raceme slender, 0.5-1 mm. thick (measured just below the lowest node); leaves mostly less than 10 cm. long; flowers small, the disc 2 mm. wide or less.
13. Leaves tomentose beneath, sub-vernigose and rough above, with many glandular dots . . . . . *E. curvipilosa* McVaugh.
13. Leaves glabrous or essentially so at maturity, the upper surface smooth, rather dull, eglandular . . . . . *E. limbosa* Berg.
12. Axis of the raceme stouter, 1-2 mm. thick (measured just below the lowest node); leaves mostly more than 10 cm. long; flowers larger, the disc 2.5 mm. wide or more.
14. Lateral and marginal veins impressed above, prominent beneath.
15. Lateral veins 8-12 pairs; leaves caudate-acuminate; disc 6 mm. wide; veins of the lower leaf surface appressed-pubescent with tawny hairs.  
*E. longicuspis* McVaugh.
15. Lateral veins about 15-20 pairs; leaves moderately acuminate; disc 3-3.5 (-6) mm. wide; veins of the lower leaf surface velutinous with erect rufous hairs . . . . . *E. atroracemosa* McVaugh.
14. Lateral veins (about 15-20 pairs) and marginal vein elevated slightly but inconspicuous on both surfaces, the blades flat; disc 2.5-3 mm. wide; lower leaf surface, including veins, with very short, closely appressed colorless hairs . . . . . *E. riparia* DC.
4. (See first "4," p. 195.) Axis of the raceme much abbreviated, 2 cm. long or usually much less; if more than 1 cm. long the nodes approximate and the internodes 3 mm. long or less, and hardly longer than the thickness of the stout angled rachis; flowers sometimes solitary at the lowest nodes of new leafy branchlets, and in axillary clusters or short racemes on the same plant.
16. Leaves markedly bullate, large and broad (5-10 cm. wide), elliptic to obovate; racemes mostly 10-18 mm. long, the axis quadrangular, with up to 8-13 pairs of slender-pedicellate flowers . . . . . *E. tetrasticha* Berg.
16. Leaves flat, or the principal veins impressed above; blades variously shaped.
17. Outer corky layers of the petiole irregularly loosening and flaking off, the whole much roughened and appearing 3-5 mm. thick; leaves large, 20-35 cm. long, 3-5 times as long as wide; flowers clustered on old wood, the axis 4 mm. long or less.
18. Leaves mostly oblanceolate, cordate-auriculate and subsessile (petiole 3-5 mm. long and about as thick); lateral veins about 15; midvein impressed above; calyx-lobes 4-5 mm. long . . . . . *E. multiramosa* McVaugh.
18. Leaves elliptic-oblong, rounded at base, the petiole 10-18 mm. long and 3-4 mm. thick; lateral veins 20-30; midvein convex above; calyx-lobes 6-8 mm. long . . . . . *E. tumulescens* McVaugh.
17. Petiole smooth or wrinkled, not thick and exfoliating, rarely more than 2 mm. thick; leaves and flowers various.
19. Large-leaved, large-flowered, coarse species (leaves 23-35 cm. long or more; petioles 2-4 mm. thick; buds 1-2 cm. long; anthers 1-1.8 mm. long).

20. Lateral veins 25-30 pairs; marginal vein about as strong as the laterals; leaves about 4 times as long as wide; buds probably 2 cm. long, the suborbicular calyx-lobes up to 15 mm. long; bracteoles elliptic, probably deciduous.....*E. scalariformis* McVaugh.
20. Lateral veins 9-12 pairs, prominent and ascending but diminishing distally and scarcely forming a marginal vein; leaves 2.3-3 times as long as wide; buds about 1 cm. long, the triangular or oblong calyx-lobes 4-6 mm. long; bracteoles obovate, enveloping the bud, their narrow connate bases forming a collar about the pedicel.....*E. myrobalana* DC.
19. Leaves usually smaller, or with a definite marginal vein; flowers various, the buds mostly less than 1 cm. long; bracteoles usually small and persistent.
21. Calyx-lobes foliaceous, elongate, erect, 7-9 mm. long at anthesis, separated by broad rounded sinuses; leaves 9-18 cm. long, with about 10 pairs of veins; anthers 0.3 mm. long.....*E. macrocalyx* (Rusby) McVaugh.
21. Calyx-lobes not or scarcely foliaceous, mostly broad, concave and imbricate; if more than 6 mm. long the margins variously connate or overlapping and the anthers 1-1.5 mm. long; leaves various.
22. Leaves with a glabrous cartilaginous margin (visible from above), this formed by a heavy convex vein about twice as thick as the lateral veins; blades elliptic-oblong, 6-8.5 cm. wide, 12-14 cm. long; plants velutinous with coarse reddish-brown hairs; flowers in sessile glomerules.  
*E. percincta* McVaugh.
22. Leaves without a heavy vein at the margin; plants not coarsely rufous-velutinous; flowers various.
23. Calyx-lobes large (the larger ones 5-8 mm. long or more), often as broad as long, much imbricated but distinct from the first, glabrous within; flowers probably always in sessile clusters on old wood.
24. Inflorescence minutely appressed-pubescent with glistening brown hairs; leaves papillose-roughened above; style 9-10 mm. long.  
*E. tenuimarginata* McVaugh.
24. Plants glabrous except the ciliate margins of the perianth lobes and bracteoles; leaves smooth above; style 15 mm. long or more.
25. Leaves 8-14 cm. wide and about 1.5 times as long; disc 4-5 mm. wide; anthers 2-2.3 mm. long.....*E. chartacea* McVaugh.
25. Leaves 4-7.5 cm. wide and 3-3.5 times as long; disc 6-7 mm. wide; anthers 1-1.3 mm. long.....*E. illepida* McVaugh.
23. Calyx-lobes smaller (the larger ones 6 mm. long or less) or if longer (up to 9-10 mm. long), then oblong, usually hooded at the tips and loosely connate in the bud; inner surface of calyx-lobes glabrous or pubescent; flowers various.
26. Bracteoles early deciduous (just before, or usually much before anthesis) or wanting (unknown in *E. quebradensis*), subulate or linear or sometimes lanceolate to ovate, narrowed at base, not connate.
27. Inflorescence, especially the hypanthium, heavily pubescent or tomentose with gray, white, or light yellowish hairs.
28. Branchlets and inflorescence tomentose with crisped, matted hairs; flowers sessile in small clusters; leaves lanceolate, 0.8-1.5 cm. wide, 5-6 times as long; Lambayeque.....*E. quebradensis* McVaugh.
28. Branchlets and inflorescence strigose or velutinous, the hairs mostly straight and ascending; flowers pedicellate; leaves ovate to elliptic or oblong.
29. Leaves 2-6 cm. long; flowers mostly 1-2 pairs, often from the lowest axils of new leafy branches.

30. Bracteoles ovate or lanceolate, blunt; pedicels, hypanthium and calyx velutinous; Junín . . . . . *E. barbata* McVaugh.
30. Bracteoles subulate; hypanthium closely strigose, the pedicel sparsely so, the calyx glabrate; Bolivia . . . . . *E. mandonii* McVaugh.
29. Leaves 8–24 cm. long; flowers up to 6 pairs in axillary racemes; bracteoles subulate; Amazon basin . . . . . *E. prosoneura* Berg.
27. Hairs of the inflorescence red or copper color or dark purplish brown.
31. Hairs coarse, dark purplish brown; leaves narrowly elliptic, 14–24 cm. long.  
*E. gomesiana* Berg.
31. Hairs slender, reddish or pale copper color; leaves broader, mostly less than 15 cm. long.
32. Bracts 1 mm. long, broadly rounded at tips and convex on the backs, inconspicuous; calyx-lobes 2.5 mm. long, pubescent except at tips, triangular, the long points longer than the corolla in bud . . . . . *E. aerea* McVaugh.
32. Bracts elongate, 1.5–7 mm. long, delicate, loosely imbricated in 4 ranks at the bases of racemes and new shoots; calyx-lobes short and broadly rounded, 1.5 mm. long, glabrous both sides, much shorter than the corolla in bud . . . . . *E. patrisii* Vahl.
26. Bracteoles persistent, usually until after the fruit falls, lanceolate or broader, broad-based, often connate and involucre-like.
33. Calyx-lobes oblong or elliptic, longer than the petals in bud, hooded and thickened at tips, connate in bud below the middle but separating and reflexed at anthesis, glabrous within; anthers 1–1.5 mm. long.
34. Buds 12–15 mm. long; calyx-lobes 8–10 mm. long in flower; stamens 300 or more . . . . . *E. schunkei* McVaugh.
34. Buds 9 mm. long or less; calyx-lobes 3–6 mm. long in flower (up to 9 mm. long in fruit); stamens 75–175.
35. Lateral veins about 20 pairs; buds 6 mm. long, closed at the tip; pedicels 8–20 mm. long . . . . . *E. hexovulata* McVaugh.
35. Lateral veins 6–15 pairs; calyx-lobes distinct in the bud at least distally; pedicels 2–8 mm. long (or a little more in fruit).
36. Buds 4.5–5 mm. long; calyx-lobes 3–3.5 mm. long; style 6–7 mm. long.  
*E. cuspidifolia* DC.
36. Buds 6–9 mm. long; calyx-lobes 3.5–6 mm. long (to 9 mm. in fruit); style (unknown in *E. acrensis*) 10 mm. long.
37. Calyx permanently velutinous; lateral veins 12–15 pairs, the basal not strongly ascending; leaves with numerous small convex glands above.  
*E. acrensis* McVaugh.
37. Calyx glabrate; lateral veins 6–10 pairs, the basal ones often strongly ascending and not forming a definite marginal vein; leaves eglandular and very smooth above . . . . . *E. feijoi* Berg.
33. Calyx-lobes various, not hooded or thickened at the tips or connate below the middle; anthers usually less than 1 mm. long.
38. Inflorescence, including the hypanthium, appressed-pubescent, velutinous or tomentose with reddish or reddish-brown hairs.
39. Bracteoles ovate, 1.5 mm. long, not connate.
42. Calyx-lobes 3–4 mm. long, concave, dehiscent after anthesis; buds 4 mm. long; inflorescence and branchlets closely and finely tomentose with very small dark red-brown hairs; leaves 16–24 cm. long, the arcuate-ascending lateral veins scarcely forming a marginal vein . . . . . *E. curvivenia* McVaugh.
42. Calyx-lobes 4–6 mm. long, flattened, or cucullate and reflexed or spreading after anthesis; hairs appressed-ascending or spreading, lustrous, coppery or pale red, up to 0.5 mm. long; marginal veins about as strong as the laterals.

43. Leaves 4.5-8 cm. long, with 7-10 pairs of lateral veins; calyx-lobes flat and spreading after anthesis, the inner pair truncate, obovate.  
*E. crucialyx* McVaugh.
43. Leaves 15-21 cm. long, with 12-15 pairs of lateral veins; calyx-lobes reflexed and cucullate after anthesis. . . . . *E. acrensis* McVaugh.
39. Bracteoles broadly ovate to rotund, fused by the basal margins and forming an involucre-like cupule beneath the flower.
40. Veins impressed above, elevated and conspicuous beneath; leaves pale and smooth or appressed-pubescent beneath; inflorescence softly rufous-tomentose; margins of the bracteoles and calyx-lobes delicate and fracturing even in bud. . . . . *E. macrophylla* Berg.
40. Veins slightly convex on both surfaces, not conspicuous on either one; lower leaf surface glistening, irregularly cellular-honeycombed or obscured by tiny hairs; inflorescence puberulent with short crisped hairs; bracteoles and calyx relatively tough and unbroken even in age.
41. Calyx-lobes 6 mm. long; leaves 12-19 cm. long, with 12-15 pairs of lateral veins, appearing loosely cellular-honeycombed beneath when viewed with a lens. . . . . *E. heterochroma* Diels.
41. Calyx-lobes 1.5-2 mm. long; leaves 6-13 cm. long, with 6-10 pairs of lateral veins, the lower surface obscured by tiny glistening hairs.  
*E. versicolor* McVaugh.
38. Inflorescence, particularly the hypanthium, glabrous, or pubescent with pale white or yellowish hairs (hairs of young shoots sometimes reddish).
44. Leaves coarsely impressed-punctate and dark above, the lateral veins not at all or scarcely apparent; inflorescence usually with some elongate nodes, appressed-pubescent with pale hairs; blades 10 cm. long or less. [Including *E. biflora* (L.) DC. and *E. inundata* DC.]
44. Leaves not impressed-punctate, the lateral veins usually apparent above, the blades often more than 10 cm. long; nodes of raceme approximate.
45. Midvein elevated above in a sharply defined pubescent ridge; bracts 1-3.5 mm. long, 4-ranked at base of pedicels. . . . . *E. subterminalis* DC.
45. Midvein impressed to convex above; bracts not 4-ranked, usually inconspicuous.
46. Flowers usually 2, one from each side of the axillary bud; leaves mostly 3-6 cm. long, obtuse. . . . . *E. puniceifolia* (HBK.) DC.
46. Flowers fasciculate or in approximate pairs in short racemes, usually 4 or more; leaves mostly larger and acuminate.
47. Inflorescence, including hypanthium, densely hispidulous with erect pale hairs about 0.1 mm. long; raceme up to 8 mm. long, with 2-5 pairs of flowers on pedicels 2-4 mm. long; leaves elliptic, 4-7 cm. long, subcaudate-acuminate.  
*E. micranthoides* McVaugh.
47. Inflorescence, at least the hypanthium, glabrous or sparingly strigose; leaves and inflorescence various.
48. Branchlets, petioles and inflorescence somewhat strigose with white appressed hairs; flowers middle-sized, the buds 5-10 mm. long, the disc 3-4 mm. wide; leaves 9-18 cm. long, 2.5-3 times as long as wide.
49. Buds 7-10 mm. long; marginal vein evident, 2-3 mm. from margin; petiole heavily strigose with hairs up to 0.5-0.8 mm. long, spirally longitudinally furrowed and transversely wrinkled; hypanthium with a few long hairs.  
*E. spruceana* Berg.
49. Buds 5-6 mm. long; marginal vein not distinct from the laterals; petiole nearly glabrous, merely irregularly wrinkled in drying; hypanthium with numerous very fine short hairs. . . . . *E. atrosquamata* McVaugh.

48. Branchlets, petioles and inflorescence glabrous, or pubescent with very small dibranchiolate hairs, minute erect hairs or sparse stiff and ascending reddish or pale hairs; flowers smaller, the buds 5 mm. long or less, the disc 1-2.5 mm. wide.
50. Leaves elliptic-ovate, 5-6 cm. long or less; midvein flat above; plants sparingly strigose with reddish or yellowish hairs up to 0.5 mm. long, the hypanthium glabrous; flowers tiny, the calyx-lobes 1 mm. long, the disc 1 mm. wide; stamens 36 or fewer. . . . . *E. malpighioides* (HBK.) DC.
50. Leaves usually more than 5 cm. long, rarely ovate; pubescence not as above; flowers larger; stamens 60-75 or more.
51. Flowers sessile or nearly so, in clusters on the stems, the pedicels 2 mm. long or less (up to 4 mm. in fruit); styles (as far as known) 10 mm. long or more; hypanthium often obconic. . . . . *E. nigra* DC.
51. Flowers on definite slender pedicels mostly 4-10 mm. long; style mostly less than 10 mm. long; hypanthium mostly campanulate.
52. Midvein on upper surface of leaf flat or convex (then sometimes with a shallow median furrow near base), never narrowly impressed. [Includes *E. egensis* DC., *E. flavescens* DC., *E. dittocrepis* Berg, and *E. ochrophloea* Diels.]
52. Midvein impressed on the upper surface, the actual vein narrow and often obscured in the bottom of a deep fold or furrow.
53. Leaves mostly elliptic-lanceolate, long-pointed, very smooth and glabrous above; lateral veins inconspicuous, sometimes reddish; plant nearly glabrous, the branchlets and pedicels sometimes minutely and sparsely hispidulous.   
*E. schomburgkii* Benth.
53. Leaves elliptic to obovate, shortly and often bluntly acuminate, the veins usually somewhat elevated and forming an evident reticulum on the upper surface; pubescence various.
54. Inflorescence glabrous or minutely pubescent with pale erect hairs; leaves elliptic, blunt-pointed or obscurely acuminate. . . . . *E. tapacumensis* Berg.
54. Inflorescence more or less appressed-puberulent with minute and partly dibranchiolate hairs.
55. Leaves oblanceolate or obovate, 14-18 cm. long, coarsely veiny-reticulate.   
*E. discreta* McVaugh.
55. Leaves elliptic, 7-11 cm. long, finely veiny-reticulate.   
*E. quadrijuga* McVaugh.
2. (See first "2," p. 194.) Flowers solitary or in 3- to many-flowered dichasia, the terminal flower or flowers usually present and sessile; flowers, if solitary, arising directly from the axil of a foliage leaf, not from the lower bracteate nodes of new branches which are leafy above or from the bracteate nodes of abortive axillary buds; bracts and bracteoles mostly linear or lanceolate, scarious, deciduous at anthesis or often much before this.
56. Primary branches of the inflorescence racemously arranged, i.e., in decussate pairs (see first "3," p. 195). . . . . *E. stipitata* McVaugh.
56. Cymes (dichasia) arising directly from the leaf axils, sometimes irregularly branched but the branches not in decussate pairs; bracteoles usually closely subtending the flowers.
57. Flowers 5-merous; leaves coriaceous, yellow-green and vernicose, subsessile, orbicular to broadly ovate, 1.5-7.5 cm. long and wide; Pacific slope, Lima.   
*E. quinqueloba* McVaugh.
57. Flowers 4-merous; leaves various; species mostly of the inter-Andean valleys.
58. Flowers solitary (see second "58," p. 201, for plants with flowers partly solitary and partly in threes or more numerous).



59. Leaves 6 mm. long or less, rigidly coriaceous, vernicose, prominently impressed-punctate on both sides; flowers numerous toward the tips of the branches, on peduncles 2-3 mm. long . . . . . *E. minimifolia* McVaugh.
59. Leaves mostly 1-2.5 cm. long, the texture various; blades not impressed-punctate beneath, sometimes obscurely so above; flowers relatively few, not crowded in the terminal axils, the pedicels (or peduncles) usually much longer.
60. Hypanthium with strong longitudinal angles; leaves often suborbicular, grayish green and closely appressed-pubescent beneath. . . . . *E. oreophila* Diels.
60. Hypanthium not angled; leaves rarely suborbicular, neither grayish green nor closely appressed-pubescent.
61. Hypanthium narrowly obconic, attenuate at base; pedicels 12-20 mm. long; calyx-lobes glabrous within; leaves about 2.5 cm. long, mostly acutely narrowed to both ends. . . . . *E. myrtomimeta* Diels.
61. Hypanthium narrowly campanulate or broader, blunt or rounded at base and usually broader than the markedly compressed pedicel; calyx-lobes appressed-pubescent within (sometimes sparingly so in *E. myrsinoides* with pedicels 2-6 mm. long); leaves various.
62. Leaf margins pale, cartilaginous-thickened and revolute, often irregularly roughened and apparently denticulate because of the prominent glands; flowers always solitary, the pedicels filiform, little compressed, scarcely 1 mm. wide at summit, 10-20 mm. long or more. . . . . *E. cartilaginea* McVaugh.
62. Leaf margins scarcely thickened or roughened, the glands scarcely or not at all apparent in mature leaves; peduncle 1- or 3-flowered, usually markedly compressed, enlarged distally and 1 mm. wide or more.
63. Branchlets coarsely appressed-pubescent but the inflorescence glabrous; peduncle 1- or 3-flowered, if 1-flowered 5-15 mm. long, compressed, up to 1.5 mm. wide; stamens about 250; Cuzco . . . . . *E. indifferens* McVaugh.
63. Branchlets from nearly glabrous to pubescent, if coarsely pubescent the inflorescence not markedly less so; hypanthium densely strigose; peduncle 1- or 3-flowered; stamens 50-100.
64. Leaves mostly less than 1.5 cm. long, obovate, and cuneate at base; flowers all solitary, on pedicels mostly 2-6 mm. long; hypanthium mostly glabrous; northern Peru and Ecuador. . . . . *E. myrsinoides* (HBK.) Diels.
64. Leaves 1.2-4 cm. long, broadly elliptic to ovate, rounded at base; peduncles usually 3-flowered.
65. Branchlets glabrous or sparingly strigose; Ecuador and Colombia. [Includes *E. hallii* Berg and *E. foliosa* (HBK.) DC.]
65. Branchlets densely strigose with straight appressed white or brownish hairs; southern Peru (Arequipa). . . . . *E. ferreyrae* McVaugh.
58. Inflorescence a 3- to many-flowered dichasium, the central flowers usually present and sessile (see first "58," p. 200, for plants with solitary flowers at least in part).
66. Veins of the lower leaf-surface raised in a conspicuous reticulum, the veinlets enlarged, with appearance of having softened and fused; terminal flowers sub-pedicellate. . . . . *E. fimbriata* (HBK.) DC.
66. Veins, if apparent, slender and inconspicuously reticulate; pubescence and inflorescence various; terminal flower usually closely sessile.
67. Inflorescence usually reddish purple, glabrous or essentially so, stout, the peduncle 2-3.5 mm. wide near summit; flowers usually 3-7, large, the style 10-11 mm. long. . . . . *E. rhopaloides* (HBK.) DC.
67. Inflorescence green or brownish in drying, glabrous or variously pubescent; peduncle 2 mm. wide at summit or usually less; flowers smaller, the style 8.5 mm. long or less.

68. Inflorescence 7-flowered (or the smaller ones on the same plant 3-flowered) or repeatedly branched and many-flowered; plants usually markedly strigose or otherwise pubescent, especially the inflorescence and hypanthium.
69. Inflorescence loosely pubescent or tomentose with soft curved or spreading hairs; dichasia usually with more than 7 flowers.
70. Pubescence of whitish spreading hairs 0.5–1 mm. long; leaves mostly obovate, 5 cm. long or less; northern Peru (Huánuco, Cajamarca).  
*E. lindleyana* (HBK.) DC.
70. Pubescence of rufous curved matted hairs; leaves elliptic-ovate, 6.5–11 cm. long; Bolivia. . . . . *E. pearcei* McVaugh.
69. Inflorescence thinly appressed-puberulent or strigose with shorter hairs; leaves and number of flowers variable.
71. Leaves less than 2 cm. long, obovate, cuneate; flowers small (style 3.5–4.5 mm. long), in terminal clusters of 2- to 3-forked cymes; Bolivia.  
*E. osteomeloides* (Rusby) McVaugh.
71. Leaves, if less than 2 cm. long, usually elliptic or suborbicular, rarely cuneate; style 5–7 mm. long; dichasia axillary, 3- to 7-flowered; central Peru to Ecuador.
72. Branchlets thinly appressed-puberulent; leaves elliptic-oblong, 2.5–5 cm. long; disc 3.5–4 mm. wide, the hairy staminal ring prominent; calyx-lobes 2.5–3 mm. long; stamens more than 200. . . . . *E. limbata* (HBK.) DC.
72. Branchlets coarsely pubescent with spreading-ascending hairs; leaves elliptic to suborbicular, 0.5–2 cm. long; disc 2.5 mm. wide, the staminal ring inconspicuous, nearly glabrous; stamens 50–60; central Peru (Ayacucho; Apurímac). . . . . *E. bifurcata* McVaugh.
68. Inflorescence 3-flowered (or if occasionally 7-flowered, glabrous) or the flowers solitary in some or all of the axils; hypanthium glabrous to variously strigose.
73. Hypanthium with strong longitudinal angles; leaves often suborbicular, grayish green and closely appressed-pubescent beneath; Cuzco.  
*E. oreophila* Diels.
73. Hypanthium not angled; leaves various, rarely suborbicular, neither grayish green nor closely appressed-pubescent.
74. Branchlets nearly or quite glabrous, sometimes thinly strigose; northern Peru (Libertad) to Colombia. [Includes *E. compressa* (HBK.) DC., *E. discolor* (HBK.) DC., *E. foliosa* (HBK.) DC., and *E. hallii* Berg.]
74. Branchlets with numerous appressed or spreading stiff hairs up to about 0.5 mm. long; southern Peru (Arequipa; Cuzco).
75. Inflorescence glabrous; stamens about 250; Cuzco. . . *E. indifferens* McVaugh.
75. Inflorescence rather densely strigose; stamens about 50; coastal hills, Arequipa. . . . . *E. ferreyrae* McVaugh.

### ***Eugenia acrensis* McVaugh, sp. nov.**

Frutex, gemmis racemisque pilis lucidis cupreis, adpressis obtectis; foliis 15–21 cm. longis acuminatis, venis utroque latere 12–15; racemis abbreviatis; bracteolis persistentibus, ovatis nec connatis, 1.5 mm. longis; calycis lobis intus glabris, in alabastro corollam cooperientibus, ad florendi tempus reflexis cucullatisque.

A shrub 3.5 meters high, nearly glabrous except for the coppery-velutinous inflorescence and vegetative buds; leaves elliptic, 15–21 cm. long, 2.5–3 times as long as wide, with somewhat impressed veins, the marginal vein about as strong

as the laterals and arched between them; calyx at anthesis splitting in the sinuses down to the level of the staminal ring; stamens about 200; anthers 1.2 mm. long.

This species, with *E. cuspidifolia* DC. and *E. feijoi* Berg, belongs to a somewhat ill-defined group characterized by elongate anthers and hooded and partially or completely connate calyx-lobes which are reflexed and cucullate after anthesis. According to Amshoff (Rec. Trav. bot. néerl. 42: 21. 1949, and in Pulle, Flora of Suriname 3, pt. 2: 58, 105. 1951), these species comprise the genus *Catinga* Aubl. Plants of this affinity are rather abundant in the upper Amazon Basin, but the available collections are few, and the taxonomy of the group is in need of study and clarification. The degree of coherence of the calyx-lobes in the bud varies from almost none in the present species to almost complete union in the newly described *E. hexovulata*, and in specimens identified by Amshoff as *Catinga moschata* Aubl.

Brazil, Acre: Basin of Rio Purus, near mouth of Rio Macauhan (tributary of Rio Yaco), Lat. 9° 20' S., Long. 69° W., on terra firma, Aug. 22, 1933, B. A. Krukoff 5619 (NY, type).

#### ***Eugenia aërosa* McVaugh, sp. nov.**

Arbor, ramulis gemmis paniculisque, pilis pallide cupreis, adpressis obtectis; foliis 13–15 cm. longis acuminatis, venis utroque latere 8–10; racemis abbreviatis; bracteolis deciduis; calycis lobis deltoideis, 2.5 mm. longis, ut videtur valvatis, ad florendi tempus reflexis.

A tree up to 15 meters high with elliptic-oblong leaves 2.3–3 times as long as wide, resembling *E. patrisii* but lacking the 4-ranked imbricated bracts of that species; buds 6 mm. long, pyriform, the long-pointed calyx-lobes exceeding the globe of the petals until anthesis; style 10 mm. long; stamens about 100; fruit ellipsoid, 2.3 cm. long.

The single fruiting specimens, probably belonging to this species, are from Krukoff's no. 6870, from Livramento, Amazonas, Brazil.

Peru, Loreto: Mishuyacu, near Iquitos, forest, elev. 100 meters, May–June, 1930, G. Klug 1535 (F 627573, type; NY; US). Iquitos, Aug., 1925, G. Tessmann 5355 (fragment, F; G; NY).

#### ***Eugenia atroracemosa* McVaugh, sp. nov.**

Arbor, rufo- vel atro-velutina, foliis 11–18 cm. longis acuminatis, venis utroque latere circiter 20; racemis 5–7.5 cm. longis validis, floribus 12–20; disco 3–3.5 mm. lato.

A tree 4 meters high with oblong, ovate or oblanceolate leaves mostly 2–3 times as long as wide, readily recognized by the stout reddish brown or almost black velutinous racemes; flowers moderately large, the buds 7 mm. long; calyx-lobes 2.5–3 mm. long; style 6–6.5 mm. long; stamens 125–150.

Peru, San Martín: Zepelacio, near Moyobamba, elev. 1,100–1,200 meters, Oct.–Nov., 1933, *G. Klug 3368* (A; F 736442, type; GH; NY; US). Brazil, Amazonas: São Paulo de Olivença, *Krukoff 8738* (NY).

### ***Eugenia atrosquamata* McVaugh, sp. nov.**

Arbor vel frutex, appresse pubescens, ramulis petiolisque et racemis, pilis albidis usque ad 0.2 mm. longis obsitis; foliis 9–15 cm. longis obtuse acuminatis; nervo medio supra planiusculo vel concavo; venis utroque latere 6–10, supra planiusculis vel convexis; racemis abbreviatis; alabastris 5–6 mm. longis; calycis lobis inaequalibus, exterioribus 3.5 mm. longis, 4 mm. latis; bracteolis persistentibus glabris, ovatis, 1.5 mm. longis et latis.

A shrub or tree with elliptic leaves about 2.5 times as long as wide, the relatively few lateral veins ascending but usually not forming a definite marginal vein. Flowers 4–6 pairs, middle-sized, with dark contrasting bracts and bracteoles; disc 3 mm. wide; style 7 mm. long; stamens about 100.

This plant is contrasted in the key with *E. spruceana* Berg, which it somewhat resembles, but its actual relationships are obscure to me.

Peru, Loreto: Iquitos, May, 1925, *G. Tessmann 5130* (G, type; NY). Colombia, Amazonas: Trapecio amazónico, Loretoyacu River, elev. 100 meters, March, 1946, *R. E. Schultes 7133* (US). Univ. of Mich. Neg. 439.

### ***Eugenia barbata* McVaugh, sp. nov.**

Ut videtur frutex, ramulis hispidulis, floribus cinereo-flavido-velutinis; foliis 3–5 cm. longis, acutis vel obtusis, venis inconspicuis; racemis abbreviatis, floribus plerumque 2, interdum 4; bracteolis deciduis, obtusis; alabastris 9–10 mm. longis obovoideis.

Probably a shrub, 4–8 meters high with coriaceous broadly elliptic leaves and markedly hairy, rather large flowers in small nearly sessile clusters or solitary at the lower nodes; calyx-lobes suborbicular, 4–5 mm. long; style 9–10 mm. long; stamens about 250.

This plant superficially resembles *E. pungens* Berg, a species which ranges from the lowlands of Bolivia to Uruguay; in *E. pungens*, however, the leaves are normally aristate, and the pubescence is nearly white.

Peru, Junín: Valle del Río San Bernardo, elev. 2,200–2,300 meters, en monte bajo, abierto, compuesto de arbustos, Apr. 2, 1913, *A. Weberbauer 6558* (F; GH; US 1497251 *pro parte*, type; USM). Pariahuanca, elev. 1,800 meters, bosque compuesto de árboles y arbustos, Apr. 8, 1913, *Weberbauer 6594* (F; GH; US; USM).

***Eugenia bifurcata* McVaugh, sp. nov.**

Frutex parvifolius, appresse pubescens vel strigosus; foliis subrotundatis, 0.5–2 cm. longis; floribus subcorymbosis, dichasiis 3–7-floris; stylo 5–7 mm. longo; disco 2.5 mm. lato, fere glabro; staminibus 50–60.

A shrub to 3 meters high, with elliptic to suborbicular, ovate or obovate leaves up to 1.5 times as long as wide, the blades coriaceous and obscurely veined. The rather slender, several-flowered, corymbosely aggregated dichasia 2–3 cm. long are distinctive. Flowers small, the buds 3–4 mm. long.

This species is superficially similar in flower and inflorescence characters to *E. osteomeloides* (Rusby) McVaugh, a Bolivian species, but differs in a number of individually trivial respects, the most notable of which are contrasted above in the key to species.

Peru, Apurímac: Valley of the Río Pampas, Lat. 13° 20' S. to 13° 30' S., elev. 2,600 meters, *A. Weberbauer 5842* (F; GH; US 1497208, type); Pincos, in rain-green shrubland, elev. 2,700 meters, Feb. 19, 1939, *Stork & Horton 10678* (F). Ayacucho: Hills from River Pampas to Ocos, elev. 9,000–10,000 feet, *R. Pearce* (BM).

***Eugenia calva* McVaugh, sp. nov.**

Arbor, appresse pubescens, glabrescens, floribus glabris; foliis 9–15 cm. longis acuminatis, venis utroque latere 12–15, nervo marginali aperto; racemis 4.5–5.5 cm. longis; alabastris 2–3 mm. longis glabris, calycis lobis fimbriatis, intus pubescentibus.

A tree 6 meters high with lance-ovate or elliptic leaves 2.5–3 times as long as wide; because of the glabrous flowers this species is not likely to be confused with any other except *E. florida* DC., from which it differs in the characters set forth in the key to species. Flowers small, the larger calyx-lobes 1.5 mm. long; stamens about 100.

Peru, Loreto: Florida, Río Putumayo, mouth of Río Zubineta, elev. 180 meters, forest, May–July, 1931, *G. Klug 2146* (F 668811, type; G; GH; NY; US).

***Eugenia cartilaginea* McVaugh, sp. nov.**

Frutex vel arbor parvifolius, appresse hispidulus vel gemmis strigosus; foliis 1–2.5 cm. longis, coriaceis, obtusis vel acutis; marginibus pallidis, incrassatis, paulum revolutis, glandulosis; floribus solitariis, axillaribus, vel infimis ex axillis bractearum caducarum oriundis; hypanthio obconico; pedicellis filiformibus 10–20 mm. longis; calycis lobis intus pubescentibus.

A shrub or small tree 4–6 meters high with lustrous ovate or elliptic leaves 1.5–2 times as long as wide, the margins often irregularly roughened by the prominent glands; bracteoles deciduous; flowers rather small, the disc 2.5–3 mm. wide; style 5–6 mm. long; stamens about 75.

This species evidently belongs with the complex which includes some species with 3-flowered dichasia, e.g., *E. discolor* (HBK.) DC.

It is similar on the one hand to *E. orthostemon* Berg, a species which ranges from central Ecuador to Colombia. In *E. orthostemon*, however, pubescence is of more general occurrence on the flowers and pedicels, and the leaves are larger (up to 3.5 cm. wide and 6-7 cm. long); the leaves also lack the cartilaginous margins, prominent glands and mucronate tips which characterize those of *E. cartilaginea*. The latter is similar in many respects, on the other hand, to *E. myrsinoides* (HBK.) Diels, from which it may be distinguished by the characters given in the key.

Peru, Junín: Valley of the Río Mantaro near Huachicna, elev. 2,300 meters, *Weberbauer 6548* (F; GH; NY; US; USM). Huanavelica: Pampas-Salcabamba trail, elev. 2,500 meters, *Stork & Horton 10443* (F 1180795, type).

***Eugenia chartacea* McVaugh, sp. nov.**

Arbor, glabra (disco sparse piloso; calycis lobis petalisque minute ciliatis); foliis late ellipticis vel ovatis, 11-21 cm. longis obtuse acuminatis; venis 7-8, supra convexis sed sulcatis; nervo marginali aperto; petiolo 2 mm. crasso canaliculato; racemis abbreviatis; alabastris 15-18 mm. longis; calycis lobis rigidis, chartaceis, imbricatis, 10-12 mm. longis; antheris 2-2.3 mm. longis.

A tree 15 meters high with very broad leaves about 1.5 times as long as wide, relatively few veins, and small clusters of large flowers produced on old wood. Disc quadrangular, 4-5 mm. wide; style probably 15 mm. long or more; stamens 250-300.

Brazil, Amazonas: Basin of Rio Juruá, on high terra firma, near mouth of Rio Embira (tributary of Rio Tarauaca), Lat. 7° 30' S., Long. 70° 15' W., June 21, 1933, *B. A. Krukoff 4951* (NY, type; US).

***Eugenia crucicalyx* McVaugh, sp. nov.**

Frutex, ramulis gemmisque et racemis pilis appressis, pallide rufulis, obtectis; foliis 4.5-8 cm. longis brevi-acuminatis; venis utroque latere 7-10, utrinque elevatis; racemis abbreviatis; hypanthio paulum angulato, rufo-velutino; calycis lobis 5-6 mm. longis, quam hypanthio 2-3-plo longioribus, intus glabris, ad florendi tempus patentibus; bracteolis 1.5 mm. longis persistentibus, ovatis, distinctis; stylo 8 mm. longo.

A shrub with concolorous, lustrous elliptic leaves about twice as long as wide and a well-defined marginal vein; buds 7-8 mm. long; calyx-lobes in unequal pairs, the inner ones obovate and truncate, the outer ovate-triangular, bluntly pointed; disc 2-2.5 mm. wide; stamens 200-250.

Peru, San Martín: Tarapoto, elev. 360-900 meters, forest, Dec. 4, 1929, *L. Williams 6216* (F 627015, type). Univ. of Mich. Neg. 466.

***Eugenia curvipilosa* McVaugh, sp. nov.**

Frutex, pallide brunneo-pilosus; foliis 4-7 cm. longis breve lateque acuminatis, supra sub-verniosis scabriusculisque, subtus tomentosus; racemis 1-2 cm. longis

tenuibus; floribus 6-12, divaricatis, pedicellis 4-6 mm. longis; hypanthio strigoso, disco 1.5-2 mm. lato.

A shrub 3 meters high, with subcoriaceous elliptic-ovate leaves 1.5-2 times as long as wide, the midvein and the about 10 lateral veins somewhat impressed above; bracteoles persistent, connate, glabrescent, not strongly glandular; flowers small, the buds 4 mm. long, style about 4(?) mm. long, stamens 50-60.

Superficially suggesting *E. limbosa* Berg, but readily differentiated from that species by the leaf and pubescence characters used in the key.

Peru, Cajamarca: Valley of the Río Llaucán, near Pión, elev. 1,700-1,800 meters, June, 1915, A. Weberbauer 7137 (F 628083, type; GH). Univ. of Mich. Neg. 447.

### *Eugenia curvivenia* McVaugh, sp. nov.

Frutex, minute fusco-rufo-tomentosus; foliis 16-24 cm. longis acuminatis mox glabrescentibus; venis utroque latere circiter 10, impressis, arcuatim adscendentibus, apicem versus sensim extenuatis; nervo marginali nullo; racemis abbreviatis; bracteolis 0.8-1.5 mm. longis persistentibus, non connatis; floribus minusculis, alabastris 4 mm. longis, calycis lobis 3-4 mm. longis distinctis, deciduis; disco 2 mm. lato; stylo 5 mm. longo.

A shrub 6 meters high with large, broadly elliptic-ovate coriaceous veiny leaves 2-2.5 times as long as wide, stout dark petioles, and (in proportion to the leaves) very small flowers in small clusters in the axils; stamens 50-60.

Brazil, Amazonas: Basin of Rio Juruá, near mouth of Rio Embira, tributary of Rio Tarauaca, 7° 30' S. Lat., 70° 15' W. Long., June 27, 1933, B. A. Krukoff 5045 (NY, type; US).

### *Eugenia dibranchiata* McVaugh, sp. nov.

Arbor, innovationibus petiolisque et racemis, pilis rufis appressis, partim dibranchiatis, obsitis; foliis glabris vel appresse strigosis, 8.5-14 cm. longis anguste acuminatis; nervo medio supra elevato; venis utroque latere 10-15; nervo marginali interrupto, exiguo; racemis 3-6 cm. longis tenuibus; bracteolis obtusis, connatis, strigosis vel ciliatis, nec glandulosis; disco 2.5-3 mm. lato; stylo 7 mm. longo.

A tall forest tree with inconspicuously veined elliptic leaves 2-3 times as long as wide, and slender axillary racemes with 4-7 pairs of flowers; hypanthium pubescent without; calyx-lobes about 2 mm. long, pubescent on both sides; stamens 60-75, up to 10 mm. long.

This species is apparently most closely related to *E. florida* DC.; the leaves suggest in color and texture those of *E. florida*, but the marginal vein is more uniformly developed in *E. dibranchiata* and the midvein is elevated, whereas in *E. florida* it is flat or somewhat impressed. Specimens suggesting intermediates between these two species have been collected near Palmares, Brazil, not far from the

Peruvian border (Krukoff no. 8322), and also at Zepelacio, near Moyobamba, Peru (Klug no. 3304). These plants have rather well-developed marginal veins, and the pubescence and floral characters are nearly as in *E. dibranchiata* (except that the hypanthium is glabrous in Klug's collection), but the midveins are impressed as in *E. florida* and the young leaves are pubescent along the midvein as in that species. It appears also that *E. dibranchiata* is related to the species complex which includes *E. riparia* DC., but differs in the thin and concolorous leaves, poorly developed marginal vein, elevated midrib, and the shorter and more compact racemes with smaller flowers, relatively longer styles and a far greater proportion of branched hairs.

Peru, Loreto: Caballo-Cocha, Aug. 13, 1929, *L. Williams 2449* (F 615017, type); *Williams 2415* (F), *2416* (F). La Victoria, *Williams 2934* (F). Leticia, *Williams 3145* (F).

### ***Eugenia discreta* McVaugh, sp. nov.**

Arbor, puberulenta, pilis appressis minimis, magna pro parte dibranchiatis, obsita; foliis oblanceolatis obovatisve, 14–18 cm. longis acuminatis; venis utroque latere 10–15, supra elevatis; nervo medio supra impresso; venulis reticulatis; racemis abbreviatis; floribus 4–6 minusculis pedicellatis, alabastris 5 mm. longis; bracteolis ovatis obtusis, 2.5 mm. longis persistentibus connatis; disco 2 mm. lato; staminibus circiter 75.

A tree to 11 meters high with reticulate-veiny leaves 2.5–3 times as long as wide. The leaves tend to become liver-colored beneath in drying but to remain olive-green above. The calyx-lobes are unequal, 1–2.5 mm. long, the style 7–9 mm. long; fruit globose, said to be yellow.

Peru, Loreto: Gamitanacocha, Río Mazán, on river bank, Jan. 15, 1935, *J. M. Schunke 40* (A; F; US 1458946, type). Brazil, Amazonas: Near mouth of Rio Embira, *Krukoff 4884* (US).

The Peruvian species related to the above are poorly represented in herbaria and are consequently difficult to interpret taxonomically. The group may be characterized as having small, slender-pedicellate, glabrous flowers in axillary "glomerules" or "fascicles" (actually very short racemes), nearly glabrous foliage, the midvein impressed above, and the marginal vein relatively far from the margin with a distinct sub-marginal vein beyond it, the fruit globose and 1 cm. in diameter or less. The species in question include *E. schomburgkii* Benth., *E. tapacumensis* Berg, *E. maculata* Berg, and two newly proposed species, *E. discreta* and *E. quadrijuga*. A species of Amazonian Brazil, *E. agathopoda* Diels (Verh. Bot. Ver. Brandenb. 48: 192. 1907), is similar but has larger flowers, longer racemes and longer pedicels.



Because of the small amount of material available for study, no really workable key to the above species can be constructed. The flowers of all the species are so much alike that they provide no good diagnostic characters, and the fruits are almost unknown. In the present treatment *Eugenia schomburgkii* includes chiefly glabrous or nearly glabrous plants with lanceolate and long-pointed leaves which are very smooth on the upper surface; *E. maculata* is distinguished from broad-leaved extremes of *E. schomburgkii*, and from the other species involved, by its relatively well-developed raceme axis which may be as much as 5 mm. long. *Eugenia tapacumensis* is a plant with subcoriaceous, elliptic, bluntly pointed leaves and rather fine, inconspicuous veins; *E. discreta*, known only from the type, has mostly oblanceolate and rather large, reticulate-veiny leaves, and sparse, appressed dibranchiate hairs in the inflorescence. The remaining species, *E. quadrijugata*, is described from four collections which may represent one species or conceivably as many as four. The collections agree very well in most features, but differ in leaf shape from long-elliptic (as in Ule's no. 9661, which suggests *E. schomburgkii*) to broadly elliptic (as in Klug's no. 3153, which suggests *E. tapacumensis*). The pubescence differs slightly from one of the four collections to another, but all have in common the minutely bristly ascending hairs of the pedicels.

### ***Eugenia ferreyrae* McVaugh, sp. nov.**

Frutex, ramulis dichasiisque, et innovationibus, insigniter strigosis; foliis 1-2 cm. longis coriaceis, obtusis vel rotundatis vel emarginatis; nervo medio impresso, venis et nervo marginali inconspicuis; floribus solitariis, vel plerumque pedunculis 3-floris, 7-10 mm. longis, compressis, apicem versus 1 mm. latis; hypanthio ut videtur campanulato, strigoso; calycis lobis intus strigosis vel demum glabrescentibus; staminibus ut videtur circiter 50; embryone cotylis carnosus, discretis.

A shrub with stiff smallish, broadly elliptic, ovate or obovate leaves 1.2-1.9 times as long as wide, sometimes drying bluish- or grayish-green above and dark reddish-brown beneath, the upper surface sparingly impressed-punctulate; calyx-lobes broad and coriaceous, 2-3 mm. long; disc 3 mm. wide; style 7-9 mm. long; fruit probably globose, about 7-10 mm. in diameter, the seeds 1 or 2, about 7 mm. long.

This species is of unusually great interest, as coming from an arid area of southern cis-Andean Peru, where no other native species of Myrtaceae is known to occur. Unfortunately it is known but from two collections, and one fruit only has been available for study. The plant resembles in general habit and leaf morphology some of the Chilean Myrtaceae, e.g., *Reichea coquimbensis* (Barn.) Kausel,

but that species has pentamerous flowers and a very short erect radicle, whereas in *Eugenia ferreyrae* the radicle is accumbent, tapering-cylindrical, about 0.5 mm. thick at base, and 2.5 mm. long. The embryo of *E. ferreyrae*, with its separate cotyledons and prominent radicle, is anomalous in the genus *Eugenia*, *sens. str.*, but apparently agrees well with those of other species of the genus *Ananomis* Griseb. Until a more general survey of fruit and seed characters in *Ananomis* can be made, however, I prefer to refer the present species and its close relatives to *Eugenia*.

Peru, Arequipa: Prov. Caravelí, Lomas de Chaparra, elev. 500–560 meters, Oct. 19, 1946, *Ramón Ferreyra 1483* (USM, type); southeast of the port of Chala, highway to Chaparra, elev. 600–750 meters, Oct. 10, 1955, *Ferreyra 11450* (MICH). Univ. of Mich. Neg. 427.

### *Eugenia hexovulata* McVaugh, sp. nov.

Arbor, appresse pubescens, ramulis petiolis umbellisque, et folii pagina inferiore, pilis densis rufis dibranchiatis obtectis; foliis 12–24 cm. longis acuminatis; nervo medio supra elevato; venis utroque latere circiter 20, utrinque paulum elevatis; nervo marginali aperto; racemis abbreviatis, umbelliformibus, usque ad 15-floris; alabastris 6 mm. longis clausis, obtusis vel obscure apiculatis, hypanthio 8-angulato; calyce ad florendi tempus usque ad verticem germinis in lobos 4 subaequales longitudinaliter direpto; lobis ovatis, acutis, 5 mm. longis, intus glabris; bracteolis persistentibus, appressis.

A tree 15 meters high, with lance-oblong leaves about 3 times as long as wide; disc 2 mm. wide, the staminal ring extending nearly to the depressed center; style 6–7 mm. long; stamens 100–125, the anthers linear, 1–1.2 mm. long; ovary bilocular, the ovules 3 in each locule, collateral.

A plant of uncertain relationships; the small number of ovules is unusual but not unknown in the Eugeniinae. An affinity to *E. feijoi* Berg, *E. cuspidifolia* DC. and their relatives (the supposed genus *Catinga* Aubl.) is suggested by the characters of inflorescence, bracteoles and pubescence, the angled hypanthium, the long narrow anthers and the broad staminal ring. The venation in *E. hexovulata*, however, is anomalous in *Catinga*, and the closed buds of the present species appear to be nearly unique.

Peru, Loreto: Pumayacu, between Balsapuerto and Moyobamba, elev. 600–1,200 meters, forest, Aug.–Sept., 1933, *G. Klug 3194* (F 715574, type; NY). Univ. of Mich. Neg. 462.

### *Eugenia illepida* McVaugh, sp. nov.

Arbor, glabra (disco piloso; bracteolis, petalis et calycis lobis ciliatis); foliis 4–7.5 cm. latis, 12–26 cm. longis, leviter acuminatis; petiolo 1–2 mm. crasso; venis

utroque latere 10–15, utrinque paulum elevatis; nervo marginali aperto; racemis abbreviatis; alabastris 12 mm. longis, supra hypanthium globosis; calycis lobis rigidis, glandulosis, late imbricatis, inaequalibus; lobis interioribus 8 mm. longis, 14 mm. latis; bracteolis persistentibus nec connatis; disco 6–7 mm. lato; antheris 1–1.3 mm. longis.

A tree to 20 meters high, with relatively thin oblanceolate or elliptic leaves 3–3.5 times as long as wide. Flowers in axillary clusters, on pedicels up to 15 mm. long; flowers large, the style 16–17 mm. long, the stamens probably about 300.

Brazil, Acre: Near mouth of Rio Macauhan (tributary of Rio Yaco), Lat. 9° 20' S., Long. 69° W., on terra firma, Aug. 13, 1933, *B. A. Krukoff 5482* (NY; US), Aug. 27, 1933, *Krukoff 5675* (NY; US 1662164, type). *Krukoff's* no. 5482 is represented by unbroken specimens, with the inflorescence in place; in these specimens, the anthers are invariably abnormal because of the attacks of gall-forming insects, and no. 5675, with apparently normal flowers, is designated as type.

### *Eugenia indifferens* McVaugh, sp. nov.

Arbor vel frutex, ramulis foliisque novellis pubescentibus vel strigosis, pedunculo hypanthioque glabris; foliis rigide coriaceis 1.3–3 cm. longis obtusis, maturitate eglandulosis; venis inconspicuis; pedunculis 1–3-floris compressis, 5–15 mm. longis, apicem versus usque ad 1.5 mm. latis; hypanthio late turbinato; calycis lobis intus sericeis; staminibus circiter 250.

A tree or shrub with ovate, obscurely veined leaves as broad as long, or up to twice as long as broad; most of the flowers solitary; buds 3–5 mm. long; disc 3.5 mm. wide, glabrous, the style 6.5–7.5 mm. long.

Peru, Cuzco: Urubamba Valley, Hacienda Fanccac, elev. 2,760 meters, Sept. 10, 1928, *F. L. Herrera 2099* (F; US 1422430, type). Univ. of Mich. Neg. 442.

### *Eugenia longicuspis* McVaugh, sp. nov.

Arbor, ramulis racemisque pilis appresse-adscendentibus obtectis; foliis 18–21 cm. longis, cuspidato-acuminatis; nervo medio supra impresso; venis utroque latere 8–12, supra impressis, subtus strigosis; nervo marginali aperto, supra impresso; racemis 6–9 cm. longis validis; disco 6 mm. lato.

A tree 9 meters high with obovate-oblong leaves about 3 times as long as wide, readily recognized by the caudate tips 2–3 cm. long, and the prominent pattern formed on the lower surface by the lateral and marginal veins. Flowers 3–5 pairs, large for this group of species; bracteoles connate, persistent, together 5 mm. wide; style not seen; stamens more than 200.

The only collection surely referable to this species is the type, which bears flowers from which the corolla, androecium and style have fallen. A specimen which seems intermediate between this and *E. atroracemosa* McVaugh is Williams' no. 4747, from Yurima-

guas, Peru, which bears immature buds and one raceme with half-grown fruits. This has the stout, short-pedicelled racemes, short-acuminate leaves and non-connate bracteoles of *E. atroracemosa*, but the disc (6–7 mm. wide and glabrous at the center), stamens (about 200) and style (9 mm. long) of *E. longicuspis*. The ovules are about 7 in each locule, and collateral. This may represent an undescribed species, but the material is imperfect and is referred with doubt to *E. longicuspis*. A second collection from near Iquitos, Williams' no. 8018, is perhaps also referable to this species, but the leaves tend to be elliptic and are not markedly caudate-acuminate, the upper surface is impressed-puncticulate, the pedicels are 5 mm. long and the disc is 4.5 mm. wide; the fruit, nearly at maturity, is subglobose, about 1.5 cm. in diameter.

Peru, Loreto: Mishuyacu, near Iquitos, elev. 100 meters, forest, Feb.–Mar., 1930, *G. Klug 855* (F; NY; US 1455842, type).

***Eugenia macrocalyx*** (Rusby) McVaugh, comb. nov. *Calycorectes macrocalyx* Rusby, Mem. N. Y. Bot. Gard. 7: 313. 1927.

A distinctive species, but quite out of place in *Calycorectes*, which was described as having the calyx closed in bud, then splitting longitudinally. The present species belongs rather to the genus *Phyllocalyx* Berg, which I believe is better regarded as a part of the inclusive genus *Eugenia*.

***Eugenia mandonii*** McVaugh, sp. nov.

Arbor vel frutex, ramulis floribusque et praesertim hypanthio strigosis; foliis 2–4 cm. longis obtusis acutisve vel subacuminatis; venis utroque latere 5–8 inconspicuis; pedunculis solitariis, 1-floris, oppositis, ex infimis nodis 2 ramulorum hornotinorum oriundis, vel rhachi raro abortiva, abbreviata, efoliata, 1–4-flora; bracteolis subulatis 2 mm. longis strigosis, deciduis; calycis lobis rotundatis 2.5 mm. longis, intus strigosis.

A tree or shrub with small coriaceous elliptic-ovate leaves 2–3 times as long as wide, strigose and vernicose above, with impressed midvein; pedicels 8–16 mm. long, subtended by small foliaceous bracts or much smaller scarious bracts 1.5–2 mm. long; buds 6 mm. long, obovate; disc 4–4.5 mm. wide; style 6.5–9 mm. long; stamens about 200.

Bolivia: Prov. Larecaja, viciniis Ananea, in nemoribus, June, 1856, *G. Mandon 634* (G, type; NY). Univ. of Mich. Neg. 438.

***Eugenia micranthoides*** McVaugh, sp. nov.

Arbor vel frutex, minute pubescens; ramulis racemisque dense pilis erectis 0.1 mm. longis obsitis; foliis ellipticis 4–7 cm. longis subcaudatis supra eglandulosis; nervo medio supra sulcato; venis utroque latere circiter 10, utrinque obscuris;

racemis brevis, 2-8 mm. longis tenuibus, 4-10-floris; pedicellis 2-4 mm. longis; bracteolis persistentibus; calycis lobis 1 mm. longis.

A shrub or small tree with tiny racemes, small flowers and small narrow leaves 2-3 times as long as wide, their narrowly acuminate tips 1-1.5 cm. long; disc about 2 mm. wide; style 4.5-5 mm. long; stamens about 50.

This plant is strikingly similar in characters of pubescence and in morphology of the inflorescence to *E. micrantha* (HBK.) DC., but in that species the leaves are narrower, prominently veined and glandular, the midvein is not impressed above, the flowers are smaller and the bracts are persistent. The type locality of *E. micrantha* is near Honda, in the valley of the Río Magdalena, Colombia. A note at the end of the original description, however (HBK. Nov. Gen. & Sp. 6: 145 [folio ed. 115]. 1823), reads: "Bonplandius haec specimina in Peruvia lecta esse memorat." Apparently this reference to Peru is erroneous, for the species is well known in Colombia but has not been found subsequently in Peru.

Peru, Loreto: Yurimaguas, Parana Pura, in forest, Oct.-Nov., 1929, *L. Williams* 3825 (F), 4102 (F), 4620 (F 623009, type).

### ***Eugenia minimifolia* McVaugh, sp. nov.**

Frutex multiramis compactus, appresse strigosus; foliis 2.5-6 mm. longis vernicosis rigide coriaceis, obtusis, subaveniis, utrinque impresso-punctatis; pedunculis 1-floris solitariis, 2-3 mm. longis.

A much-branched sclerophyllous shrub 2 meters high, with the numerous white flowers abundant toward the tips of the branches; leaves obovate or elliptic, 1.5-2 times as long as wide; buds 3.5 mm. long; calyx-lobes broad, 1 mm. long, glabrous both sides; style 5.5-6 mm. long; stamens about 125.

Peru, Huancavelica: Prov. Tayacaja, hills to the left of the Río Mantaro, above the bridge of Chiquiac, low open mountain sides covered with evergreen shrubs, elev. 2,600-2,700 meters, Mar. 15, 1913, *A. Weberbauer* 6500 (F; GH; US 1497222, type; USM).

### ***Eugenia multiramosa* McVaugh, sp. nov.**

Frutex vel arbor, glomerulis (racemis abbreviatis) puberulis; ramis rufidis, exophloeolongitudinaliter rumpente et secedente; foliis subsessilibus, basi cordato-auriculatis, plerumque oblanceolatis, ut videtur 25-35 cm. longis, 3-5-plo longioribus quam latioribus; nervo medio supra impresso; venis utroque latere circiter 15; petiolo rimoso 3-5 mm. longo, ut videtur 3-5 mm. crasso (exophloeosuberoso soluto); racemis abbreviatis; bracteolis persistentibus 1.5 mm. longis; calycis lobis suborbiculatis, majoribus 4-5 mm. longis; disco 3.5-4.5 mm. lato.

A shrub or small tree, well marked by the nearly sessile, cordate-auriculate and oblanceolate leaves, and by the tendency for the outer cortical layers of the petioles and pedicels to separate irregularly; flowers about 6, on stout pedicels 8-11 mm. long, not large for the size of the leaves, the hypanthium in anthesis

3 mm. long; stamens probably about 300; fruit said to be orange, ellipsoid, about 3 cm. long.

Peru, Loreto: Yurimaguas, along lower Río Huallaga, elev. 135 meters, dense forest, Aug. 23–Sept. 7, 1929, *Killip & Smith 29019* (NY; US 1462448, type); Yurimaguas, *Killip & Smith 28020* (F; NY); Timbuchi, *L. Williams 1017* (F).

***Eugenia osteomeloides*** (Rusby) McVaugh, comb. nov. *Myrtus osteomeloides* Rusby, Mem. Torr. Bot. Club 6: 36. 1896. *M. myrciopsis* O. Ktze. Rev. Gen. 3, pt. 2: 92. 1898. *E. myrciopsis* (O. Ktze.) K. Schum. in Just, Bot. Jahresb. 26, pt. 1: 359. 1900.

This is a *Eugenia* of the affinity of *Ananomis* Griseb., not a member of the Pimentinae. The cotyledons are large, distinct and plano-convex; the radicle is cylindrical and about a third as long as the seed. The type specimens of *Myrtus myrciopsis*, from Santa Cruz, Bolivia, are somewhat more densely pubescent than other plants from the same area. Possibly the number of hairs is related to the fact that Kuntze's plants are in young bud; there do not appear to be other significant differences between *M. myrciopsis* and *M. osteomeloides*.

***Eugenia pearcei*** McVaugh, sp. nov.

Frutex sempervirens, rufo-tomentosus; foliis coriaceis, 6.5–11 cm. longis obtusis, subtus tomentosis; venis utroque latere circiter 10, arcuatum adscendentibus, apicem versus sensim extenuatis, venulis nec incrassatis; dichasio plerumque 7–15-floro, floribus in dichotomis sessilibus; pedunculo 2.5–5 cm. longo, compresso, apicem versus usque ad 2 mm. lato; alabastris 4–5 mm. longis; calycis lobis utrinque tomentosis; stylo 5 mm. longo vel longiore; disco 3–4 mm. lato.

An evergreen shrub 2–3 meters high, with lustrous thick elliptic-ovate leaves about twice as long as wide, impressed-punctate above; flowers middle-sized, the calyx-lobes 3 mm. wide, 1.5–2.5 mm. long; stamens 200–250; petals lightly tomentose without.

A very distinctive species, but unfortunately the only known specimen has been severely damaged by insects.

Bolivia: Hills near Pata, 6,000 feet, Dec., 1864, *R. Pearce* (BM). Univ. of Mich. Neg. 483.

***Eugenia percincta*** McVaugh, sp. nov.

Frutex vel arbor, dense fulvo-velutinus; foliis elliptico-oblongis 12–14 cm. longis, 6–8.5 cm. latis deltoideo-acuminatis, crassimarginatis; racemis perbrevisibus, rhachi subnulla et floribus 4 approximatis; calycis lobis 4–5 mm. longis latisve concavis, imbricatis, utrinque velutinis; bracteolis deciduis; stylo 14–16 mm. longo.

A tree or shrub, well marked by the heavy covering of tawny hairs, the strong cartilaginous margins of the leaves, and the conspicuous glomerules of rather large flowers; disc 4–4.5 mm. wide; stamens about 150.

Brazil, Guaporé: Falls of Madeira, Oct., 1886, *H. H. Rusby 2084* (NY; US 1416665, type). Univ. of Mich. Neg. 453.

### *Eugenia percrenata* McVaugh, sp. nov.

Frutex, subglaber; foliis 6–9 cm. longis caudatis, marginibus conspicue crenatis; nervo medio supra planiusculo vel elevato; racemis 4–10-floris abbreviatis; bracteolis persistentibus; calycis lobis suborbiculatis vel oblongis, 1.5–2 mm. longis; disco 1.5 mm. lato.

A shrub 5 meters high, glabrous except for a few strigose hairs on the bracts and on vegetative buds; leaves elliptic, 2.5–3.5 cm. wide, and 3–3.5 times as long as wide, the apex caudate-acuminate, the base cuneate and attenuate to a petiole 1–1.5 mm. thick and 3–4 mm. long; margins deeply crenate with 6–10 notches on each side, the notches 1 mm. deep with a gland 0.5–0.8 mm. wide at the base of each; midvein flat, or centrally and sharply keeled above, pale and elevated beneath; lateral veins about 12 pairs, obscure above, somewhat raised beneath; marginal veins about equaling the laterals and arched between them, 1–2 mm. from margin; blades when dry dull and dark in color and obscurely gland-dotted above, brown and conspicuously glandular beneath; inflorescence a short axillary raceme, the axis 2–5 mm. long, with 2–5 approximate decussate pairs of flowers; bracts 1 mm. long, ovate, ciliate, rounded on the backs; pedicels 5–10 mm. long, somewhat compressed distally and there 1 mm. wide; bracteoles 0.7 mm. long, persistent and nearly erect, ovate but trough-shaped and so appearing lance-ovate, acute; hypanthium 2 mm. long, constricted at base above the bracteoles; calyxlobes suborbicular or oblong, rounded at apex, strongly reflexed after anthesis, 1.5–2 mm. long and wide; disc about 1.5 mm. wide, somewhat quadrangular; style 3.5 mm. long; stamens about 50, up to 3 mm. long; anthers 0.8 mm. long; petals ovate, 3 mm. wide, 3.5 mm. long, yellowish white (Krukoff); ovary bilocular, the ovules about 15 in each locule, radiating from a centrally affixed placenta.

Brazil, Mato Grosso: Near Tabajara, upper Machado River region, in terra firma, Nov. 18, 1931, *B. A. Krukoff 1368* (MICH, type; NY; US).

This species resembles in habit and in morphology of leaf and inflorescence both *Eugenia egensis* and *E. flavescens*, but it is readily distinguished from these and from other known species by the caudate-acuminate and markedly crenate leaves, and by the reflexed calyxlobes.

### *Eugenia pustulescens* McVaugh, sp. nov.

Arbor vel frutex, plusminusve dense strigosus, pilis ferrugineo-rufidis appressis partim dibranchiatis, etiam pilis erectis brevioribus immixtis, obsitus; foliis 7–9 cm. longis brevi-acuminatis; racemis usque ad 6 cm. longis validis; bracteis bracteolisque et calycis lobis vix pubescentibus, sed glandulis fuscis convexis crebro obsitis; stylo 5–6 mm. longo; staminibus circiter 100.

A shrub or tree with elliptic leaves 2–2.7 times as long as wide, inconspicuously veined. The very prominent glands in the inflorescence serve to distinguish this species from all others except *E. polyadena* Berg, which as noted in the key to species has differences in pubescence and considerably larger flowers, as well as a different geographical range. Buds 5 mm. long; larger calyx-lobes 2–2.5 mm. long; flowers up to about 18.

Ecuador: El Recreo, Prov. Manabi,  $\frac{1}{2}^{\circ}$  S. Lat., *H. F. A. Eggers 15787* (GH; US 1361943, type), *Eggers 14957*, Apr. 29, 1897 (F). Locality uncertain: Fl. H[?uayaquil.] no. 408, [anno] 1803 (Herb. Barbey-Boissier).

The last specimen cited above is of uncertain origin but may have formed a part of the *Flora Huayaquilensis*, of which some specimens were distributed, probably by Pavón. The collector may have been Tafalla, but even this is uncertain. Another specimen of this same species, from the Moricand herbarium and now at Geneva (G), is labelled "Eugenia sp nova, Peru," and in another hand, "Pavon." This is probably one of a considerable series which Moricand received from Pavón in 1827, and which included plants from various parts of America, collected in part by Pavón himself, and in part by others. From the state of preservation of this particular specimen, from its morphology and from its degree of maturity, it appears that the plant originally formed a part of the collection cited above, which is attributed tentatively to Tafalla. The *Flora Huayaquilensis* is known to include species from various parts of what is now Ecuador, including the higher Andes (e.g., *Myrteola microphylla* var. *microphylla*), so that it is impossible to make a definite statement that the above specimens of *Eugenia pustulescens* came from any particular part of Ecuador. In view of the known modern localities where the species grows, however, it seems most probable that the early collection or collections came from the coastal lowlands of Ecuador; this, if true, suggests that the species may justifiably be excluded from the known flora of Peru.

### ***Eugenia quadrijuga* McVaugh, sp. nov.**

Frutex vel arbor, plusminusve appresse pubescens; foliis ellipticis, 7–11 cm. longis obtuse acuminatis; venis utroque latere circiter 10, utrinque elevatis; nervo medio supra impresso; venulis tenuiter reticulatis; racemis abbreviatis; floribus 2–8 pedicellatis, pedicellis minute hispidulis, pilis brevissimis adscendentibus obsitis; alabastris 4.5–5 mm. longis; bracteolis longiusculis, 1.5 mm. longis persistentibus nec connatis; disco 1.5–2.5 mm. lato; staminibus circiter 60–75.

A shrub or tree up to 15 meters high; for discussion of the variability and relationships of this species, see above under *E. discreta*; calyx-lobes up to 2.5–3 mm. long; style 6–8 mm. long; fruit globose or pyriform, probably about 1 cm. in diameter.



Peru, Loreto: Pumayacu, between Balsapuerto and Moyobamba, *G. Klug 3153* (A; F; G; GH; US). Brazil, Acre: near mouth of Rio Macauhan (tributary of Rio Yaco), Lat. 9° 20' S., Long. 69° W., on terra firma, Aug. 21, 1933, *B. A. Krukoff 5594* (NY; US 1664166, type; Y); same locality, *Krukoff 5415* (NY; US). Seringal S. Francisco, *E. Ule 9661* (G; US).

### *Eugenia quebradensis* McVaugh, sp. nov.

Arbor vel frutex, tomentosus, vel gemmis ramulisque novellis sericeo-velutinis, pilis sordidis usque ad 1 mm. longis obtectis; foliis lanceolatis, 5.5–7.5 cm. longis, 5–6-plo longioribus quam latioribus; racemis abbreviatis, floribus majusculis sessilibus glomeratisque; bracteolis ignotis, ut videtur deciduis; calycis lobis rotundatis, 3–3.5 mm. longis; disco 6 mm. lato.

A tree or shrub, with the aspect of some species of *Psidium*, well marked by the tomentum, the narrow rigidly coriaceous leaves and the large sessile flowers; hypanthium 4–5 mm. long and wide, with 4 strong winglike angles; style probably 10–15 mm. long; stamens about 300.

Known only from the type, which is from a botanically little-studied area.

Peru, Lambayeque: Prov. Chiclayo, quebrada del Río Saña, monte seco, Dec., 1928, *N. Esposito s.n.* (USM, type). U. S. Nat. Mus. Neg. 4466.

### *Eugenia quinqueloba* McVaugh, sp. nov.

Arbor pilosa, ramulis dichasiisque pilis appressis vel adscendentibus usque ad 0.8 mm. longis obtectis; pilis pellucidis, luminibus rufidis; foliis subsessilibus, orbiculatis vel late ovatis, supra flavido-viridibus vernicosisque; dichasiis 3–7-floris; alabastris 5–6 mm. longis; floribus 5-meris; calycis lobis inaequalibus, rotundatis, majoribus 3, 3 mm. longis; disco 3–4 mm. lato.

A tree 4–6 meters high, unique in its sessile and often suborbicular rigid leaves up to 7.5 cm. long and wide, its 5-merous flowers in small dichasia, and its isolated position in the Department of Lima. Dichasium up to about 3 cm. long; style 6 mm. long; stamens 75–100; petals white or yellowish (Ferreyra); fruit probably ellipsoid, 1 cm. long or more.

Peru, Lima: Prov. Huarochirí, arriba de San Bartolomé, monte bajo, elev. 2,900–3,000 meters, Nov. 5, 1954, *R. Ferreyra 10417* (MICH, type); same locality, *Ferreyra 10424* (MICH).

A very distinct species of uncertain relationships. Were it not for the 5-merous flowers, the characters of the embryo, placentation and inflorescence would align *E. quinqueloba* perfectly with the group of species that I take to represent the genus *Anamomis* Griseb. Surely *E. quinqueloba* has little affinity to the genus *Myrcianthes*, a small eugenoid group of eastern warm-temperate South America, in

which its 5-merous flowers would place it according to Berg's system. Possibly it is somewhat more closely related to the monotypic Chilean genus *Reichea* Kausel, which has, however, mostly solitary flowers, a very short erect radicle, and apparently somewhat different placentation. (In *E. quinqueloba* the ovules are about 20 in each of the two locules, radially and externally directed from a short, centrally affixed placenta; the testa of the [somewhat immature] seed is free and membranaceous, the cotyledons distinct, fleshy, plano-convex, the radicle accumbent and at least half as long as the cotyledons; for the corresponding details in *Reichea*, see Kausel in *Lilloa* 13: 129-130. 1947.) I have assigned the present species to *Eugenia* in spite of the 5-merous flowers, pending revision and examination of the generic characters of the whole group of Andean species which apparently comprise the major portion of the so-called genus *Ananomis*, as well as the characters of the Chilean genera *Reichea* and *Myrceugenella*. See also some remarks above, under *Eugenia ferreyrae*.

***Eugenia scalariformis* McVaugh, sp. nov.**

Arbor vel frutex; foliis adultis subglabris, 33-35 cm. longis, 4-plo longioribus quam latioribus; venis utroque latere 25-30; nervo marginali aperto, valido, vix arcuato; petiolo 4 mm. crasso, 12-15 mm. longo; ramis annotinis ut videtur floriferis, floribus pedicellatis, ?glomeratis; alabastris ut videtur 2 cm. longis; bracteolis 10 mm. longis, appressis, deciduis; calycis lobis rotundatis, imbricatis concavisque, interioribus 15 mm. longis; staminibus ut videtur circiter 500, antheris 1.5-1.8 mm. longis linearibus.

A shrub or tree with very long elliptic or oblanceolate acuminate leaves with numerous scalariform lateral veins; the inflorescence is densely felted with short flaccid pale brown mostly dibranchiate hairs; hypanthium 8-angled, 10 mm. long; disc 10 mm. wide, glabrous; style 2.5 cm. long; petals 25-32 mm. long.

Superficially resembles *Eugenia tumulescens*, from which it may be distinguished by the smooth petiole, the more numerous veins, the pedicels, which are longer than the hypanthium, and the much larger flowers.

Peru, Loreto: Stromgebiet des Marañón, Santiago Mündung am Pongo de Manseriche, *G. Tessmann 4328* (G, type). F.M. Neg. 23507.

***Eugenia schunkei* McVaugh, sp. nov.**

Arbor, subglabra (gemmis rufo-strigosis; calycis lobis bracteolisque minute ciliatis; disco sparse piloso); foliis (ramulorum terminalium validorum) 14-23 cm. longis acuminatis; venis utroque latere circiter 10, apicem versus sensim extenuatis, superioribus venam marginalem formantibus; racemis abbreviatis; alabastris 12-15 mm. longis pyriformibus; bracteolis 1-2.5 mm. longis persistenti-

bus nec connatis; calycis lobis 8-10 mm. longis oblongis, apicem versus incrassatis cucullatisque, intus glabris, ad florendi tempus reflexis; staminibus 300 vel ultra, antheris 1.5 mm. longis linearibus in alabastro erectis.

A tree 5 meters high with oblong-lanceolate leaves often 3.5 times as long as wide and the marginal vein evident in the distal one-third of the blade; racemes with 5-6 approximate decussate pairs of flowers, often several together on short spurlike excrescences; disc 4 mm. wide; style 12 mm. long.

A species which is evidently allied to *E. feijoi* Berg and others which are sometimes referred to the genus *Catinga*, but with very much larger flowers than any other known species of this group.

Peru, Loreto: Río Mazán, Quebrada Luño, on river bank, elev. 110 meters, Feb., 1935, *José M. Schunke 184* (A; US 1459093, type). Univ. of Mich. Neg. 450.

### *Eugenia stipitata* McVaugh, sp. nov.

Arbor, hispidula; foliorum venis 6-10, arcuatim adscendentibus, inter se arcuatis sed venam marginalem vix formantibus; racemi ramis oppositis, 1-floris, vel ramis dichotomis 3 (vel raro 7) -floris, flore in dichotomiis stipitato; pedicellis 1-floris 10-20 mm. longis, longitudinaliter acutangulatis striatisque; bracteolis 1-2 mm. longis linearibus deciduis; hypanthio turbinato; disco quadrangulato, piloso; calycis lobis rotundatis 4, imbricatis, intus appresse pubescentibus, ad florendi tempus reflexis; germine 4-loculari, ovulis in quoque loculo circiter 10, ut videtur biserialim angulo loculorum interno affixis.

A species of uncertain systematic position, apparently without any close relatives. The branching of the inflorescence appears to be unique among the American species of Myrtaceae. The structure of the ovary suggests that of the Subtribe Pimentinae, but the seeds (known in subsp. *sororia* only) are definitely eugenioid in structure although relatively more numerous than is usual in the Eugeniinae. The species occurs in two well-marked populations, either one of which would probably be described as an independent species if it were found geographically isolated. These populations, described below as subspecies, are readily separated by the characters given in the key, but they have so many qualitative characters in common that they are surely to be considered as conspecific.

1. Folia ovata vel late elliptica, 5-6 cm. lata, 1.8-2.3-plo longiora quam latiora, venis supra impressis, pagina inferiore pilis erectis acutisque et usque ad 0.5 mm. longis crebro obsita; pedicelli plerumque in medio fere, vel infra medium bibracteolati; stylus 7-8.5 mm. longus, glaber; calycis lobi 4-5 mm. longi.  
subsp. *stipitata*.
1. Folia elliptica, 2.5-4.5 cm. lata, 2.2-3.3-plo longiora quam latiora, venis supra vix manifestis, nec impressis; pagina inferiore maturitate glabra, vel venis solum hispidulis, vel pilis minutissimis 0.1 mm. longis crebro obsita; pedicelli 3-5 mm. ultra hypanthium bibracteolati; stylus 5-6.5 mm. longus, basi pilosus; calycis lobi 2.5-3 mm. longi. . . . . subsp. *sororia*.

***Eugenia stipitata*** McVaugh, subsp. *stipitata*. *E. stipitata* McVaugh, as to type.

More markedly hispidulous than the subsp. *sororia*, with larger and broader leaves, more conspicuous veins and larger flowers. Stamens 100–150. The fruit is unknown.

Peru, Loreto: San Antonio, on Río Itaya, *Killip & Smith 29469* (NY; US), *Williams 3397* (F). La Victoria, *Williams 2787* (F). Mishuyacu, near Iquitos, forest, elev. 100 meters, Jan., 1930, *G. Klug 788* (F 624179, type; NY; US). Brazil, Amazonas: Mun. Humayta, near Livramento, *B. A. Krukoff 6591* (NY; US). Univ. of Mich. Neg. 464.

***Eugenia stipitata*** McVaugh, subsp. *sororia* McVaugh, subsp. nov.

Differs from subsp. *stipitata* as noted under that taxon and in the key. Stamens about 75; fruit oblate, velutinous, about 1.5 cm. across; seeds 6–15, reniform, 3–7 mm. long, the embryo completely undivided or the cotyledons slightly separated at the chalazal end; testa membranaceous.

Peru, San Martín: Juanjuí, Alto Río Huallaga, elev. 400 meters, forest, Oct., 1934, *G. Klug 3834* (F; GH, type; US). Tarapoto, *Williams 5486* (F), *5667* (F). Bolivia, ?Beni: Junction of rivers Beni and Madre de Dios, *H. H. Rusby 597* (F; MICH; NY; US). Brazil, Amazonas: Near mouth of Rio Embira, *B. A. Krukoff 4859* (US). Colombia, Meta: Villavicencio, *Bro. Apollinaire Myrt. no. 2* (US). Univ. of Mich. Neg. 474.

***Eugenia tenuimarginata*** McVaugh, sp. nov.

Arbor vel frutex, foliis ramulisque adultis glabris, racemis minute appresse-pubescentibus; foliis 10–14 cm. longis obtuse acuminatis, supra scabrido-papillosis; venis utroque latere 6–8, supra paullum elevatis; racemis abbreviatis; bracteolis connatis persistentibus; alabastris 8–9 mm. longis; calycis lobis rotundatis, late imbricatis, intus glabris, marginibus fragilibus, hyalinis, tenuioribus; lobis interioribus majoribus 5–8 mm. longis latisque; disco 6 mm. lato; stylo 9–10 mm. longo.

A tree or shrub, with elliptic, elliptic-ovate or -obovate leaves about twice as long as wide, the veins rather prominent beneath, and the surfaces somewhat papillose. The flowers are large, probably always in clusters on old wood; stamens about 250; anthers 1–1.2 mm. long.

Peru, Loreto: Mouth of Río Santiago, on high land, *G. Tessmann 4213*, anno "1924" (fragment, F; G, type; NY). Univ. of Mich. Neg. 437.

***Eugenia tumulescens* McVaugh, sp. nov.**

Frutex tumulescens, ramis crassiusculis, cortice atro-rufido squamuloso secedente; racemis tomentulosis; foliis petiolatis, ellipticis oblongisve, 20–38 cm. longis, 2.5–5-plo longioribus quam latioribus; nervo medio utrinque elevato; venis utroque latere 20–30; petiolo rimoso 10–18 mm. longo, ut videtur 3–4 mm. crasso (exophloeoo suberoso soluto); ramis annotinis floriferis, racemis abbreviatis; bracteolis 4–5 mm. longis oblongis, ad florendi tempus erectis; disco 3.5–4 mm. lato.

A shrub said to form mounds 70 cm. high, with elongate stiff veiny leaves which are acuminate at tip and narrowed or rounded at base to the corky-thickened petioles. Flowers 6–8, small for the size of the leaves; hypanthium 3 mm. long, obtusely 8-ridged and expanded into the gamosepalous calyx-base 1 mm. long; style 10–12 mm. long; stamens 250–300, the anthers 2.4–2.6 mm. long; fruit long-ovoid, salmon-yellow (according to Froes), probably 3–5 cm. long.

Brazil, Amazonas: Rio Cauabury, between Rio Iá and Rio Maturacá, *E. G. Holt & E. R. Blake 438*, Nov. 3–7, 1930 (US); Porto Curucuhy, Rio Negro, terreno arenoso alto, beira do rio, *R. Froes 21106*, Oct. 6, 1945 (MICH, type; NY).

***Eugenia valvata* McVaugh, sp. nov.**

Frutex vel arbor usque ad 5 m. alta, glabra; foliis plerumque 5–6 cm. longis ellipticis obtusis, venis inconspicuis; racemis 1–4 abbreviatis, floribus pedicellatis, in glomerulis umbelliformibus conglobatis; bracteolis persistentibus 1–1.5 mm. longis ciliatis; calycis lobis ciliatis subdeltoideis, ut videtur valvatis, inter se ad florendi tempus longitudinaliter rumpentibus.

An intricately branched shrub or small tree 3–5 meters high, glabrous except the bristly receptacular disc and the ciliate perianth-lobes and bracteoles; leaves elliptic, coriaceous, (1.5–) 2–3.5 cm. wide, (3–) 5–6 cm. long, about twice as long as wide, obtuse or obscurely acuminate at tip, rounded or gradually narrowed at base to the petiole 3–5 mm. long; margins somewhat pale-cartilaginous and revolute; midvein sulcate above, prominent beneath; lateral veins 6–10 pairs, very slender, scarcely apparent in mature leaves; marginal vein 2–3 mm. from margin, about as strong as the laterals and somewhat arched between them; upper surface of blade smooth, lustrous, the lower surface paler; glandular dots numerous, small, apparent in young leaves but hardly at all on mature foliage; inflorescence an abbreviated axillary raceme, or usually a cluster of 2–4 racemes from each axil, the axis of the raceme 3–6 mm. long, bearing 5–7 approximate, decussate pairs of flowers on pedicels (5–) 11–15 mm. long and up to 0.8 mm. wide at the somewhat compressed apex; bracts thin, deltoid or ovate, reddish brown, 0.7–1.5 mm. long; bracteoles lanceolate or ovate, persistent, appressed to the base of the hypanthium, 1–1.5 mm. long; hypanthium subcylindric, 1–1.5 mm. in diameter, 1.5–2.5 mm. long, somewhat enlarged distally, then abruptly widened into the base of the spreading-ascending rounded-deltoid calyx-lobes; lobes membranaceous, markedly convex without in the bud, ciliate at tips or in the distal half only, united by the proximal margins and separating at the time of anthesis by longitudinal splits up to 1–1.5 mm. long; globe of petals in the opening bud 1.5–2 times as long as the calyx; disc 3 mm. wide; style 5–6.5 mm. long; stamens about

75, about as long as the style, the anthers 0.6–0.8 mm. long; petals white or pinkish, about 5 mm. long; ovary bilocular, the ovules 12–20 in each locule, attached radially to the central septum.

A species which is distinctive because of the umbelliform clusters of flowers and the splitting of the calyx; the calyx-lobes show scarcely a trace of any imbricate condition even in the youngest bud, and are well separated by irregular short breaks below the sinuses by the time the flower opens. Fruit of this species is not definitely known, but Hitchcock's collection includes a single detached fruit, with persistent bracteoles and calyx-lobes, which is apparently dark in color, globose and about 1 cm. in diameter.

Ecuador, Chimborazo: Cañon of the Río Chanchan, about 5 km. north of Huigra, elev. 5,000–6,500 feet, moist forested valleys in the afternoon fog-belt, May 19–28, 1945, *W. H. Camp E-3280* (MICH); cañon of the Río Chanchan, open deforested slope with small patches of scrub in the draws, directly above Huigra, elev. 7,000 feet, May 29–31, 1945, *W. H. Camp E-3512* (MICH, type); Huigra, elev. 1,200 meters, *A. S. Hitchcock 20733* (US). Cañar: Santa Rosa de Cañar, *J. N. Rose 22655* (US); between Tambo and Suscal, north rim of the valley of Río de Cañar, *Camp E-2757* (MICH).

### ***Eugenia variareolata* McVaugh, sp. nov.**

Arbor vel frutex, rufo-tomentosus; foliis maximis, 30–45 cm. longis obovatis oblanceolatisve, supra lucidis, subtus minute ceroso-papillosis glaucisque; marginibus cartilagineis; venulis utrinque reticulatis; racemis abbreviatis; bracteolis 2.5–3 mm. longis persistentibus; calycis lobis intus glabris, ovatis, 7–9 mm. longis, ad florendi tempus reflexis, deciduis; disco 4.5 mm. lato.

A tree or shrub, the branchlets, inflorescence and petioles closely tomentose with coarse flexuous lustrous tangled dark red-brown hairs up to 0.5 mm. long, a few hairs persistent on the veins of the lower leaf-surface; leaves obovate or oblanceolate, 10–15 cm. wide, 30–45 cm. long, about 3 times as long as wide, rounded from above the middle to a broad short acumen, and narrowed from near or above the middle to near the base, where abruptly contracted, subcordate, with low rounded basal lobes; cartilaginous margin (about as thick as the marginal vein on the upper surface) passing abruptly into the flat summit of the petiole, which is 3–4 mm. thick, 10–15 mm. long; midvein convex and sometimes shallowly sulcate above, 1.5–2 mm. wide at base, prominent beneath; lateral veins 12–15 pairs, ascending, convex but sometimes also impressed above, prominent beneath; marginal vein (5–) 10–20 mm. from margin, evident but appearing as a series of asymmetric loops formed by the laterals; minor veins prominulous outside the marginal vein, including 2 successively smaller submarginal veins forming rather symmetrical arches connected to the inner veins by small right-angled veinlets; veinlets on both surfaces forming angular areoles of varying sizes; upper surface of blade smooth, lustrous, green or drying brown, the lower surface reddish brown or paler, glaucous, minutely waxy-papillose; both surfaces obscurely gland-dotted;

inflorescence an abbreviated axillary raceme (or 2-3 racemes from the same axil), the axis up to 5 mm. long, bearing as many as 4 approximate, decussate pairs of flowers on pedicels 1-2 mm. thick, 10-12 mm. long; bracts scarious, ovate or subrotund, 1-2 mm. long; bracteoles broadly ovate to suborbicular, broad at base, persistent, 2.5-3 mm. long; hypanthium bluntly 4-angled, 2-3 mm. long, hemispheric to subglobose; calyx-lobes membranaceous, thin-margined, ovate, bluntly pointed, 4-6 mm. wide near base, 7-9 mm. long, glabrous within, reflexed at flowering time and finally dehiscent; disc quadrangular, 4.5 mm. wide, its center 1.5 mm. wide, deeply depressed (1 mm.), with red-hirsute margin; style glabrous, more than 10 mm. long; ovary bilocular, the ovules about 35 in each locule, attached radially to the central septum.

A most distinctive species, of which unfortunately neither buds, complete flowers nor fruits are known.

Colombia, Meta: Villavicencio, elev. 450 meters, Jan., 1856, *J. J. Triana 14* (BM, type; COL; NY). Univ. of Mich. Neg. 485.

### *Eugenia versicolor* McVaugh, sp. nov.

Arbor, ramulis racemisque puberulis, pilis pallide rufis, crispiusculis, brevibus, obtectis; foliis 6-13 cm. longis acuminatis, venis utroque latere 6-10; racemis abbreviatis; bracteolis persistentibus, connatis; calycis lobis late rotundatis, intus appresse pubescentibus, 1.5-2 mm. longis; stylo 7-9 mm. longo; folii pagina inferiore ferruginea vel cinerea, pilis crebris minutissimis nitidis obtecta.

A tree to 15 meters high with elliptic leaves 2-3 times as long as wide, relatively few veins, and umbelliform clusters of flowers; the lustrous upper surface of the leaves contrasts markedly with the rusty or ashy color of the lower surface; buds 4.5-6 mm. long; disc 2-2.5 mm. wide; stamens about 200.

Compared in the key with *E. heterochroma* Diels, and perhaps related to that species or to *E. ferreiraeana* Berg, the type of which came from near the mouth of the Rio Negro, Brazil.

Brazil, Amazonas: Basin of Rio Solimões, Mun. São Paulo de Olivença, basin of Creek Belem, high forest, terra firma, Oct. 26-Dec. 11, 1936, *B. A. Krukoff 8910* (MICH; US). Colombia, Amazonas: Trapecio amazónico, Loretoyacu River, elev. 100 meters, Nov., 1945, *R. E. Schultes 6959* (US, type).

## 5. PLINIA L.

1. Pedicels 4-5 mm. long; flowers 2-4 pairs in short racemes; buds completely closed, apiculate, 7-8 mm. long; plants appressed-hispidulous with no long silky hairs. . . . . *P. clausa* McVaugh.
1. Flowers sessile or subsessile, in sessile clusters subtended by sterile bracts; buds, if closed, 12 mm. long; plants variously hirsutulous or silky-pilose in the inflorescence.
2. Buds 12 mm. long, completely closed, whitened and felted with long appressed hairs; stamens about 500; leaves 4-6.5 cm. wide.

*P. inflata* McVaugh.

2. Buds 6-7 mm. long or less, silky-pilose or hirsutulous, the calyx-lobes free at tips; stamens 125-150 (number unknown in *P. pinnata*); leaves various.
3. Leaves hirsutulous beneath, with hairs about 0.5 mm. long, the veins with some longer hairs up to 2 mm. long; hypanthium 2-2.5 mm. across; style 4.5-6 mm. long. . . . . *P. pinnata* L.
3. Leaves with minute hairs 0.2 mm. long on the lower surface, the young branchlets and leaves having also some hairs up to 4 mm. long; hypanthium 3.5-4.5 mm. wide; style 9-11 mm. long. . . . . *P. duplipilosa* McVaugh.

### ***Plinia clausa* McVaugh, sp. nov.**

Arbor vel frutex, ramulis foliis novellis petiolisque ochraceo-hispidulis; alabastris albidis, clausis, apiculatis, 7-8 mm. longis; racemis usque ad 3 mm. longis, 4-8-floris, floribus pedicellatis; hypanthio supra germen circiter 4 mm. producto; staminibus 200-250.

A tree or shrub with nearly glabrous, elliptic and narrowly acuminate leaves 7-10 cm. long, 2-2.3 times as long as wide; the flowers are in short racemes with conspicuous membranaceous bracts and bracteoles 2.5-4 mm. long; stamens arising from a broad zone occupying most of the distal half of the bud, their bases intermixed with short silky hairs, the inner surface of the hypanthium glabrous below this.

Peru, Loreto: Soledad (lower Río Itaya, near Iquitos), July, 1925, G. Tessmann 5287 (NY, type).

### ***Plinia duplipilosa* McVaugh, sp. nov.**

Arbor, ramulis foliisque novellis pilosis, pilis albidis rectis tenuibusque, usque ad 4 mm. longis, obsitis; glomerulis dense sericeo-pilosis; ramulis petiolisque, et folii paginae inferioris venis minute pubescentibus, pilis erectis 0.2 mm. longis immixtis; foliis 10-13 cm. longis acuminatis; glomerulis 4-floris, sessilibus, bracteatatis; bracteis 4-seriatis, inferioribus sterilibus; bracteolis 5-6 mm. longis, pilosis ciliatisque; alabastris 6.5 mm. longis, calyce 4-dentato, dentibus deltoideis 1.5 mm. longis; hypanthio supra germen 2.5-3 mm. producto; stylo 9-11 mm. longo; staminibus 125-150.

A tree with elliptic-ovate leaves about 2.5 times as long as wide and 6-10 pairs of lateral veins; the rather large silky flowers are in clusters of 4 in leafless axils on old wood, the clusters subtended by 4-ranked sterile bracts; buds concealed by straight hairs 2.5 mm. long; calyx and hypanthium glabrous within, the limb at maturity nearly quadrangular, 5-6 mm. on a side, the receptacular cup 3.5-4.5 mm. wide.

The flowers and inflorescence in Klug's collection are very like those of the type, but the leaves are longer and narrower, more prominently veined beneath, and with up to 15 pairs of veins. Apparently Cuatrecasas' no. 7092, from the lowlands of eastern Colombia, is also conspecific; the flowers in this collection have more elongate bracts and free calyx-tips, but are otherwise much like Peruvian specimens.



Peru, Loreto: Yurimaguas, elev. 135 meters, dense forest, Aug.–Sept., 1929, *Killip & Smith 28007* (NY; US 1461669, type); Mishuyacu, near Iquitos, elev. 100 meters, forest, *G. Klug 1155* (US).

### *Plinia inflata* McVaugh, sp. nov.

Arbor hispidula, pilosa etiam, pilis eburneis 1–1.5 mm. longis, tenuissimis, obsita; glomerulis ut videtur 4-floris, pilis longis concretis dealbatis; foliis 9–15 cm. longis, 4–6.5 cm. latis acuminatis; bracteis sterilibus 3–4-jugis, 4-seriatis; alabastris clausis, apiculatis, 12 mm. longis, calyce demum in lobos 4 subaequales, 10–12 mm. longi, longitudinaliter direpto; hypanthio supra germen 2 mm. producto; staminibus circiter 500; petalis minusculis 3 mm. longis.

A tree to 9 meters high, with elliptic-oblong leaves about 2.5 times as long as wide, and about 15 pairs of very slender lateral veins; the plant appears to differ from others in the same genus in its larger flowers, which are markedly whitened by the matted hairs; the splits between the calyx-lobes extend somewhat deeper than the inner (proximal) margin of the broad hairy staminal ring, which is 6–7 mm. wide and extends distally to a line 1.5–2 mm. from the apex of the bud; style not seen.

Brazil, Amazonas: Basin of Rio Madeira, Mun. Humayta, near Tres Casas, low terra firma, rare, Sept. 28, 1934, *B. A. Krukoff 6365* (NY, type; US); same locality, Oct. 8, 1934, *Krukoff 6525* (NY).

## 6. PSIDIUM L.

1. Calyx-lobes 7–9 mm. long and distinct, or the lobes prolonged into narrow appendages 6–14 mm. long.
2. Calyx-lobes 4, ovate, 7–9 mm. long, tomentose without, appressed to the bud and covering it, apparently valvate . . . . . *P. uliei* Diels.
2. Calyx-lobes 5, separating irregularly as segments 4.5–5 mm. long and wide, each tipped by an erect or spreading narrow foliaceous nearly glabrous appendage 1.5–3 mm. wide, 6–14 mm. long . . . . . *P. caudatum* McVaugh.
1. Calyx-lobes 3 mm. long or less, short, broad and rounded, or the buds completely closed before anthesis and dehiscing irregularly.
3. Leaves crenate, obtuse and cuspidate, narrow (1–2 cm. wide, 2–7 cm. long); plants finely pubescent; flowers solitary; buds glabrous, about 12 mm. long. *P. maribense* DC.
3. Leaves entire, or sometimes irregularly undulate, rarely less than 2.5 cm. wide and if so acute or acuminate; pubescence and flowers various.
4. Plants completely glabrous, even to the young vegetative buds; branchlets compressed, not angled; leaves 3–5 cm. wide, 7–14 cm. long, narrowed from below or near the middle to the acute and mucronate tip; calyx open, slightly flaring in bud, the broadly rounded lobes 2 mm. high . . . *P. densicomum* DC.
4. Plants with evident and usually abundant pubescence (sometimes on young growing parts only); branchlets often angled; leaves and calyx various.
5. Lateral veins 12–20 pairs, usually impressed above, prominent beneath and well differentiated from the smaller intermediate veins; young growth heavily pubescent; branchlets 4-angled or sometimes terete; buds closed, 10–16 mm. long, pointed, not cuspidate; peduncles 1 (very rarely 3) -flowered.

6. Leaves lanceolate or narrowly ovate, 1.5-3 cm. wide, 3-4 times as long as wide, gradually narrowed to the acute or acuminate tip; fruit with 8-15 irregular longitudinal ridges. . . . . *P. rutidocarpum* G. Don.
6. Leaves elliptic or oblong, 3-6 cm. wide, 2-3 times as long as wide, more abruptly narrowed to the obtusely pointed or rounded tip; fruit globose or pyriform, smooth. . . . . *P. guajava* L.
5. Lateral veins 6-15 pairs (mostly 10 pairs or fewer), if more numerous then slender and scarcely differentiated from the intermediate veins, or the plants very sparsely pubescent only; branchlets and flowers various.
7. Lower leaf-surface hirsutulous, the numerous hairs erect or nearly so, 0.5-1 mm. long.
8. Leaves mostly 6-10 cm. long; pubescence of branchlets reddish; buds 10-12 mm. long, almost completely closed; peduncle 1.5-3 cm. long, 3-flowered.  
*P. guineense* Sw.
8. Leaves mostly 5-6.5 cm. long; pubescence tawny yellow; buds 3.5-4 mm. long, with 5 broad low calyx-lobes 1 mm. long; peduncle 1 cm. long or less, 3- to 7-flowered. . . . . *P. fulvum* McVaugh.
7. Lower leaf-surface glabrous or sparingly pubescent or strigose.
9. Leaves small for the genus, mostly 5.5 cm. long or less, often acute at both ends; buds 5-7 mm. long, open, the 5 broad low calyx-lobes much shorter than the corolla; branchlets terete or sometimes longitudinally channeled.
10. Dichasia 3-flowered, with very slender divaricate branches; calyx-lobes 1 mm. long or less; marginal vein of leaf strongly arcuate, 1.5-4 mm. from the margin at the points where the arches join the lateral veins; glands not apparent even in young leaves. . . . . *P. pedicellatum* McVaugh.
10. Flowers solitary; calyx-lobes more than 2.5 mm. long; marginal vein about 1 mm. from margin, not strongly arcuate; leaves gland-dotted on both sides at least when young. . . . . *P. arayan* (HBK.) Burret.
9. Leaves larger, 5-10 cm. long or even longer; buds 10-16 mm. long, closed at apex; branchlets various.
11. Branchlets quadrangular, wing-angled; buds shortly apiculate; lateral veins 10 pairs or fewer; leaves usually with very numerous dark raised glands beneath; Amazonian lowlands, widely distributed. . . . . *P. acutangulum* DC.
11. Branchlets compressed, sometimes with low rounded ridges, not wing-angled; buds with linear or subulate apiculum 2-5 mm. long; lateral veins 10-15 pairs; leaves with numerous small open glandular depressions of varying sizes, on both surfaces; Pacific slopes, Tumbes. . . . . *P. rostratum* McVaugh.

***Psidium caudatum* McVaugh, nom. nov.** *Psidiopsis moritziana* Berg, *Linnaea* 27: 351. 1856, non *Psidium moritzianum* Berg, l.c. 359. *Calycolpus moritzianus* (Berg) Burret, *Repert. Sp. Nov.* 50: 57. 1941.

As far as I am aware, no one has been able to point out any distinguishing feature of *Psidiopsis* except the prolonged tips of the calyx-lobes. This is certainly noteworthy but scarcely indicative of a profound evolutionary hiatus between the one species which is so marked, and the other species of *Psidium*.

***Psidium fulvum* McVaugh, sp. nov.**

Arbor vel frutex, fulvo-hirsutulus; foliis integris ovatis, 5-6.5 cm. longis obtusis; venis utroque latere 8-10; pedunculis usque ad 1 cm. longis, 3-7-floris;

alabastris 3.5–4 mm. longis; calycis lobis 5, 1 mm. longis, 2–2.5 mm. latis; disco 5-angulato, 3–4 mm. lato; germine 3-loculari, sporophoris axillaribus peltatis 20-ovulatis.

A shrub or tree, rather conspicuously and densely tawny-hirsute with hairs up to 0.5 mm. long; leaves broadly ovate, 1.5–2 times as long as wide; flowers small; style glabrous, not seen fully expanded, probably peltate; stamens about 200.

Peru, Amazonas: Chachapoyas, A. Mathews ["dernière collect."] (BM, type; G). Univ. of Mich. Neg. 484.

### *Psidium pedicellatum* McVaugh, sp. nov.

Arbor, puberula; foliis integris immaturis 3–5.5 cm. longis, brevi-acuminatis; venis utroque latere 7–10; pedunculis usque ad 1.5 cm. longis, ramis filiformibus 5–6 mm. longis divaricatis; dichasiis 3-floris; alabastris 5 mm. longis; calycis margine arcuato-undulato 5-lobato, lobis 0.8–1 mm. longis; disco glabro, 2.5 mm. lato; germine 2-loculari, sporophoris axillaribus peltatis 20-ovulatis.

A tree 12 meters high with scant puberulence, the leaves broadly elliptic-ovate and 1.5 (–2) times as long as wide; glands not apparent even in young leaves; dichasia usually 3-flowered, the flowers occasionally solitary; flowers small, the style 4–5 mm. long, the stigma subpeltate; stamens about 150.

Ecuador, Santiago-Zamora: Along Quebrada Honda, vicinity of Rancho Achupallas, elev. 2,500–2,700 meters, along river, Oct. 10, 1943, J. A. Steyermark 54571 (F 1391169, type). Univ. of Mich. Neg. 472.

### *Psidium rostratum* McVaugh, sp. nov.

Arbor vel frutex, pubescens vel strigosus; foliis integris 10–14 cm. longis acutis vel apice obtusis; venis utroque latere 10–15; pedunculis 1-floris, axillaribus, vel infimis ex nodis efoliatis, vel rhachi abortiva, oriundis; alabastris 12–16 mm. longis clausis, longe apiculatis; calyce intus dense strigoso; disco 12–14 mm. lato.

A shrub or tree to 10 meters high, rather sparingly pubescent, with irregularly ovate to oblong or even obovate leaves about twice as long as wide, and irregularly glandular-pitted on both surfaces; flowers large, the style 10–13 mm. long, the stigma peltate; stamens probably about 300.

Peru, Tumbes: Mountains east of Hacienda Chicama, in deciduous bushwood, elev. 900–1,000 meters, Feb. 19–24, 1927, A. Weberbauer 7648 (F 571783, in flower; F 571784, type, in bud). Univ. of Mich. Negs. 471 (type), 494.

## 7. MYRTEOLA Berg

1. Plants glabrous and subherbaceous; stamens 12 or fewer; northern Peru to Venezuela. . . . . *M. oxycoccoides* (Benth.) Berg.
1. At least the young branches densely pubescent, or if exceptionally the whole plant glabrous, an erect shrub with 30 or more stamens.

2. Leaf-margins strongly revolute; leaves densely strigose or setose beneath; stamens more than 30; northern Peru and Ecuador. [*M. acerosa* (Berg) Burret; *M. microphylla* (Humb. & Bonpl.) Berg, var. *microphylla*.]
2. Leaf-margins not or scarcely revolute; leaves glabrous beneath or sparingly strigose.
3. Stamens 20 or fewer; leaves mostly broadest below the middle, with a tendency to become bullate at least in age; plants with extensive rhizomes, the flowering branches prostrate or erect, often less than 20 cm. high (up to 1 meter); bracteoles 1.5–3 mm. long; calyx-lobes 1.5–2 mm. long.
4. Leaves narrowly lanceolate, 1.5–2 mm. wide, 6–7 mm. long, bullate from the first, the midvein not apparent beneath.  
*M. vaccinioides* var. *carabaya* McVaugh.
4. Leaves ovate, 2.5–5 mm. wide, 4–8 mm. long, bullate in age or not at all, the midvein apparent at least in young leaves.  
*M. vaccinioides* (HBK.) Berg, var. *vaccinioides*.
3. Stamens 30–65; leaves broadest near the middle or but slightly below it, not bullate or only exceptionally so, the midvein apparent beneath; erect shrubs mostly 1–2 meters high; bracteoles 3.5–6 mm. long; calyx-lobes 2.5–3.5 mm. long. [*M. microphylla* var. *glabrata* Berg; *M. weberbaueri* Diels.]

**Myrteola vaccinioides** (HBK.) Berg, var. **carabaya** McVaugh, var. nov.

Frutex, strigoso-hispidulus, rhizomatus; ramis floriferis 6–15 cm. longis erectis; foliis anguste lanceolatis, subtus bullatis, nervo medio haud manifesto; bracteolis 2–2.5 mm. longis; staminibus circiter 15.

Further revisionary study in this genus, or examination of additional material of the present plant, may well indicate that this is an independent species. Unquestionably, however, it is akin to *M. vaccinioides*, which it much resembles in habit, in stamen-number, and in all vegetative characters except the leaf-shape.

Peru, Puno: Prov. Carabaya, June–July, 1847, *H. A. Weddell* 4667 (P, type). Bolivia, La Paz: Unduavi, en bosques, elev. 3,300 meters, Feb. 12, 1907, *O. Buchtien* 647 (NY). Univ. of Mich. Neg. 428.

























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