STUDIES OF PACIFIC ISLAND PLANTS, XV

THE GENUS ELAEOCARPUS IN THE NEW HEBRIDES, FIJI, SAMOA, AND TONGA

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INTRODUCTION

In continuation of a series of limited revisions of selected families of phanerogams from Fiji and the adjacent archipelagos,[1] the present treatment is intended to facilitate the identification of species of *Elaeocarpus* in the island groups east of the Solomon Islands. The area here considered extends from the New Hebrides through Fiji and into Samoa and Tonga; the very few available specimens from Niue, the Wallis Islands, and Rotuma have also been considered. The family Elaeocarpaceae is represented in this region only by the genus *Elaeocarpus*, with the exception of a single species of *Aceratium* endemic to the New Hebrides, *A. braithwaitei* (F. v. Muell.) Schlechter (including *Elaeocarpus kajewskii* Guillaumin; see Smith, 1944, p. 119, for discussion).[2]

Impetus for the preparation of this paper was derived from my attempt to identify the Fijian specimens of *Elaeocarpus* collected by me in 1947.[3] I soon learned that the genus is as difficult, in proportion to the number of species involved, in the Melanesian Islands as it is in Papuasia and regions to the west. The only satisfactory solution seemed to be to prepare a limited revision of *Elaeocarpus* in Fiji and the adjacent archipelagos, with redescriptions of the known spe-

[1] Recent papers in this series have been published as follows:
X. Contr. U. S. Nat. Herb. 30: 469–519. 1952.
XI. Journ. Arn. Arb. 33: 97–118. 1952.
XII. Op. cit. 33: 119–149. 1952.
XIII. Op. cit. 33: 367–402. 1952.
XIV. Op. cit. 34: 37–51. 1953.

[2] For references to selected literature, see bibliography at the end of this paper.

[3] The mentioned collections were made under the auspices of the Arnold Arboretum of Harvard University and the John Simon Guggenheim Memorial Foundation, with the aid of grants from the Penrose Fund of the American Philosophical Society and the Bache Fund of the National Academy of Sciences.

cies, most of which were first described on the basis of inadequate material or without mention of certain critical characters. For this purpose the herbarium material of several institutions has been examined and is here cited, with the indicated abbreviations: Arnold Arboretum of Harvard University (A); Bernice P. Bishop Museum (Bish); British Museum (BM); Gray Herbarium of Harvard University (GH); Royal Botanic Gardens, Kew (K); New York Botanical Garden (NY); and U. S. National Herbarium (US). I am greatly indebted to the administrators of these herbaria for the privilege of examining specimens under their care.

Elaeocarpus has been discussed (Merrill, 1945, p. 216, *fig. 255*) as an example of the typical attenuation of Malaysian genera in their extension to the eastward. The following figures, indicating the number of species known from groups between New Guinea and Tonga, are illustrative: New Guinea, at least 111; Solomon Islands, 4; New Hebrides, 2; New Caledonia, 29; Fiji, 18; Samoa, 5 (of which 1 extends into Tonga). These figures are by no means reliable, being in most cases too low. It is probable that the figures for Samoa and Tonga are essentially correct, but additional new species may be anticipated from Fiji, to judge from the several available collections which are at present unidentifiable because essential parts are lacking. Whether any considerable number of new *Elaeocarpi* are to be expected from New Caledonia I cannot say; the figure of 29 is taken from Guillaumin's recent list (1948, p. 205–206). The New Caledonian species are not considered in the present treatment, as the material in American herbaria from that island is entirely inadequate. It is certain that additional species of *Elaeocarpus* will be discovered in New Guinea, when remote parts of that rich island are explored. The figures of species known from the Solomon Islands and the New Hebrides, 4 and 2 respectively, are the least credible. It is quite unlikely that these archipelagos support fewer species of the genus than does Fiji, and the known record only serves to emphasize the total inadequacy of botanical collections in the Solomon-New Hebrides region.

No real agreement has been reached by students of *Elaeocarpus* as to infrageneric categories, and it is not probable that acceptable categories can be erected until a competent student revises the entire genus. The difficulties inherent in the genus and the unsatisfactory nature of strictly regional approaches have been well discussed by Merrill (1951). In considering the Papuasian species (1944), I accepted as a basis for discussion the sectional arrangement proposed by Schlechter (1916), with minor modifications. Schlechter's division of the Papuasian species into 9 sections is not entirely satis-

factory, as will be obvious to students of other floras, whose *Elaeocarpi* will not always fit into this system; but nevertheless these sections permit a reasonable grouping of the New Guinean species. Such an attempt to group the species in readily definable categories seems more realistic than retaining the unwieldy sectional concepts of earlier workers, a point of view I have elsewhere elaborated (1944). To ignore infrageneric divisions altogether in *Elaeocarpus*, as Knuth and Gagnepain (see Merrill, 1951, for discussion) and Guillaumin (1948) seem to have done, will not bring order to the genus.

For purposes of reviewing the species considered in the present paper, Schlechter's system is quite usable. Table 1 shows the occurrence of Schlechter's sections (as modified by me, 1944) in the island groups from New Guinea to Tonga, exclusive of New Caledonia.

TABLE 1.—*Occurrence of sections of* Elaeocarpus *in the island groups from New Guinea to Tonga*

Section	New Guinea	Solomon Islands	New Hebrides	Fiji	Samoa	Tonga
Lobopetalum	X					
Dactylosphaera	X					
Chascanthus	X	X			X	
Ganitrus	X	X	X		X	
Fissipetalum	X			X		
Oreocarpus	X		X			
Blepharoceras	X			X	X	
Monocera	X	X		X		
Collopetalum	X	X	X		X	X

This table will serve to demonstrate that the eastward attenuation of *Elaeocarpus* is not uniform. Certain combinations of basic characters (whether or not expressed in nomenclatural units at the sectional level) persist farther to the east than other combinations. Eastward attenuation of the number of species, of course, is merely an expression of the attenuation of possible or probable character-combinations. The distributional gaps shown by the table are striking and indicate that one can draw only the most general conclusions about the distribution of *Elaeocarpus* in the southwestern Pacific, on the basis of material now available.

The present treatment accounts for 25 species, of which 6 are described as new. In the following keys I rely largely upon floral characters, and therefore this study will be of only limited use if sterile or fruiting specimens are at hand. Such specimens can usually be identified by careful comparison, but it is hardly possible to construct a useful key without reference to floral details, some of which can be

observed only by accurate dissection. The key to sections utilizes only those characters found in the species of our region and is not intended to show the total variability within sections throughout their ranges.

SYSTEMATIC TREATMENT

KEY TO THE SECTIONS

Ovary 5-locular, each locule with 4–6 ovules; anthers erostrate, setose at apex; fruits subglobose, the endocarp copiously ornamented with irregular oblong processes, all the locules but 1 sometimes aborting---------- 1. § *Ganitrus*

Ovary 2-locular (3- or 4-locular only in § *Coilopetalum*).

Flowers small, the petals not more than 6 mm. in length, with few (up to 10) laciniae; stamens 10–27, the anthers erostrate; ovules 2–4 per locule; fruit small, round in cross-section, the mesocarp thin, the endocarp inconspicuously rugulose---------- 2. § *Fissipetalum*

Flowers larger, the petals at anthesis at least 7 mm. long, often copiously laciniate; stamens often numerous, rarely as few as 15, the anthers rostrate.

Petals thinner than sepals and obviously different, not copiously sericeous within (hairs never retrorse); ovary 2-locular; fruits comparatively large, the mesocarp thick, the endocarp forming a somewhat flattened putamen, this with obvious and sometimes lobed lateral angles.

Flowers large, the petals 18–47 mm. long; stamens 40–125; fruits large (3.5–6.5 cm. long), the endocarp hard and bony---------- 3. § *Monocera*

Flowers smaller, the petals 7–18 mm. long; stamens 15–41; fruits often somewhat smaller (3–5 cm. long), the endocarp sometimes fibrous.

Ovary glabrous; ovules 6 per locule---------- 4. § *Oreocarpus*

Ovary obviously sericeous.

Ovules 4–7 per locule---------- 5. § *Blepharoceras*

Ovules 2 per locule---------- 6. § *Chascanthus*

Petals resembling sepals in size and texture but with 6–11 apical laciniae, densely sericeous on both sides (hairs retrorse within); ovary glabrous, 3- or 4-locular, the locules with 6–8 ovules; fruits small, round in cross-section, the mesocarp thin, the endocarp coarsely rugulose, inconspicuously angled---------- 7. § *Coilopetalum*

KEYS TO THE SPECIES

1. § *Ganitrus*

Petioles 5–8 mm. long, the leaf-blades 8–14×1.5–4 (–5) cm., finely crenulate distally with 3–6 crenations per centimeter, entire in lower half; pedicels in fruit 13–20 mm. long; New Hebrides---------- 1. *E. hebridarum*

Petioles 12–20 mm. long, the leaf-blades 11–19×3–5.2 cm., conspicuously crenate except at base with 2 or 3 crenations per centimeter; pedicels in fruit 20–25 mm. long; Samoa and perhaps adjacent small islands-- 2. *E. christophersenii*

2. § *Fissipetalum*

Petals 5.5–6 mm. long, with 3–5 apical laciniae; stamens 26 or 27, the anthers 2–2.5 mm. long; ovary glabrous, the locules 4-ovulate; racemes lax, 2–4-flowered, the pedicels 20–25 mm. long; leaf-blades attenuate at base.

3. *E. pittosporoides*

Petals 1.3–3 mm. long, with 5–10 apical laciniae; stamens 10–16, the anthers not more than 1.3 mm. long; ovary pilose, the locules 2-ovulate; racemes essentially straight, 6–18-flowered, the pedicels 2–6 mm. long.

Flowers minute, the petals 1.3–1.9 mm. long; stamens 14–16, the anthers 0.3–0.7 mm. long.

Branchlets and petioles at first pale-puberulent or strigose, usually soon glabrate; leaf-blades subacute and attenuate at base, predominantly obovate-elliptic, 2–5 cm. broad, soon glabrate on both sides; flower-subtending bracts 2–3 mm. long; stamens 1.2–1.3 mm. long, the anthers 0.6–0.7 mm. long---------- 4. *E. cassinoides*

Branchlets and petioles copiously hispidulous-puberulent, the indument often subpersistent; leaf-blades rounded or broadly obtuse at base, rarely acute, oblong-elliptic, 3–6.7 cm. broad, often persistently puberulent beneath at least on costa and secondaries; flower-subtending bracts about 1 mm. long; stamens 0.6–0.7 mm. long, the anthers 0.3–0.4 mm. long---------- 5. *E. pyriformis*

Flowers larger, the petals 2.5–3 mm. long; stamens 10–12, the anthers 1–1.3 mm. long; leaf-blades obovate-oblong, often reddish beneath, attenuate at base---------- 6. *E. kasiensis*

3. § *Monocera*

Ovary glabrous or very sparsely pilose and soon glabrate; sepals essentially glabrous without or, if sparsely strigose in bud, soon glabrate; anthers with a comparatively conspicuous dorsal awn (0.8–4 mm. long) and sometimes also with a ventral awn.

Leaf-blades thick-coriaceous, rounded or bluntly cuspidate at apex, acute or obtuse at base; branchlets very stout (7–15 mm. in diameter toward apices) and copiously cicatricose; sepals thick-coriaceous, 30–40 mm. long; petals yellow toward base, pink distally, carnose, 30–47 mm. long, crenulate-lobed at the rounded apex (lobes subequal, obtuse, 1–2 mm. long); stamens 100–125, the filaments short-hispidulous (hairs 0.1–0.2 mm. long), the anthers 13–16 mm. long---------- 7. *E. storckii*

Leaf-blades chartaceous to coriaceous, gradually narrowed to an acute or obtuse apex; branchlets usually not exceeding 5 mm. in diameter toward apices; sepals 18–32 mm. long; petals white, submembranaceous, 22–37 mm. long, the apical laciniae oblong or lanceolate, often irregular, acute or subacute, 2–8 mm. long; stamens 40–100, the filaments conspicuously hispidulous (hairs 0.5–1 mm. long), the anthers 7–13 mm. long.

Flowers comparatively large, the sepals usually exceeding 20 mm. in length, the petals 23–37 mm. long, the apical laciniae 9–20, the anthers 1-aristate; fruits (not known for No. 9) comparatively large, at least 5 cm. long at maturity.

Leaf-blades elliptic to lanceolate, usually 13–23×5–9 cm., acute to attenuate at base and decurrent on the petiole; inflorescence-axis usually 1–4 cm. long and pale-puberulent at anthesis; sepals copiously sericeous-tomentellous within (hairs golden, 0.2–0.5 mm. long); stamens 48–90, the anthers 9–13 mm. long including the dorsal awn (0.8–1.5 mm. long)---------- 8. *E. chelonimorphus*

Leaf-blades ovate-elliptic, 7–13×3–5 cm., rounded or faintly cordate at base; inflorescence-axis 4–6 cm. long, glabrous; sepals densely sericeous within (hairs whitish, 1–2 mm. long); stamens 90–100, the anthers 7–9 mm. long including the dorsal awn (3–3.5 mm. long)---------- 9. *E. gillespieanus*

Flowers smaller, the sepals up to 20 mm. long, the petals 22–25 mm. long, the apical laciniae 6–16, the anthers sometimes biaristate; fruits 3.5–5 cm. long at apparent maturity.

Leaf-blades ovate-elliptic, 7–16×3–6.5 cm., rounded to broadly obtuse at base, the petioles 2–4 cm. long; sepals 3–4 mm. broad, the petals with 6–9 apical lobes---------- 10. *E. vitiensis*

Leaf-blades lanceolate or lanceolate-ovate, 7–10×2–4 cm., acute to obtuse at base, the petioles (1–) 1.5–2.8 cm. long; sepals 2–3 mm. broad, the petals with 11–16 apical lobes---------- 11. *E. lepidus*

Ovary sericeous with long-persistent hairs; sepals puberulent without, perhaps at length subglabrate; anthers with a comparatively short awn (0.5–0.8 mm. long).

Leaf-blades acute or narrowly obtuse at base and decurrent on the petiole; young vegetative parts and inflorescence-axis closely pilose with hairs less than 0.4 mm. long; petals laciniate along margins nearly to base, or at least on lateral margins above middle, as well as apically, the lobes 11–35.

Leaf-margin coarsely crenate, the veinlet-reticulation comparatively conspicuous, prominulous on both surfaces; axis of inflorescence and pedicels sparsely strigose-puberulent; sepals 11–15 mm. long; petals probably not much exceeding the sepals in length at anthesis, laciniate along margins nearly to base with 11–17 lobes; ovary minutely sericeous with pale hairs about 0.2 mm. long---------- 12. *E. laurifolius*

Leaf-margins inconspicuously crenulate, the veinlet-reticulation inconspicuous, subimmersed or plane above; axis of inflorescence and pedicels copiously sericeous-puberulent; sepals 17–22 mm. long; petals 18–25 mm. long, laciniate in the distal half with 16–35 lobes; ovary conspicuously sericeous with golden hairs 0.4–0.5 mm. long---------- 13. *E. subcapitatus*

Leaf-blades rounded or subcordate at base; young vegetative parts and inflorescence-axis with hairs 0.4–0.6 mm. long; petals laciniate only at apex, the lobes 11–13---------- 14. *E. melochioides*

4. § *Oreocarpus*

One species; New Hebrides---------- 15. *E. hortensis*

5. § *Blepharoceras*

Flowers comparatively large, the sepals 12–13.5 mm. long, the petals 13–15 mm. long, white, with 8–12 apical laciniae; stamens 28–30, the filaments copiously sericeous with pale hairs 0.7–1 mm. long, the anthers 5–7 mm. long; style 10–12 mm. long; inflorescence short, the axis not more than 2.5 cm. long; leaf-blades comparatively small, not exceeding 7×3.5 cm., acute or obtuse at base, the petioles not more than 1.5 cm. long---------- 16. *E. kambi*

Flowers smaller, the sepals not more than 10 mm. long and the petals not exceeding 13 mm.; stamens (15–41) with glabrous or minutely hispidulous-puberulent filaments (hairs not more than 0.1 mm. long), the anthers not more than 4.2 mm. long; style not exceeding 6 mm. in length; inflorescence often elongate, the axis at least 3 cm. long at anthesis; leaf-blades only rarely less than 7 cm. in length, the petioles usually much longer than 1.5 cm.

Leaf-blades large, usually 14–30 cm. long and 6–14.5 cm. broad, the secondary nerves 10–15 per side; branchlets greatly thickened, 5–15 mm. in diameter toward apices; anthers with an apical awn 0.5–0.7 mm. long.

Racemes up to 15 cm. long, the pedicels 4–10 mm. long at anthesis.
Leaf-blades obovate, gradually narrowed toward base, then abruptly narrowed and decurrent on the petiole; hairs of young parts 0.1–0.2 mm. long; racemes 10–15 cm. long, the rachis and pedicels puberulent with hairs less than 0.1 mm. long; petals with 7 or 8 apical laciniae; ovary sericeous with hairs 0.1–0.2 mm. long, the ovules 6 per locule; Fiji---------- 17. *E. milnei*
Leaf-blades ellipitic or elliptic-ovate, rounded to a shallowly cordate base; hairs of young parts 0.3–0.6 mm. long; racemes 3–7.5 cm. long, the rachis and pedicels with hairs 0.2–0.4 mm. long; petals white, with 12–18 apical laciniae; ovary sericeous with hairs 0.3–0.5 mm. long, the ovules 4 per locule; Samoa---------- 18. *E. magnifolius*
Racemes 22–40 cm. long, the rachis and pedicels tomentellous with hairs 0.3–0.7 mm. long, the pedicels 15–55 mm. long at anthesis; petals pink, whitish distally, with 13–17 apical laciniae; ovules 6 per locule; leaf-blades elliptic or obovate-elliptic, rounded at base; young parts copiously sericeous with hairs 0.6–1 mm. long; Fiji---------- 19. *E. roseiflorus*
Leaf-blades comparatively small, usually 5–20 cm. long and 3–11 cm. broad, the secondary nerves 5–11 per side; branchlets comparatively slender, 2–8 (–10) mm. in diameter toward apices; anthers with an apical awn 0.8–1.6 mm. long (shorter in Nos. 22 and 24, small-leaved species).
Stamens 26–41, 1–3-seriate; style 3–4 mm. long; petals white (color not known for No. 22), the apical laciniae 8–19; leaf-blades cordate to very broadly obtuse at base, the indument of branchlets and petioles often long-persistent.
Leaf-blades elliptic to lanceolate-ovate, usually 9–20×4–11 cm., crenulate at margin; pedicels at least 5 mm. long at anthesis; sepals 6.5–8 mm. long; petals 7–10 mm. long; anthers with an apical awn 1–1.6 mm. long.
Pedicels at anthesis 8–13 cm. long, the petals 5–6 mm. broad, with 12–16 apical laciniae; endocarp of fruit 2–3 mm. thick, forming a putamen with the lateral angles subacute and undulate into lobes 2–3 mm. long; Fiji---------- 20. *E. graeffei*
Pedicels at anthesis 5–8 mm. long, the petals 3.5–5 mm. broad, with 8–14 apical laciniae; endocarp of fruit 1–2 mm. thick, forming a putamen with the lateral angles strongly produced into lobes 5–8 mm. long; Samoa---------- 21. *E. ulianus*
Leaf-blades ovate, 5–9×3–6.5 cm., essentially entire at margin; pedicels 3–5 mm. long at anthesis; sepals 9–10 mm. long; petals 12–12.5 mm. long, with 16–19 apical laciniae; anthers with an apical awn 0.6–0.8 mm. long; Fiji---------- 22. *E. degenerianus*
Stamens 15–22; leaf-blades obtuse to attenuate at base, essentially entire or inconspicuously undulate-crenulate at margin, the branchlets and petioles soon glabrate.
Leaf-blades obtuse to subacute at base; petals pink with 7 or 8 yellowish apical laciniae; stamens 15, the anthers 3.3–3.8 mm. long, with a terminal awn 0.8–1 mm. long; style 5–6 mm. long; ovules 4–6 per locule; Fiji---------- 23. *E. xanthodactylus*
Leaf-blades attenuate at base and long-decurrent on the petiole; petals (color not known) conspicuously fimbriate with 14–18 lobes; stamens 18–22, the anthers 2.5–3 mm. long, with a terminal awn 0.5–0.8 mm. long; style 2.5 mm. long or less; ovules 2 per locule; Samoa.
24. *E. tuasivicus*

6. § *Chascanthus*

One species; Samoa ..... 24. *E. tuasivicus*

7. § *Coilopetalum*

One species; Samoa, Tonga, and Niue ..... 25. *E. tonganus*

1. § GANITRUS

Elaeocarpus § Ganitrus Brongn. & Gris in Bull. Soc. Bot. Fr. 8: 202. 1861.

Section *Ganitrus* is comparatively easily characterized and readily recognized (see Smith, 1944, pp. 227–229 for discussion). In New Guinea it is composed of approximately 16 known species, some of these having been referred to § *Ptilanthus*, which I believe not to be separable, by Schlechter (1916, p. 121). The section is represented eastward of New Guinea by 1 species each in the Solomon Islands, New Hebrides, and Samoa.

1. Elaeocarpus (§ *Ganitrus*) hebridarum Knuth in Rep. Sp. Nov. 50: 84. 1941.
***Elaeocarpus* aff. *persicaefolius* sensu Guillaumin in Journ. Arn. Arb. 12: 232. 1931; non Brongn. & Gris.**

Tree, up to 25 m. high, glabrous throughout (or young parts obscurely puberulent) except infructescence, the branchlets slender, 1.5–3 mm. in diameter near apices, distally purpurascent and obscurely angled; leaves numerous toward apices of branchlets, the petioles slender, canaliculate, 5–8 mm. long, angled or narrowly winged nearly to base, the blades thin, papyraceous, drying greenish brown, lanceolate, 8–14 cm. long, 1.5–4 (–5) cm. broad, attenuate at base and long-decurrent on the petiole, gradually narrowed to an obtuse or subacute apex, entire and narrowly recurved at margin in lower half, finely crenulate distally, the crenations 3–6 per centimeter, obscurely callose on the rounded upper margin, the costa plane or slightly raised above, prominent beneath, the secondary nerves 14–18 per side, spreading, curved, prominulous on both sides, the veinlet-reticulation intricate, plane or faintly prominulous on both sides; inflorescences not known; infructescences lateral below leaves, 3–7 cm. long, the short peduncle and rachis slender, 1–2 mm. in diameter, faintly strigose, glabrate; fruits 4–7 per infructescence or fewer, more or less unilateral, the pedicel slender, curved, 13–20 mm. long, pilose like rachis (hairs pale, 0.2–0.3 mm. long) and soon glabrate; disk pulvinate in fruit or obscure, the lobes confluent, distally hispidulous with yellowish hairs about 0.3 mm. long; fruits coriaceous when dried, presumably carnose when fresh, subglobose or slightly oblate, up to 22 mm. in diameter, faintly pentagonal when dried, obscurely sericeous-puberulent or soon glabrate, the epicarp very thin, tough, the mesocarp 2–3 mm. thick, fibrous, the endocarp hard and bony, 1–2 mm. thick, with numerous

irregular oblong processes 1–2 mm. long, the locules 5 (1–3 often aborting), each 1-seeded, the seeds oblong-ellipsoid, apparently about 8 mm. long, castaneous.

TYPE LOCALITY: Eromanga, New Hebrides; the type is *Kajewski* 328, deposited in the Berlin Herbarium and presumably destroyed; isotypes are cited below.

DISTRIBUTION: New Hebrides, thus far known only from three of the southern islands, in rain-forest at elevations of 200–400 m. The species is said by Kajewski to be a common tree 10–25 m. high, with a straight trunk; the fruit is blue.

LOCAL NAME AND USE: A local name for the type collection is given as *nay-yos*, and on Aneityum the wood is used for comb-making.

NEW HEBRIDES: EROMANGA: Dillion Bay, *Kajekski* 328 (TYPE COLL., A, K, NY. US). TANNA: Lenakel, *Kajewski* 93 (A. K. NY). ANEITYUM: Anelgauhat Bay, *Kajewski* 917 (A, K, NY).

Elaeocarpus hebridarum is a species of the general relationship of *E. sphaericus* (Gaertn.) K. Schum., amply characterized, even in the absence of flowers, by its small, short-petioled leaves with distally finely crenulate margins. The related *E. fauroensis* Hemsl., of the Solomon Islands (see Smith, 1944, p. 236, for amplification of original description) has leaf-blades about 15–20×4.5–6.5 cm., the fruiting pedicel about 25 mm. long, the fruit 2–3 cm. in diameter, and the endocarp with longer processes.

2. **Elaeocarpus (§ *Ganitrus*) christophersenii** A. C. Sm. sp. nov.
Elaeocarpus sp. Christophersen in Bishop Mus. Bull. 128: 140. 1935.
Elaeocarpus sphaericus sensu Christopherson in Bishop Mus. Bull. 154: 18. 1938, non K. Schum.

Arbor foliorum laminis lanceolatis fere ad basim conspicue crenatis, crenationibus decidue aristatis, sepalis utrinque sericeo-puberulis, petalis in lobos 5 primarios profunde fissis, laciniis ultimis 12–16, staminibus circiter 50, antheris 3–4.5 mm. longis erostratis apice setosis, ovario sericeo, stylo 6–7.5 mm. longo, loculis 5, ovulis 5 vel 6 per loculo; a *E. hebridarum* petiolis longioribus, laminis majoribus manifestius crenatis, pedicellis sub fructu longioribus differt.

Tree, up to 10 m. high, the young branchlets slender, 2–4 mm. in diameter near apices, purpurascent, inconspicuously angled, sparsely sericeous-puberulent with pale hairs 0.1–0.2 mm. long, soon glabrate and subterete; leaves numerous toward apices of branchlets, the petioles slender, flattened above, 12–20 mm. long, pilose like branchlets and soon glabrate, the blades thin, papyraceous, drying brownish, lanceolate or narrowly oblong, 11–19 cm. long, 3–5.2 cm. broad, glabrous on both sides, shining above, attenuate at base and decurrent on the petiole, gradually narrowed to an obtuse and shallowly retuse apex, conspicuously crenate at margins except near base,

the crenations 2 or 3 per centimeter, callose-aristate on the rounded distal margin (awn 0.5–1 mm. long, readily caducous, leaving a slight thickening), the costa nearly plane above or slightly elevated, prominent beneath, the secondary nerves 10–16 per side, arcuate-ascending, slightly elevated on both sides or subprominent beneath, irregularly anastomosing toward margins, the veinlet-reticulation prominulous on both sides or plane above; inflorescences lateral below leaves, at anthesis 7–9 cm. long, the peduncle short, the rachis slender, striate, 1–1.5 mm. in diameter, sparsely pilose like young branchlets; flowers numerous, 6–8 per centimeter of rachis but some caducous, the subtending bracts oblong-obovate, 2.5–3×1–1.5 mm., copiously sericeous without and puberulent within, caducous before anthesis, the pedicels at anthesis 13–17 mm. long; sepals 5, thin-carnose, lanceolate, 8–9 mm. long, 1.7–2 mm. broad, acute at apex, pilose on both sides like pedicel, inconspicuously carinate within; petals 5, thin-carnose, obovate-cuneate, 8–9 mm. long, 2.5–3 mm. broad, copiously tomentellous on proximal margins and within near base (hairs 0.2–0.4 mm. long), otherwise glabrous, copiously and deeply laciniate, the 5 principal divisions 4–5 mm. long, each of these once or twice dichotomously divided, the ultimate lobes 12–16, lanceolate, 1-nerved, 2–4 mm. long; disk carnose, 0.7–0.8 mm. high, copiously sericeous-hispidulous with golden hairs 0.2–0.3 mm. long, the lobes 5, confluent, dorsally shallowly sulcate; stamens about 3-seriate, 50–52, diverse in length, 4–6 mm. long, the filaments terete, 1–1.5 mm. long, minutely setulose-sericeous, the anthers 3–4.5 mm. long, minutely hispidulous, erostrate, subacute at apex, the dorsal apex terminated by 1–3 setae up to 1 mm. long; ovary subglobose, copiously sericeous with golden hairs 0.3–0.6 mm. long, the style subulate, 6–7.5 mm long, sericeous in the basal half, glabrous distally, soon caducous, the locules 5, each with 5 or 6 biseriate ovules; infructescences up to 11 cm. long, the indument of rachis and pedicels sometimes subpersistent, the pedicels 20–25 mm. long, the disk persistently hispidulous; fruits coriacous when dried, subglobose, at apparent maturity about 20 mm. in diameter, marked at apex with 5 obscure radiating lines, the epicarp thin, tough, the mesocarp 1.5–3 mm. thick, fibrous, the endocarp hard and bony, about 2 mm. thick, copiously ornamented with irregularly oblong processes 1–2 mm. long, the locules 5 but often all except one aborting, the seeds 1 per locule when developing.

Type in the herbarium of the Bernice P. Bishop Museum, collected in forest at Falelima-Sluvao, Savaii, Samoa, alt. about 50 m., November 19, 1931, by Erling Christophersen (No. 309).

ADDITIONAL SPECIMENS EXAMINED:

SAMOA: SAVAII: Tufutagoe-Falelima, *Christophersen* 2766 (Bish, US); near Salailua, *Christophersen* 2983 (Bish).

(?) WALLIS ISLANDS: UVEA: *Burrows* W8 (Bish).

(?) ROTUMA: *Waqatabu* 2631 (A).

DISTRIBUTION: The new species is known definitely only from Savaii, Samoa, where it has a limited range at low elevations (up to 150 m.). Christophersen notes it as from forest or edge of forest, near an abandoned plantation (No. 2766). The species is a tree 5–10 m. high, the fruit being blue when ripe and eaten by pigeons.

LOCAL NAME: *Siapo atua* is the name referred to Christophersen's three collections.

The specimens from Uvea and Rotuma are not too confidently referred here, since both are sterile and show slight differences in petiole-length and leaf-margins from the Samoan specimens. Burrows gives the local name *tongovao* for the Uvea plant; the Rotuma specimen was from a tree nearly 20 m. high, locally known as *umasa.*

The new species is certainly of the general affinity of *E. sphaericus* (Gaertn.) K. Schum., to which Christophersen referred it with the suggestion that it might be a recent introduction into Samoa. The notes with his specimens do not necessarily indicate that the plants were introduced. When clearing land for a plantation, the Polynesians usually leave large hard-wooded trees standing, and of course trees on the edge of a forest are often characteristic of the forest itself, but they are more accessible to collectors.

The conventional herbarium concept of *E. sphaericus*, so ably discussed by Merrill (1951, pp. 196–199), seems to me quite artificial, including as it does a large part of § *Ganitrus.* Of course, the ultimate decision as to the limits of this species will rest with some future monographer; but in the meantime I see little gain in the wholesale reduction of regionally limited taxa to a somewhat vague concept. Although *E. sphaericus* is said to be cultivated in India and perhaps in parts of Malaysia, because of the value attached to the hard endocarps, there is no evidence to indicate that the occurrence of § *Ganitrus* as far east as Samoa is unnatural. Its absence from Fiji, on the basis of present material, is puzzling, but a parallel distribution is seen in § *Coilopetalum;* both cases seem to indicate the need of more intensive collecting in our area.

From the only other species of § *Ganitrus* known from our region, *E. hebridarum* Knuth, of which flowers are unknown, *E. christophersenii* is readily distinguished by its longer-petiolate and larger leaves with more obvious marginal crenations, and by its comparatively long-pedicellate fruits.

Another species to which the Samoan plant is allied is the Australian *E. grandis* F. v. Muell., sometimes cultivated; the two entities are very close in foliage, *E. christophersenii* having its marginal crenations somewhat coarser. The sepals of *E. grandis* are about 12 mm. long and attenuate at apex, the petals are at least 16–17 mm. long but laciniate and pilose like those of the Samoan plant, the disk is about 1.5 mm.

high, the stamens are about 57–60 in number, with anthers 5–7 mm. long, and the style is about 15 mm. long.

2. § FISSIPETALUM

Elaeocarpus § Fissipetalum Schlechter in Bot. Jahrb. 54: 118. 1916.

The 4 species of § *Fissipetalum* known from our region are all Fijian, indicating that the section is to be expected in the Solomon Islands and the New Hebrides; in New Guinea it is represented by approximately 17 known species. The species placed here are easily recognized by their very small flowers, few stamens with erostrate anthers, reduced number of ovules, small fruits, and essentially unornamented pyrenes which are round in cross-section. Characteristically, the New Guinean species of this section have the ovules 4 per locule, but I found it necessary to place in the section species with 2 and 6 ovules per locule (1944, pp. 236–246). Of the Fijian species here placed, 3 have biovulate locules, and I believe that Schlechter's original interpretation of the section must be expanded to this extent.

It is questionable whether or not § *Fissipetalum* should be separated from § *Dicera* (for discussion of which see Smith, 1944, p. 223), a section which has, and perhaps correctly, been rather broadly interpreted. For instance, Merrill (1951, p. 165, etc.) refers to § *Dicera* certain new species which in petal-characters would be placed in § *Fissipetalum*, although elsewhere (1951, p. 174) he retains the latter section as distinct. Perhaps a reasonably broad interpretation of sectional lines will lead to the combination of these two names, and also § *Lobopetalum* Schlechter (1916, p. 109), under the earliest name, § *Dicera*. Such a decision can best be made by the ultimate monographer of the genus.

3. **Elaeocarpus** (§ *Fissipetalum*) **pittosporoides** A. C. Sm. in Journ. Arn. Arb. 26: 100. 1945.

Tree, up to 6 m. high, glabrous except for some floral parts, the branchlets slender (3–4 mm. in diameter distally), terete, cinereous; leaves crowded toward apices of branchlets, the petioles slender, shallowly canaliculate, 1–2 cm. long, the blades subcoriaceous or chartaceous, drying olivaceous, obovate-elliptic, 6.5–10 cm. long, 2.5–4.5 cm. broad, attenuate at base and decurrent on the petiole, obtusely cuspidate at apex, slightly recurved at margin and remotely undulate-crenulate, the costa strongly raised on both sides, the secondary nerves 6–8 per side, subspreading, anastomosing toward margins, sharply prominulous on both sides, the veinlet-reticulation obvious, prominulous on both sides; racemes axillary, lax, up to 6 cm. long, 2–4-flowered, the peduncle up to 3 cm. long and like the rachis slender, the pedicels very slender, at anthesis 20–25 mm. long; sepals 5, thin-carnose or

papyraceous, oblong, 5.5–6×1.5–2 mm., subacute, glabrous without, conspicuously carinate within and sericeous-puberulent with hairs 0.1–0.2 mm. long; petals 5, submembranaceous, obovate, about as long as sepals, 2.5–3 mm. broad, carinate within toward base and there faintly tomentellous, otherwise glabrous, 3–5-lobed at apex, the lobes subacute, 1–2 mm. long; disk about 0.5 mm. high, sparsely hispidulous, obscurely 5-lobed; stamens 26 or 27, 1- or 2-seriate, 3.5–4 mm. long, minutely papillose-hispidulous throughout, the filaments 1–1.5 mm. long, the anthers 2–2.5 mm. long, subacute at apex, erostrate, the dorsal apex slightly projected; gynoecium glabrous, the ovary ovoid, 2-locular, each locule with 4 biseriate ovules, the style subulate, 2–2.5 mm. long.

TYPE LOCALITY: Viti Levu, Fiji; the type is *Greenwood* 1010.

DISTRIBUTION: Thus far known only from the type collection, obtained at an elevation of 200–300 m. in southeastern Viti Levu, from a tree 5–6 m. high; the flower-buds (essentially mature) are yellow, somewhat dependent on very thin pedicels.

FIJI: VITI LEVU: Namosi: Hills between Navua River and Suva, *Greenwood* 1010 (A TYPE, K).

This very distinct species, which remains known only from the original collection, is distinguishable from *E. cassinoides* and its more immediate allies by the several obvious characters utilized in my key. Although I referred the species to § *Dicera* in 1945, I am now inclined to place it in § *Fissipetalum* because of its laciniate (although few-lobed) petals and erostrate anthers.

4. **Elaeocarpus** (§ *Fissipetalum*) **cassinoides** A. Gray, Bot. U. S. Expl. Exped. 1: 204. 1854; C. Muell. in Walp. Ann. Bot. Syst. 4: 331. 1857; Seem. Fl. Vit. 29. 1865; Hemsl. in Journ. Linn. Soc. Bot. 30: 171. 1894; A. C. Sm. in Journ. Arn. Arb. 26: 99. 1945.

Tree, up to 23 m. high, the young parts copiously strigose-hispidulous, the branchlets subterete, slender, brownish, when young pale-puberulent or strigose with hairs 0.1–0.2 mm. long, usually soon glabrate; petioles pilose and glabrate like branchlets, slender, canaliculate, 5–15 mm. long; leaf-blades papyraceous or chartaceous, oblong- or obovate-elliptic, 5–11 cm. long, 2–5 cm. broad, subacute to attenuate at base and decurrent on the petiole, broadly obtuse to obtusely cuspidate and often obscurely emarginate at apex, often narrowly recurved at margin and crenulate especially distally (crenations 1–3 per centimeter, at first obscurely spinulose but soon rounded and callose on distal margin), obscurely puberulent on nerves when young but soon glabrate on both sides, the costa plane or slightly raised above, prominent beneath, the secondary nerves 4–9 per side, erecto-patent, anastomosing, slightly prominulous or plane above, raised and often with axillary domatia beneath, the veinlet-reticulation prominulous on

both sides or obscure above; racemes axillary, usually 3–4.5 cm. long at anthesis, 12–17-flowered, short-pedunculate, the rachis and pedicels pale-puberulent or hispidulous with pale or yellowish hairs 0.1–0.3 mm. long, the flower-subtending bracts submembranaceous, lanceolate, 2–3 mm. long, sparsely pilose, soon caducous, the pedicels 2–3.5 mm. long at anthesis; sepals 5, submembranaceous, deltoid-oblong, 1.5–2 mm. long, 0.7–1.2 mm. broad, subacute, sparsely puberulent on margin and distally within, otherwise glabrous, carinate within; petals 5, submembranaceous, glabrous, obovate-cuneate, 1.3–1.9 mm. long, 0.8–1.2 mm. broad, fimbriate with 6–8 lobes, these subequal, obtuse, 0.3–0.5 mm. long; disk 5-lobed, the lobes nearly free, about 0.4 mm. high and 0.7 mm. broad, dorsally deeply sulcate, copiously hispidulous; stamens 14–16, uniseriate, 1.2–1.3 mm. long, the filaments slender, glabrous, about 0.6 mm. long, the anthers oblong, hispidulous, obtuse, erostrate, 0.6–0.7 mm. long; ovary ovoid, with base of style puberulent-hispidulous (hairs about 0.15 mm. long), the style 0.4–0.5 mm. long, the locules 2, each biovulate; infructescence often shortened by loss of apical portion of rachis, the pedicels stout, 2–5 mm. long, subglabrate; fruits obovoid or ellipsoid, 14–20 mm. long, 8–11 mm. broad, glabrous, the epicarp thin, rugulose, waxy, together with the mesocarp forming a carnose outer layer 0.5–1 mm. thick, the endocarp very hard, about 2.5 mm. thick, rugulose by means of slight irregular depressions, longitudinally bisulcate, the locule and seed usually solitary, the seed ellipsoid-oblong, about 10 mm. long.

TYPE LOCALITY: Mbua Bay [Sandalwood Bay], Vanua Levu, Fiji; type collected by U. S. Exploring Expedition, cited below.

DISTRIBUTION: Endemic to Fiji,[4] thus far known from several of the islands, occurring in various types of forest or in thickets at elevations up to 400 m. My own notes indicate the plant as a tree 13–23 m. high, with a trunk-diameter up to 1 m.; the petals of No. 1086 (the only specimen with mature flowers) were pale pink; the fruits are blue or purplish.

LOCAL NAME: *Wailoaloa* (*Smith* 1735).

FIJI: VITI LEVU: Rewa: Slopes of Korombamba Mt., *Gillespie* 2307 (Bish, GH, K, NY, US). VANUA LEVU: Mbua: Mbua Bay, *U. S. Expl. Exped.* (GH, K, US 13596 TYPE); lower Wainunu River valley, *Smith* 1735 (Bish, GH, K, NY, US). KORO: Eastern slope of main ridge, *Smith* 1007 (Bish, GH, K, NY, US); western slope, *Smith* 1086 (Bish, GH, K, NY, US). MOALA: Above Maloku, *Smith* 1353 (Bish, GH, K, NY, US).

Elaeocarpus cassinoides is clearly distinguished from its relatives

[4] In 1945 I remarked that statements of the occurrence of this species in Tonga were all based upon Gray's very questionable record. In currently known and authentic Tongan collections it has not reappeared, and so it seems advisable to drop the species from lists of Tongan plants; I feel certain that Gray's material came from one collection, from Vanua Levu.

in our region, except the following (*E. pyriformis*), by its comparatively minute flowers. Its small, predominantly obovate-elliptic, and glabrous leaves further characterize it, and its small fruits, with a bony and inconspicuously rugulose endocarp, are typical for the section. In my previous notes on *E. cassinoides*, in 1945, I was reluctant to assign it to § *Fissipetalum*, because of its biovulate ovary-locules, but in all other basic respects it agrees with the Papuasian members of this section.

5. Elaeocarpus (§ *Fissipetalum*) pyriformis A. Gray, Bot. U. S. Expl. Exped. 1: 205. 1854; C. Muell. in Walp. Ann. Bot. Syst. 4: 332. 1857; Seem. Fl. Vit. 29. 1865.

Shrub or tree, up to 8 m. high (or more?), the young parts copiously hispidulous with yellowish hairs, the branchlets subterete, striate, often flexuose distally, 1.5–2.5 mm. in diameter toward apices, at first copiously hispidulous-puberulent with hairs 0.1–0.3 mm. long, eventually glabrate; leaves numerous toward apices of branchlets, the petioles slender, flattened above or shallowly canaliculate, 4–15 mm. long, pilose like branchlets, the indument persistent, the leaf-blades chartaceous or submembranaceous, drying dull green, oblong-elliptic, 4.5–12 cm. long, 3–6.7 cm. broad, rounded or broadly obtuse at base or rarely acute and decurrent on the petiole, rounded or obtusely cuspidate and inconspicuously emarginate at apex, often narrowly recurved at margin and shallowly crenulate (crenations 2 or 3 per centimeter, obscurely spinulose but soon becoming inconspicuously callose on distal margin), glabrous above or subpersistently puberulent on lower part of costa, puberulent beneath with pale hairs 0.1–0.3 mm. long, these often persistent at least on costa and some secondaries, the costa plane or slightly elevated above, prominent beneath, the secondary nerves 5–10 per side, spreading, inconspicuously anastomosing, prominulous or plane above, sharply elevated beneath and often with axillary domatia, the veinlet-reticulation intricate, prominulous on both sides or plane above; racemes solitary, axillary or borne above scars of fallen leaves, 2–3 cm. long at anthesis, 8–12-flowered (or some flowers caducous), the peduncle very short, the rachis and pedicels slender, copiously pilose with pale spreading hairs 0.2–0.3 mm. long, the flower-subtending bracts membranaceous, lanceolate, about 1 mm. long, dorsally minutely strigillose, the pedicels 2–3 mm. long at anthesis; sepals 5, submembranaceous, ovate-deltoid, 1.5–1.7 mm. long, 0.7–1 mm. broad, acute, carinate within, minutely puberulent without and toward apex within; petals 5, membranaceous, obovate-cuneate, glabrous, 1.5–1.8 mm. long, 0.8–1.2 mm. broad, fimbriate with 7–10 lobes, these subequal, obtuse, 0.2–0.4 mm. long; disk-lobes 5, nearly free, 0.3–0.4 mm. high and 0.6–0.8 mm. broad, deeply bilobed, uniformly and copiously hispidulous; stamens 14 or 15, uniseriate, 0.6–0.7 mm.

long, the filaments terete, glabrous, about 0.3 mm. long, the anthers oblong, minutely hispidulous, obtuse, erostrate, 0.3–0.4 mm. long; ovary ovoid, sparsely sericeous with hairs 0.2–0.3 mm. long, the style subulate, 0.6–0.7 mm. long, the locules 2, each biovulate; infructescence up to 5 cm. long, often shortened by loss of tip of rachis, the pedicels 3–5 mm. long, with long-persistent indument but eventually subglabrate; fruits obovoid, 15–22 mm. long, 10–14 mm. broad, glabrous, obtuse at base and apex, the epicarp thin, rugulose, waxy, forming with the mesocarp an outer carnose layer 1–1.5 mm. thick, the endocarp hard and bony, 2–3 mm. thick, inconspicuously rugulose, longitudinally bisulcate, the locule 1, the seed filling the entire cavity.

TYPE LOCALITY: Mbua Bay [Sandalwood Bay], Vanua Levu, Fiji; the type is the Exploring Expedition specimen cited below.

DISTRIBUTION: Endemic to Fiji, collected only on the two large islands, at elevations from near sea level up to 750 m. The species is a tree or shrub noted up to 8 m. in height, occurring in forest or on wooded ridges. The only flowering specimen (*Horne* 222) is without color notes; the fruits accompanying my No. 6831 were shining, metallic, green-blue, becoming brighter blue.

LOCAL NAME: *Kesa* (*MacDaniels* 1041).

FIJI: VITI LEVU: Mba: Nambuyasa Village, *Gillespie* 4086 (Bish, GH, K). Nandronga & Navosa: Southern slopes of Nausori Highlands, above Tumbenasolo, *Greenwood* 1187 (A, US). Namosi: Vicinity of Namosi, *Gillespie* 2835 (Bish, GH, NY, US). Naitasiri: Waindina River basin, *MacDaniels* 1041 (A, Bish). VANUA LEVU: Mbua: Mbua Bay, *U. S. Expl. Exped.* (GH, K, US 13616 TYPE). Mathuata: Southern base of Mathuata Range, north of Natua, *Smith* 6831 (A, US). Fiji, without definite locality: *Horne* 222 (K), 981 (K), *Tothill* 375 (K).

Gray was aware of the close relationship between his *E. pyriformis* and *E. cassinoides*, and indeed there would be justification for treating the available material as conspecific. Only the slight differences in leaf-shape and in degree and persistence of indument of vegetative parts, as indicated in my key, separate the two concepts. Only one collection of each species with mature flowers is thus far known, and so no comprehensive picture of floral differences, if consequential, is available. On the basis of these two specimens, however, *E. pyriformis* has the smaller bracts and stamens, other floral parts being essentially similar.

6. **Elaeocarpus** (§ *Fissipetalum*) **kasiensis** A. C. Sm. in Bishop Mus. Bull. 141: 92, *fig. 48*. 1936.

Shrub, about 3 m. high, glabrous throughout except for young parts and inflorescences, the young parts sericeous with pale hairs 0.3–0.5 mm. long, soon glabrate, the branchlets terete, slender, 2–4 mm. in diameter toward apices; petioles rugose, shallowly canaliculate,

1–2 cm. long; leaf-blades thin-coriaceous, when dry green and shining above and often reddish beneath, obovate-oblong, 7–15 cm. long, 3–7 cm. broad, attentuate at base and long-decurrent on the petiole, rounded at apex, often revolute at margin and obviously crenulate (crenations 1 or 2 per centimeter, distally terminated by a blackish callose apiculation 0.5–0.8 mm. long, this caducous, leaving the distal margin rounded), the costa plane or slightly raised above, prominent beneath, the secondary nerves 5–8, ascending, obviously anastomosing toward margin, the veinlet-reticulation lax, prominulous or immersed on both sides; racemes solitary, axillary, 2–6 cm. long at anthesis, short-pedunculate, 6–18-flowered, the rachis and pedicels slender, often reddish, sparsely strigose-puberulent with pale hairs 0.2–0.3 mm. long, the flower-subtending bracts lanceolate, 2–3 mm. long, sparsely puberulent without, caducous, the pedicels 3–6 mm. long, curved; sepals 4 or 5, thin-carnose, lanceolate-ovate, acute, 3–3.5 mm. long, 1.2–2 mm. broad, sparsely puberulent and glabrate without, glabrous and carinate within; petals 4 or 5, submembranaceous, thickened toward base, oblong-obovate, 2.5–3 mm. long, 1.2–1.5 mm. broad, glabrous, fimbriate at apex with 5–7 lobes, these about 0.5 mm. long, rounded, subequal or the middle lobe the largest; disk-lobes 4 or 5, essentially free, about 0.4 mm. high and 0.8 mm. broad, minutely but copiously hispidulous; stamens 10–12, uniseriate, 1.8–2 mm. long, the filaments terete, glabrous, 0.5–0.8 mm. long, the anthers minutely tuberculate-hispidulous, 1–1.3 mm. long, rounded at both ends, erostrate; ovary ovoid, minutely pale-sericeous with hairs 0.1–0.2 mm. long, the style conical-filiform, about 1 mm. long, sparsely sericeous near base, glabrous distally, the locules 2, each with 2 collateral ovules; infructescences soon glabrate throughout, up to 8 cm. long, the pedicels up to 10 mm. long, incrassate, the fruits obovoid, up to 2×1 cm., apiculate at apex, the immature pericarp about 1 mm. thick.

TYPE LOCALITY: Yanawai River region, Vanua Levu, Fiji; type, *Smith* 1761.

DISTRIBUTION: Known only from the type collection, taken from a shrub 3 m. high, occurring in dense bush at an elevation of 300–430 m. The sepals are yellow and the petals pink with yellow margins.

FIJI: VANUA LEVU: Thakaundrove: Yanawai River region, Mt. Kasi, *Smith* 1761 (Bish TYPE, GH, K, NY, US).

While agreeing with *E. cassinoides* and *E. pyriformis* in its basic characters, including the biovulate ovary-locules, *E. kasiensis* is a very distinct species on the basis of its obovate-oblong and often reddish leaves, its comparatively large flowers, and its reduced number of stamens. Although I originally referred the species to § *Dicera*, it now seems better placed in § *Fissipetalum*.

3. § MONOCERA

Elaeocarpus § Monocera Brongn. & Gris in Bull. Soc. Bot. Fr. 8: 201. 1861.

Section *Monocera* has been used in a very broad sense by many students; its typification and essential characters were recently outlined by me (1944, pp. 255–256), and § *Papuanthus* Schlechter was reduced to synonymy. In New Guinea the section consists of approximately 12 species, while 1 species is known from the Solomon Islands. In our region 8 species, all Fijian, are here recognized; the discovery of the section in the New Hebrides seems inevitable.

The species here referred to § *Monocera* are characterized by comparatively large flowers, often copiously laciniate petals, numerous and aristate stamens, a bilocular ovary with numerous ovules, and a large somewhat flattened fruit. The endocarp is characteristically flattened, very hard and uniformly bony, with obvious and often lobed lateral angles.

7. **Elaeocarpus** (§ *Monocera*) **storckii** Seem. in Bonplandia 10: 295. 1862, Fl. Vit. 28. *pl.* 7. 1865.

A large tree, glabrous throughout except for some floral parts, the branchlets very robust, subterete, 7–15 mm. in diameter near apices, conspicuously cicatricose with the crowded scars of fallen leaves; leaves congested near apices of branchlets, the petioles stout (1.5–3 mm. in diameter), rugose, shallowly canaliculate, 3–6 cm. long, swollen at base and apex, the leaf-blades thick-coriaceous, drying olivaceous, obovate- or elliptic-oblong, 9–20 cm. long, (3–) 4–9 cm. broad, acute or obtuse at base, rounded or very bluntly cuspidate at apex and shallowly emarginate, thickened and somewhat recurved at margin, entire in the basal half or throughout but more often shallowly crenulate distally (crenations 1 or 2 per centimeter, inconspicuously callose-spinulose and soon rounded on distal margin), the costa stout, strongly elevated above and very prominent beneath, the secondary nerves 7–11 per side, erecto-patent, irregularly anastomosing toward margin, bluntly elevated on both sides, the veinlet-reticulation intricate, conspicuous, prominulous on both sides; racemes lateral from branchlets below leaves, robust, 6–11 cm. long including flowers, the peduncle short, forming with the rachis a very stout (2–5 mm. in diameter) axis 2–5 cm. long, this subterete, swollen at bases of pedicels, the flower-subtending bracts not seen, the developing flowers 2–7 in number; pedicels 2–5.5 cm. long at anthesis, stout, 2.5–4 mm. in diameter at anthesis, swollen distally; sepals 5, thick-coriaceous (1–2 mm. thick), oblong-lanceolate, 30–40 mm. long, 5–10 mm. broad, subacute at apex, glabrous without, carinate and copiously sericeous within (hairs stramineous, 0.2–0.4 mm. long), densely puberulent on the thickened margins; petals 5, carnose, oblong-obovate, 30–47 mm.

long, about 15 mm. broad, glabrous on both sides or sparsely puberulent proximally within, greatly thickened and carinate within toward base, crenulate-lobed at the rounded apex (lobes 12–16, obtuse, 1–2 mm. long, subequal or the middle lobe the largest); disk thick-carnose or subcoriaceous, glabrous, annular-pulvinate, 2–3 mm. high, 5-lobed, the lobes confluent, dorsally sulcate; stamens 100–125, 4–6-seriate, 18–25 mm. long, the filaments terete, gradually narrowed upward, 5–9 mm. long, copiously hispidulous with hairs 0.1–0.2 mm. long, the anthers slender, stiff, minutely hispidulous-tuberculate, 13–16 mm. long including awns, uni- or biaristate at apex, the dorsal awn subulate, 1.7–4 mm. long, the ventral awn up to 2 mm. long or lacking; ovary coriaceous, conical, glabrous, the style stout, conical-subulate, glabrous, up to 20 mm. long, the ovary-wall very thick (1–1.5 mm. at anthesis), the locules 2, each with 8 biseriate ovules; very young fruits ovoid, up to 2×1 cm., the epicarp strongly rugulose, the mesocarp thick and fibrous, the endocarp not bony at this stage; mature fruits (ex Storck) ovoid, acute, 4–6 cm. long, the stone large, bony, 1-seeded.

TYPE LOCALITY: Ovalau, Fiji; the type is *Storck* 871, cited below.

DISTRIBUTION: Fiji, known definitely only from Ovalau and southeastern Viti Levu, at elevations up to 550 m. Although further data are inadequate, the species is doubtless a large forest tree, and Storck noted that its flowers were colored; Seemann's artist shows the sepals as rich pink, the petals as yellow proximally, pink toward apices.

LOCAL NAME: *Ngaingai* ["*gaigai*"], according to Storck, who noted that the tree exudes a resin.

FIJI: VITI LEVU: Rewa: Near summit of Korombamba Mt., *Gillespie* 2325 (Bish, GH). Naitasiri: Kalambo, *Tothill* in 1929 (K). OVALAU: Port Kinnaird, *Storck* 871 (BM, GH, K TYPE). Fiji, without definite locality: *Horne* 479 (GH, K).

Elaeocarpus storckii is without close relatives among the species of our area, being remarkable for its very robust habit, thick leaves, very coarse flowers, and numerous stamens. In nature it must be a beautiful and spectacular species, if the large flowers are as brightly colored as depicted by Seemann's artist.

8. **Elaeocarpus** (§ *Monocera*) **chelonimorphus** Gillespie in Bishop Mus. Bull. 83: 18. *fig. 22.* 1931; A. C. Sm. in Bishop Mus. Bull. 141: 95, 1936.

Tree, up to 15 m. or more in height, rarely a shrub, the young parts minutely sericeous-puberulent, the branchlets subterete, 2–6 mm. in diameter toward apices, when young minutely strigose-puberulent (hairs pale, 0.1–0.2 mm. long), soon glabrate; leaves usually spaced on distal parts of branchlets, not congested, the petioles stout (1.5–3 mm. in diameter, swollen at base and apex), flattened above or shallowly canaliculate, variable in length, (8–) 15–60 mm. long, obscurely

puberulent like branchlets, soon glabrate; leaf-blades chartaceous or thin-coriaceous, pale or dark green to brownish when dried, narrowly or broadly elliptic to lanceolate or obovate-lanceolate, (8–) 13–23 cm. long, (3–) 5–9 cm. broad, acute (rarely obtuse) to attenuate at base and decurrent on the petiole, acuminate or abruptly cuspidate at apex (acumen up to 15 mm. long, obtuse or callose-acute), often narrowly recurved at margin and obscurely or obviously spinulose-crenulate (crenations 1 or 2 per centimeter), glabrous on both sides or obscurely and evanescently strigose-puberulent beneath, the costa prominent on both sides, the secondary nerves 6–12 per side, curved-ascending, irregularly anastomosing, slightly elevated above, sharply raised beneath and often with axillary domatia, the veinlet-reticulation obvious, intricate, prominulous on both sides; racemes arising from branchlets below leaves or rarely axillary, the peduncle short, with the rachis forming a slender axis 1–4 (–5.5) cm. long, the maturing flowers usually 2–5 or rarely more, the rachis pale-puberulent (hairs 0.1–0.2 mm. long) or sometimes very early glabrate, the flower-subtending bracts papyraceous, ovate-deltoid, acute, 1.5–3 mm. long, puberulent on both sides or tomentellous within, soon caducous, the pedicels slender, 2–5 cm. long at anthesis, gradually enlarged distally; sepals 5, carnose, variable in thickness, lanceolate or oblong-lanceolate, 22–32 mm. long, 3.5–9 mm. broad, gradually narrowed to a subacute apex, glabrous without, carinate within and copiously sericeous-tomentellous (hairs golden, 0.2–0.5 mm. long), puberulent on the broadened margins; petals 5, submembranaceous distally, thickened toward base and conspicuously carinate proximally within, oblong to oblong-obovate or broadly oblong-elliptic, 23–37 mm. long, 7–16 mm. broad, conspicuously reticulate-veined, glabrous on both sides or sparsely spreading-pilose on lower part of carina within, conspicuously fimbriate at the rounded apex, the lobes 9–19, variously cleft, lanceolate, acute, 3–8 mm. long, usually with 1–3 ultimate veinlets, the middle lobe the broadest; disk carnose to coriaceous, annular-pulvinate, 1–2.5 mm. high, 5-lobed, the lobes confluent, dorsally sulcate and sericeous, apically copiously hispidulous with golden hairs 0.2–0.5 mm. long; stamens 48–90, 2–4-seriate in 5 clusters on flattened upper surface of disk-lobes, 17–22 mm. long, the filaments carnose, terete, gradually narrowed distally, 6–9 mm. long, copiously hispidulous with hairs 0.5–1 mm. long, the anthers minutely tuberculate-hispidulous and dorsally sericeous (hairs as on filaments), 9–13 mm. long, the dorsal awn lanceolate-subulate, 0.8–1.5 mm. long, the ventral apex obtuse, often recurved but not aristate; ovary narrowly ellipsoid, flattened, glabrous or sparsely hispidulous at base, the style subulate, glabrous, 10–20 mm. long, the ovary-wall very thick, obscurely sericeous within, the locules 2, each with 8 biseriate ovules; infructescences on branchlets or trunk, the rachis glabrate, thick but not much elongating, the

pedicels up to 6 cm. long, very stout, the disk persistent; fruits ovoid or ellipsoid, laterally slightly compressed, carnose when fresh, drying coriaceous, 5–6.5 cm. long, 3–4.5 cm. broad, glabrous, rounded or obtuse at both ends, the base of style persistent, the epicarp brittle and coarsely rugose when dry, thin (about 0.2 mm. thick), the mesocarp spongy, fibrous, 5–10 mm. thick in fresh fruits, the endocarp hard and bony, 4–6 mm. thick, forming an ellipsoid and strongly flattened putamen up to 50×35×22 mm., this acute at both ends, diamond-shaped in cross section, 4-angled, the lateral angles shallowly lobed (lobes 4–6 per side, obtuse, up to 5 mm. long, apically directed), the dorsiventral angles obtuse or acute, often sulcate, the locule 1, occupied by a single ellipsoid seed up to 3 cm. long.

TYPE LOCALITY: Mt. Korombamba, southeastern Viti Levu, Fiji; the type is *Gillespie* 2293, cited below.

DISTRIBUTION: Endemic to Fiji, but thus far known only from Viti Levu and Vanua Levu, appearing to be the most common *Elaeocarpus* on the former island. Elevations upward of 100 m. have been recorded, but the species reaches its greatest abundance toward the summits; it has been found on Tomanivi (1323 m.) and other high hills. It occurs in various types of forest, usually in dense rain-forest or in the low mossy forest of ridges. The species is usually noted as a tree 7–15 m. in height, less commonly as a low shrub. The sepals are green, the petals and filaments white to greenish yellow, the anthers and disk-lobes pale yellow, and the ovary and style green; the fruit is green to bluish or yellowish.

LOCAL NAMES: Several collectors have noted the name *kambi* on Viti Levu, and Degener mentions that the kernel of the fruit is edible. My No. 5346 bears the local name *sivia*.

FIJI: VITI LEVU: Mba: Mt. Evans Range, *Greenwood* 877A (A, K, NY); eastern slopes of Mt. Koroyanitu, Mt. Evans Range, *Smith* 4150 (A, US); hills between Nandala and Nukunuku Creeks, along trail from Nandarivatu toward Lewa, *Smith* 6189 (A, US); Mt. Nanggaranambuluta [Lomalangi], near Nandarivatu, *Smith* 4802 (A, US), *Greenwood* 877 (A); Vunlnatambua, Navai, *Degener* 14878 (A, K, NY); Nauwanga, *Degener* 14542 (A, Bish, K, NY, US); valleys of Nggaliwana and Tumbeindreketi Creeks, *Smith* 5346 (A, US), 5864 (A, US); summit of Mt. Tomanivi [Mt. Victoria], *Smith* 5195 (A, US). Nandronga & Navosa: Northern portion of Rairaimatuku Plateau, between Nandrau and Rewasau, *Smith* 5646 (A, US); ridge between Koronayalewa and Molava, *B. E. Parham* 1438 (A); ridge between Naloka and Naraiyawa, *B. E. Parham* 2473 (A). Namosi: Naitarandamu Mt., *Gillespie* 3118 (Bish, GH), 3141 (Bish, GH, NY); Wainikoroiluva River above Naraiyawa, *B. E. Parham* 1442 (A); ridge southeast of Namosi, *Gillespie* 2844 (Bish, GH, NY, US); between Ndevoira and Naseivou, *B. E. Parham* 1836 (A). Naitasiri: Nathokaika track, *B. E. Parham* 919 (A); vicinity of Nasinu, *Gillespie* 2293.5 (Bish); Tholo-i-suva, *B. E. Parham* 1609 (A); Tamavua, *Yeoward* 61 (K). Rewa: Southeastern slopes of Mt. Korombamba, *Gillespie* 2293 (Bish TYPE, GH, K, NY, US). Tailevu: Wainivesi, *B. E. Parham* 2629 (A). VANUA LEVU: Mathuata: Seanggangga Plateau, in drainage of Korovuli River, vicinity of Natua, *Smith* 6659 (A, US). Thakaundrove-

Mathuata boundary: Crest of Korotini Range, between Navitho Pass and Mt. Ndelaikoro, *Smith* 550 (Bish, NY). Thakaundrove: Yanawai River region, Mt. Kasi, *Smith* 1798 (Bish, K, NY), 1802 (Bish, GH, K, NY, US); Natewa Peninsula, Uluingala, *Smith* 2001 (Bish, GH, K, NY, US).

The basic characters of this species are the acute-based leaf-blades with obvious venation, the large flowers, the glabrous sepals and ovary, and the numerous stamens. However, in the extensive suite of available specimens there is considerable variation in such characters as length of petiole, leaf-size, size of flowers, and number of stamens. Possibly infraspecific categories will eventually seem desirable, but for the present I have only four or five collections with fully developed flowers, in which the important characters must be sought. It should be noted that in two specimens from high elevation (*Smith* 2001 and 5195) the floral variation from more typical material is considerable. These two specimens have the sepals 7–9 mm. broad, the petals 12–16 mm. broad, and the styles 15–20 mm. long; in other available mature flowers the sepals are 3.5–7 mm. broad, the petals 7–11 mm. broad, and the styles 10–14 mm. long. No correlation has been detected as to stamen-number; the type specimen has about 48 stamens (rather than 40 as stated by Gillespie), while other material has the stamens 68 to 90 in number, often in a single plant. The broad, long-styled flowers discussed above do not have any unusual leaf-characteristics, and for the time being they do not seem especially significant.

9. **Elaeocarpus (§ *Monocera*) gillespieanus** A. C. Sm. in Bishop Mus. Bull. 141: 94. *fig. 49.* 1936.

Tree, up to 20 m. high, essentially glabrous throughout except for some floral parts, the young parts glabrous or very sparsely pale-strigose, the branchlets subterete, 2.5–4 mm. in diameter toward apices; leaves spaced on distal parts of branchlets, the petioles slender, shallowly canaliculate, 2–4 cm. long, the blades thin-coriaceous, drying olivaceous, ovate-elliptic, 7–13 cm. long, 3–5 cm. broad, rounded or faintly cordate at base, acuminate at apex (acumen up to 15 mm. long, callose-acute, fragile), slightly thickened at margin and subentire or remotely crenulate (crenations about 1 per centimeter, shallow), the costa plane or slightly elevated above, prominent beneath, the secondary nerves 8–10 per side, spreading, slightly curved, pale, slightly elevated above and prominulous beneath, the veinlet-reticulation intricate, prominulous on both surfaces; racemes arising from branchlets below leaves, the peduncle very short, forming with the rachis a slender glabrous (or very obscurely pale-strigose) axis 4–6 cm. long, the maturing flowers usually 2–5, the pedicels 20–35 mm. long; sepals 4 or 5, thick-carnose, lanceolate-oblong, 18–30 mm. long, 4–7 mm. broad, acute at apex, glabrous without or very obscurely strigose like rachis, densely sericeous within (hairs whitish, 1–2 mm. long), slightly thickened at margins; petals 4 or 5, submembranaceous, inconspicu-

ously carinate and thickened proximally within, glabrous on both sides or with a few scattered strigose hairs dorsally and faintly puberulent-ciliolate toward base, obovoid, 25–35 mm. long, 10–18 mm. broad, fimbriate at apex with 14–20 lobes, these 3–6 mm. long, variously joined, each reticulate-nerved, the middle lobe the largest; disk pulvinate, about 1.5 mm. high, deeply 4- or 5-lobed, the lobes confluent, dorsally sulcate, sericeous dorsally and hispidulous distally with golden hairs 0.2–0.4 mm. long; stamens 90–100, in 4–6-seriate clusters on upper surface of disk-lobes, 15–17 mm. long, the filaments terete, slender, 7–8 mm. long, copiously hispidulous with pale ascending hairs 0.7–1 mm. long, the anthers 7–9 mm. long (including awn), copiously sericeous-hispidulous along dorsal and ventral median lines (hairs 0.5–1.5 mm. long), the dorsal awn subulate, very conspicuous, 3–3.5 mm. long, the ventral apex subacute, sometimes recurved but not aristate; ovary ovoid-ellipsoid, slightly flattened, glabrous (or very sparsely strigose toward base), the style filiform, glabrous, 12–15 mm. long, the ovary-wall very thick, the locules 2, each with 8 biseriate ovules.

TYPE LOCALITY: Mt. Seatura, Vanua Levu, Fiji; type, *Smith* 1613.

DISTRIBUTION: Known only from the type collection, obtained at an elevation of 400 m. in dense forest; this collection was from a tree 20 m. high, with the petals noted as white.

LOCAL NAME: *Mamakura.*

FIJI: VANUA LEVU: Mbua: Southern slopes of Mt. Seatura, *Smith* 1613 (Bish TYPE, GH, K, NY, US).

Elaeocarpus gillespieanus is closely related only to *E. chelonimorphus* and *E. vitiensis.* As it is thus far known only from the type collection, one does not know how dependable its characters are, but it clearly differs from *E. chelonimorphus* in such characters as leaf-shape and prominence of the anther-awn; the material of Gillespie's species is sufficiently ample so that the range of variability in these respects is well established and cannot be taken to include the type of *E. gillespieanus.* *Elaeocarpus vitiensis*, also an inadequately known species, closely resembles *E. gillespieanus* in foliage, but differs in its apparently slightly smaller flowers, less copiously fimbriate petals, and much shorter anther-awns.

10. **Elaeocarpus** (§ *Monocera*) **vitiensis** Gillespie in Bishop Mus. Bull. 83: 20. *fig. 24.* 1931.

Tall tree, essentially glaborous throughout except for some floral parts, the young parts very sparsely strigose-puberulent and soon glabrate, the branchlets terete, 1.5–3 mm. in diameter toward apices; leaves spaced on distal parts of branchlets, the petioles slender, slightly flattened above, 2–4 cm. long, swollen at base and apex, the blades coriaceous to chartaceous, olivaceous or dull green when dried, ovate-

elliptic, 7–16 cm. long, 3–6.5 cm. broad, rounded or broadly obtuse at base, gradually narrowed to a short-acuminate apex (acumen up to 1 cm. long, obtuse), undulate-crenulate at margin (crenations 1 or 2 per centimeter, shallow, rounded), the costa plane or slightly elevated above, prominent beneath, the secondary nerves 7–10 per side, spreading, curved, inconspicuously anastomosing, prominulous above and slightly elevated beneath, the veinlet-reticulation prominulous on both sides; racemes lateral below leaves, the peduncle very short, with the rachis forming an axis about 2 cm. long at anthesis, the maturing flowers apparently 2–4, the pedicels at anthesis 15–25 mm. long, sparsely pilose with a few spreading hairs, soon glabrate; sepals 4 or 5, carnose, lanceolate, 19–20 mm. long, 3–4 mm. broad, gradually narrowed to an acute apex, sparsely pilose without like pedicel and soon glabrate, carinate within and copiously sericeous (hairs pale, 0.2–0.3 mm. long), puberulent on the thickened margins; petals 4 or 5, membranaceous, carinate and slightly thickened within toward base, oblong-obovate, 22–25 mm. long, 7–10 mm. broad, glabrous on both sides or very obscurely sericeous toward base, apically 6–9-lobed, the lobes oblong, subacute, sometimes inconspicuously subdivided, copiously reticulate-veined, the middle lobe the largest; disk hispidulous at apex with pale hairs 0.4–0.6 mm. long; stamens probably 40–75 (40–50 ex Gillespie; 74 in one flower of *Degener* 14544), 14–15 mm. long, the filaments slender, 5.5–7 mm. long, copiously hispidulous with pale hairs 0.5–1 mm. long, the anthers 8–9 mm. long, very minutely tuberculate, sparsely sericeous dorsally and ventrally, the dorsal awn subulate, 1.2–2 mm. long, the ventral apex acute and sometimes also aristate with an awn up to 0.8 mm. long; ovary ellipsoid, very sparsely pilose with hairs about 0.5 mm. long but soon glabrate, the style subulate, 10–11 mm. long, the ovulation not observed but the locules obviously 2, the ovules probably several per locule; infructescences with a rachis about 3–4 cm. long, the pedicels thickened; fruits ellipsoid, slightly compressed, 3.5–4.5 cm. long and 2.5–3.5 cm. broad, rounded at both ends, the epicarp thin, fragile when dried, the mesocarp fibrous, probably spongy and about 5 mm. thick in fresh fruits, the endocarp bony, 5–7 mm. thick, forming an ellipsoid putamen, the lateral margins of this conspicuously flattened and slightly undulate, the dorsiventral angles subacute.

TYPE LOCALITY: Vicinity of Nandarivatu, Viti Levu, Fiji; the type, *Gillespie* 3973, is cited below.

DISTRIBUTION: Known only from the region of the type locality, at an elevation of 800–900 m., occurring in forest or in wooded ravines. Gillespie notes the plant as a large tree, with a trunk diameter of 50 cm.; he remarks that the flowers are slightly fragrant, the petals white, and the fruit dark olive-green. The Degener specimen, in bud, is noted as having green sepals.

FIJI: VITI LEVU: Mba: Vicinity of Nandarivatu, *Gillespie* 3973 (Bish TYPE), 4169 (Bish, GH, NY, US); Nauwanga, *Degener* 14544 (A, NY).

None of the cited specimens are satisfactory, the type consisting of foliage and detached floral parts, with a single fruit; this was the only specimen cited by Gillespie. However, I think that his No. 4169 must also be placed here, as it agrees excellently with the type in foliage; it has a few detached fruits. The Degener specimen, similar in foliage, bears a few large buds, which seem to be 4-merous but otherwise similar to the flowers of the type.

Elaeocarpus vitiensis and the new species described below form, with *E. chelonimorphus* and *E. gillespieanus*, a group of related species characterized by rather large, white-petaled flowers, essentially glabrous outer surfaces of sepals and ovaries, long-awned anthers, and distally narrowed leaf-blades. The present species has somewhat smaller flowers than the two preceding, differing further from *E. chelonimorphus* in its very different leaf-base and from *E. gillespieanus* as noted under that species.

11. Elaeocarpus (§ *Monocera*) lepidus A. C. Sm. sp. nov.

Arbor grandis *E. vitiensi* Gillespie valde affinis, foliorum petiolis brevioribus et laminis lanceolatis vel lanceolato-ovatis angustioribus basi acutis vel obtusis, floribus paullo gracilioribus, petalis manifestius laciniatis differt.

Tree, up to 27 m. high, the young parts sericeous-strigose, soon glabrate, the branchlets subterete, slender (1.5–3 mm. in diameter toward apices), distally strigose with pale hairs 0.1–0.2 mm. long, usually soon glabrate; leaves spaced on distal parts of branchlets, the petioles slender, shallowly canaliculate, (10–) 15–28 mm. long, evanescently strigose like young branchlets, the blades chartaceous, drying olivaceous, lanceolate or lanceolate-ovate, 7–10 cm. long, 2–4 cm. broad, acute to obtuse at base and abruptly decurrent on the petiole, gradually narrowed to a slender but obtuse apex, undulate-crenulate at margin (crenations about 1 per centimeter or fewer, the indentations shallow, obscurely spinulose), glabrous on both sides, the costa nearly plane above, prominent beneath, the secondary nerves 7–9 per side, subspreading, slightly curved, irregularly anastomosing, like the veinlet-reticulation prominulous on both sides; racemes borne on branchlets below leaves, the peduncle very short, with the rachis forming an axis 1–3 cm. long at anthesis, this sericeous-puberulent with silvery hairs 0.1–0.3 mm. long, eventually glabrate, the maturing flowers usually 3–8; flower-subtending bracts papyraceous, ovate-oblong, 4–5 mm. long and 2–2.5 mm. broad, subacute, pilose without like rachis, tomentellous-puberulent within, caducous; pedicels slender, pilose like rachis, at anthesis 17–23 mm. long; sepals 5, thin-carnose, lanceolate, 18–20 mm. long, 2–3 mm. broad, gradually

narrowed to an acute apex, in bud pilose like pedicels but soon glabrate, inconspicuously carinate within and sericeous (hairs pale, 0.2–0.3 mm. long), puberulent on the thickened margin; petals 5, submembranaceous, oblong-obovate, 23–25 mm. long, 7.5–9 mm. broad, carinate and slightly thickened within toward base, obscurely sericeous dorsally and puberulent on margins toward base but otherwise glabrous, apically laciniate, the lobes 11–16, lanceolate, 3–6 mm. long, inconspicuously reticulate-veined, the middle lobe the largest; disk carnose, 1–1.5 mm. high, 5-lobed, the lobes confluent on inner surface, deeply sulcate, sparsely sericeous dorsally and hispidulous apically with hairs 0.3–0.4 mm. long; stamens 42–54, 3- or 4-seriate in 5 clusters, 15–16 mm. long, the filaments slender, 6.5–7.5 mm. long, hispidulous with pale subascending hairs about 0.5 mm. long, the anthers 8–9 mm. long, very minutely tuberculate, with sparse sericeous dorsal and ventral hairs 0.5–0.8 mm. long, the dorsal awn subulate, 1.5–2 mm. long, the ventral apex acuminate or with a short awn up to 0.5 mm. long; ovary ellipsoid, inconspicuously strigillose-sericeous with pale hairs 0.2–0.5 mm. long, glabrate, the style subulate, glabrous, 12–13 mm. long, the ovary-wall sparsely sericeous within, the locules 2, each with 6–8 biseriate ovules; infructescence usually with 1 subterminal fruit maturing, the rachis and pedicels thickening but not elongating, sometimes subpersistently pilose; fruits ellipsoid, slightly flattened, coriaceous when dried, up to 5 cm. long and 2.8 cm. broad, glabrous, broadly obtuse at both ends, the epicarp 0.2–0.3 mm. thick, finely rugulose with minute shallow pits, the mesocarp spongy, fibrous, 5–8 mm. thick when fresh, the endocarp hard, bony, 3–5 mm. thick, forming an ellipsoid flattened putamen, this irregularly and inconspicuously ridged, the lateral angles produced into a hard, acute undulate wing 2–5 mm. broad, the dorsiventral angles subacute, the locule 1, the seed ellipsoid, 25–30 mm. long, acute at both ends.

Type in the U. S. National Herbarium, No. 1676699, collected on edge of forest on the eastern slope of the main ridge, Koro, Fiji, alt. 200–300 m., January 29, 1934, by A. C. Smith (No. 948). Duplicates at Bish, GH, K, NY, etc.

ADDITIONAL SPECIMENS EXAMINED:

FIJI: VITI LEVU: Mba: Slopes of the escarpment north of Nandarivatu, *Smith* 6280 (A, US). Fiji, without definite locality: *Horne* 437 (GH, K).

DISTRIBUTION: The new species is definitely known only from the islands of Koro and Viti Levu, Fiji, at elevations of 200–800 m., on edge of forest or in woods along stream. It is a tree, indicated as 20–27 m. in height; the type is noted as having green sepals, white petals and filaments, and brown anthers; No. 6280 has bluish green fruits.

LOCAL NAME: *Kambi* (*Smith* 6280).

The three specimens cited are clearly conspecific; the type and the Horne specimen bear good flowers and the remaining specimen has

essentially mature fruits. The new species is closely related only to *E. vitiensis*, having very similar flowers, which are slightly the more slender and with more numerous petal-laciniae. The short-petiolate and narrower leaves, with acute or obtuse (rather than rounded) bases, distinguish *E. lepidus* from *E. vitiensis*, and the new species also tends to have the indument of its branchlets, rachis, pedicels, and ovary more obvious and more persistent.

12. **Elaeocarpus** (§ *Monocera*) **laurifolius** A. Gray, Bot. U. S. Expl. Exped. 1: 203. 1854; C. Muell. in Walp. Ann. Bot. Syst. 4: 331. 1857; Seem. Fl. Vit. 28. 1865.

Tree (?), the young parts closely golden-sericeous (hairs about 0.2 mm. long), the branchlets subterete, rugulose, 2–4 mm. in diameter toward apices, sparsely strigose-puberulent, soon glabrate; leaves crowded toward apices of branchlets, the petioles flattened or shallowly bisulcate above, slender, 15–30 mm. long, soon glabrate, the blades coriaceous, drying brownish, lanceolate or oblong-ovate, 7–12.5 cm. long, 3–6 cm. broad, acute or narrowly obtuse at base and decurrent on the petiole, gradually narrowed to an obtuse apex, narrowly recurved at margin and coarsely crenate (crenations about 1 per centimeter, obscurely spinulose, at length rounded on distal margin), glabrous on both sides or evanescently strigose-puberulent beneath, the costa strongly elevated above, prominent beneath, the secondary nerves 6–9 per side, subspreading, curved, irregularly anastomosing, elevated or nearly plane above, sharply elevated beneath, the veinlet-reticulation coarse, prominulous on both sides; racemes lateral below leaves, the peduncle short, with the rachis forming a stout axis 2–3 cm. long, this sparsely strigose-puberulent, subglabrate, the maturing flowers apparently 2–5; pedicels very stout (1–1.5 mm. in diameter, swollen upward to 3 mm.), 10–15 mm. long, closely strigose-puberulent with hairs about 0.1 mm. or sometimes to 0.5 mm. long; sepals 5, very thick-carnose (1–1.5 mm. thick), swollen at margins, deltoid-lanceolate, 11–15 mm. long and 2.5–3 mm. broad (in nearly open flowers), acute at apex, strigose-puberulent without like pedicel, copiously sericeous within (hairs 0.3–0.8 mm. long); petals 5, submembranaceous to thin-carnose, oblong-elliptic, in advanced bud about 10 mm. long and 4–5 mm. broad, sparsely sericeous without toward base or glabrous on both sides, laciniate along margin nearly to base (lobes apparently 11–17, lanceolate, acute, 1–4 mm. long, the apical lobe the broadest); disk 0.6–0.7 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, copiously golden-sericeous and apically hispidulous with hairs 0.3–0.5 mm. long; stamens about 60, in 5 clusters opposite the petals, 8–9 mm. long (in advanced bud), the filaments subterete, up to 1.5 mm. long (obviously immature), copiously sericeous with hairs about 0.5 mm. long, the anthers 7–8 mm. long, sparsely sericeous dorsally, with an

apical dorsal awn about 0.5 mm. long; ovary conical, minutely sericeous with pale hairs about 0.2 mm. long, tapering into a stout style about 6 mm. long (immature), this sericeous toward base, glabrous distally, the locules 2, the ovules 8 per locule, biseriate.

TYPE LOCALITY: Fiji, without precise locality; the type is the Exploring Expedition specimen cited below.

DISTRIBUTION: The species is known only from two Fijian collections, both unfortunately without data.

FIJI: Without definite locality: *U. S. Expl. Expcd.* (US 13612 TYPE), *Horne* 772 (GH, K).

The type is a specimen with very young buds, which Gray erroneously described as diclinous and "entirely glabrous." Fortunately the Horne specimen bears more mature, although still not entirely open, flowers, and it is so similar to the Exploring Expedition plant that it can be safely referred here. The floral dimensions given above are from the Horne specimen. The species is necessarily not well understood, but it seems amply differentiated from the group of *E. chelonimorphus* in its pilose ovary and outer surface of sepals and its short anther-awns.

13. Elaeocarpus (§ *Monocera*) subcapitatus Gillespie in Bishop Mus. Bull. 83: 19. *fig.* 23. 1931.

Large tree, the young parts golden-sericeous with hairs about 0.2 mm. long, the branchlets subterete, 2.5–4 mm. in diameter toward apices, minutely pale-strigose-puberulent, soon glabrate; leaves crowded toward apices of branchlets, the petioles shallowly bisulcate above, (15–) 20–40 mm. long, pilose like branchlets, soon glabrate, the blades thick-coriaceous, drying brownish, paler or grayish beneath, ovate- or lanceolate-elliptic, 8–19 cm. long, (2.5–) 3–7 cm. broad, acute or narrowly obtuse at base and decurrent on the petiole, short-acuminate or cuspidate at apex (acumen up to 1 cm. long, obtuse), narrowly recurved at margin and inconspicuously crenulate (crenations about 1 per centimeter, shallow), glabrous on both sides or evanescently strigose-puberulent beneath, often with axillary domatia beneath, the costa sharply elevated above and prominent beneath, the secondary nerves 5–8 per side, spreading-arcuate, obscurely anastomosing, nearly plane above, elevated beneath, the veinlet-reticulation coarse, inconspicuous, subimmersed or plane above, prominulous beneath; racemes axillary or arising from branchlets below leaves, the peduncle short, with the rachis forming a stout subflexuose axis 1.5–2.5 cm. long, this closely sericeous-puberulent (hairs gray or dull-golden, 0.2–0.4 mm. long), the maturing flowers 3–5; flower-subtending bracts papyraceous, obovate-oblong, obtuse, 4–6 mm. long, copiously sericeous-puberulent without, caducous; pedicels stout, 12–21 mm. long at

anthesis, pilose like rachis; sepals 5, thick-carnose (about 1 mm. thick), oblong-lanceolate, 17–22 mm. long, 4–5 mm. broad, subacute, copiously puberulent without (in bud sericeous with hairs 0.2–0.4 mm. long), densely sericeous and conspicuously carinate within; petals 5, carnose especially toward base, conspicuously carinate within proximally, oblong-elliptic, 18–25 mm. long 5–10 mm. broad, sparsely sericeous dorsally near center and ciliolate-puberulent on margins near base, otherwise glabrous, copiously fimbriate with 16–35 lobes, these often lateral on margins to the middle or lower, lanceolate, acute, the distal ones 4–6 mm. long (middle lobe the largest, variously incised), the proximal ones decreasing in size; disk about 1.5 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, copiously sericeous and hispidulous with golden hairs 0.3–0.5 mm. long; stamens 50–72, 3- or 4-seriate in 5 clusters, 14–19 mm. long, the filaments terete, 5–8 mm. long, copiously hispidulous with hairs 0.5–1 mm. long, the anthers 9–11 mm. long, minutely tuberculate-hispidulous, sparsely sericeous dorsally, with an apical dorsal awn 0.6–0.8 mm. long, the ventral apex minutely emarginate; ovary ellipsoid, slightly flattened, copiously sericeous with golden hairs 0.4–0.5 mm. long, the style subulate, 11–13 mm. long, sericeous in basal half, glabrous above, the ovary-wall thick, the locules 2, each with 7 or 8 biseriate ovules; infructescence greatly thickened, the fruits flattened-ellipsoid, coriaceous when dried, up to 6 cm. long and 4 cm. broad, minutely strigose-puberulent or perhaps eventually glabrate, obtuse at both ends, the base of style persistent, the epicarp hard, about 0.2 mm. thick, the mesocarp spongy, fibrous, probably 5 mm. or more thick when fresh, the endocarp hard, bony, 3–4 mm. thick, forming a flattened ellipsoid putamen, this with the lateral angles acute, undulate, the dorsiventral angles subacute, the seed 1, occupying the entire cavity.

TYPE LOCALITY: Mt. Naitarandamu, Viti Levu, Fiji; type *Gillespie* 3235, cited below.

DISTRIBUTION: Fiji, thus far known definitely from a limited montane area in southern Viti Levu, at elevations of about 915 to 1,150 m. The specimens are presumably from large trees of dense forest; Gillespie noted the petals as white.

FIJI: VITI LEVU: *Graeffe* 49 (BM). Namosi: Summit of Mt. Naitarandamu, *Gillespie* 3235 (Bish TYPE, GH), 5117 (Bish, GH); summit of Mt. Voma, *Gillespie* 2723 (Bish, GH, K).

Elaeocarpus subcapitatus is a very close relative of *E. laurifolius;* in the absence of good flowering material of the latter a careful comparison cannot now be made. However, Gillespie's species comes from high elevations, whereas Gray's type was certainly from a lowland plant; the leaf-blades of *E. subcapitatus* are comparatively thicker, less obviously nerved, and nearly entire at margins; differences in indu-

ment and in petal-laciniation are also apparent, as noted in my key. On the basis of present evidence I am inclined to maintain Gillespie's species without question. *Graeffe* 49 was cited by Seemann under his *E. storckii*, a very different plant not of this immediate relationship.

14. **Elaeocarpus** (§ *Monocera*) **melochioides** A. C. Sm. sp. nov.

Arbor *E. laurifolio* A. Gray et *E. subcapitato* Gillespie affinis, foliorum laminis tenuioribus et basi rotundatis vel subcordatis, petalis tantum apice laciniatis, indumento partium juvenilium et inflorescentiae longiore facile distinguitur.

Tree, up to 7 m. high, the young parts copiously sericeous with stramineous hairs about 0.5 mm. long, the branchlets subterete, 2–4 mm. in diameter toward apices, when young copiously sericeous-puberulent (hairs pale, about 0.2 mm. long), at length glabrate and brownish; leaves spaced along distal portions of branchlets, the petioles slender, inconspicuously bisulcate above, 20–35 mm. long, pilose like young branchlets and soon subglabrate, the blades chartaceous, drying dark green, ovate, 8–13 cm. long, 3.5–7.5 cm. broad, rounded or subcordate at base, short-acuminate or cuspidate at apex (acumen up to 1 cm. long, obtuse), narrowly revolute at margin and coarsely crenate (crenations about 1 per centimeter, obtuse on distal margin), glabrous above, inconspicuously strigose-puberulent and soon glabrate beneth, the costa strongly elevated above, prominent beneath, the secondary nerves 7–9 per side, spreading, curved, irregularly anastomosing, prominulous above, sharply raised beneath and often with axillary domatia, the veinlet-reticulation coarse, obvious, prominulous on both sides; racemes axillary or arising from branchlets below leaves, the peduncle short, with the rachis forming a stout axis 1–2 cm. long, this copiously hispidulous-tomentellous (hairs pale golden, 0.4–0.6 mm. long), the maturing flowers 2–4 near apices of rachis, the bracts soon caducous, the pedicels (before anthesis) stout, up to 10 mm. long, pilose like rachis; sepals 5, thick-carnose, ovate-lanceolate, in bud up to 12 mm. long and 4 mm. broad, densely sericeous-strigose without (hairs about 0.2 mm. long), copiously sericeous within (hairs 0.4–0.6 mm. long), tomentellous-puberulent on the thickened margins; petals 5, submembranaceous, oblong, in bud up to 12 mm. long and 5 mm. broad, sericeous proximally without (hairs 0.5–1 mm. long), laciniate at apex only, the lobes 11–13, lanceolate, 3–4 mm. long, the middle lobe the largest; disk with 5 confluent lobes, these sulcate, apically hispidulous with hairs 0.5–1 mm. long; stamens about 4-seriate, 65–70, the filaments terete, copiously hispidulous with hairs 0.8–1 mm. long, the anthers (in bud) about 8 mm. long, the dorsal awn 0.6–0.7 mm. long, the ventral apex rounded; ovary ellipsoid, copiously sericeous with golden hairs 0.5–0.7 mm. long, the style glabrous, the locules 2, each with 6 biseriate ovules.

Type in the herbarium of the Arnold Arboretum, collected in dense forest on the northern portion of the Rairaimatuku Plateau, between Mt. Tomanivi [Mt. Victoria] and Nasonggo, Province of Naitasiri, Viti Levu, Fiji, alt. 870-970 m., Sept. 18, 1947, by A. C. Smith (No. 6092). Duplicate at US.

DISTRIBUTION: Known only from the type collection, taken from a tree 7 m. high.

The new species, although known only from a single collection with immature flowers, is clearly of the affinity of *E. laurifolius* and *E. subcapitatus*. It differs from both in having its leaf-blades thinner in texture and rounded or subcordate at base, in having its petals laciniate only at the apex rather than on the lateral margins as well, and in the longer indument of its young parts, rachis, pedicels, and sepals. Of course a final analysis cannot be made, in view of the fact that none of these three species are really adequately known, but *E. melochioides* is amply distinct even without characters that may be provided by mature flowers.

4. § OREOCARPUS

Elaeocarpus § Oreocarpus Schlechter in Bot. Jahrb. 54: 127. 1916.

Section *Oreocarpus* (for brief discussion of typification see Smith, 1944, p. 246) is not very strongly marked, and perhaps it will eventually be combined with § *Blepharoceras* or even § *Monocera*. The glabrous ovary, as a character to separate sections, certainly cannot be very seriously considered, but a full consideration of all characters may lead to a more precise delimitation of § *Oreocarpus*. For the time being the approximately 8 New Guinean species here referred are not adequately known. The only species of our region occurs in the New Hebrides.

15. **Elaeocarpus** (§ *Oreocarpus*) **hortensis** Guillaumin in Journ. Arn. Arb. 12: 231. 1931.

Tree, up to 15 m. high, essentially glabrous throughout, the young parts sometimes faintly strigose-puberulent but soon glabrate, the branchlets subterete, hollow, very stout, 8–15 mm. in diameter toward apices and there copiously marked with the crowded scars of fallen leaves; leaves congested near apices of branchlets, the petioles rugulose, canaliculate, 2–3 cm. long, sometimes with conspicuous immersed glands, the blades coriaceous, drying brownish, obovate-elliptic, 8–13 cm. long, 3–5 cm. broad, acute at base and decurrent on the petiole, rounded and slightly emarginate at apex, strongly revolute at margin and apparently entire or undulate, the costa rugose and slightly elevated above, prominent beneath and conspicuously striate when dried, the secondary nerves 6–8 per side, spreading, nearly plane above, prominent beneath, the veinlet-reticulation intricate, immersed above, plane or prominulous beneath; racemes axillary, the peduncle short, the axis 2.5–5 cm. long, slender, striate-rugulose, the maturing flowers 4–8, the

pedicels 12–15 mm. long slightly after anthesis; sepals 4, thick-carnose, lanceolate, 13–14 mm. long, 3–3.3 mm. broad, obtuse at apex, glabrous without, strongly carinate and copiously sericeous within (hairs golden, 0.1–0.2 mm. long), minutely tomentellous-puberulent on the thickened margins; petals 4, thin-carnose, swollen and carinate within toward base, obviously reticulate-veined, oblong, 13–18 mm. long, 6–6.5 mm. broad, glabrous without, inconspicuously pale-pilose on margins toward base and on carina within (hairs 0.3–0.4 mm. long), 3- or 4-lobed at apex, the lobes 4–6 mm. long, obtuse, entire or with 1 or 2 lateral teeth, each several-nerved; disk carnose, 1.3–1.5 mm. high, deeply 4-lobed, the lobes dorsally sulcate, hispidulous at apex with hairs 0.1–0.2 mm. long; stamens (not seen attached; number?) 8.5–9 mm. long, the filaments stout, terete, 3–3.5 mm. long, minutely hispidulous (hairs slightly ascending, 0.1–0.2 mm. long), the anthers 5–5.5 mm. long, minutely hispidulous, the dorsal apex slightly the longer, apiculate but not rostrate, the ventral apex obtuse; ovary subglobose, glabrous, rugulose, the style stout, glabrous, 18–19 mm. long, the ovary-wall very thick, the locules 2, each with 6 biseriate ovules; fruits (seen only detached) ellipsoid, up to 30 mm. long and 18 mm. broad, rounded at both ends, the epicarp thin, brittle, the mesocarp spongy, probably 5 mm. or more thick in fresh fruits, the endocarp hard, bony, about 2 mm. thick, forming an ellipsoid putamen, this slightly flattened, inconspicuously rugulose, with obtuse lateral angles, rounded on dorsiventral surfaces, the seed ellipsoid, occupying the entire cavity.

TYPE LOCALITY: Tanna, New Hebrides; the type is *Kajewski* 127. In Guillaumin's paper discussing Kajewski's New Hebrides plants it is not stated whether the Arnold Arboretum set or the Paris set contains the holotypes of new species.

DISTRIBUTION: New Hebrides, known only from the type collection, obtained in rain-forest at 200 m. altitude. The specimens were taken from a tree about 15 m. high, with a trunk diameter of about 60 cm., said to be uncommon but "found growing in native gardens"; the fruit was noted as dark green.

NEW HEBRIDES: TANNA: Lenakel, *Kajewski* 127 (TYPE COLL., A, K).

The single collection is not very adequate, the Arnold Arboretum sheet having its flowers past anthesis; enough detached parts are found so that the original description can be somewhat amplified. The species is without close allies in our area and perhaps it is, as suggested by Guillaumin, most closely related to the New Caledonian *E. ovigerus* Brongn. & Gris. It falls into Schlechter's § *Oreocarpus*, perhaps an unnatural section, which appears not to extend farther east into the Pacific, but it does not seem closely related to any of the New Guinean species of the section.

5. § BLEPHAROCERAS

Elaeocarpus § Blepharoceras Schlechter in Bot. Jahrb. 54: 129. 1916.

This section consists of about 10 species in New Guinea; it is not very rigidly characterized (see Smith, 1944, p. 248) but to it may be referred 8 additional species from Fiji and Samoa. Merrill (1951, p. 179) implies that § *Blepharoceras* does not merit separation from § *Monocera*, and this disposition will very likely be followed by most workers. For the New Guinean and Pacific species, however, § *Blepharoceras* provides a useful concept, differing from § *Monocera* in its smaller flowers with a reduced number of stamens. A comparison of the fruits of the two sections, when these are sufficiently well-known, may also prove instructive; at least some of the species here referred to § *Blepharoceras* differ from § *Monocera* in having the endocarp distinctly fibrous, rather than bony, in texture.

16. **Elaeocarpus** (§ *Blepharoceras*) **kambi** Gibbs in Journ. Linn. Soc. Bot. 39: 142. *pl. 13, fig. 11–13.* 1909.

Tree, up to 30 m. high, the young parts copiously but minutely tomentellous-puberulent and also spreading-pilose with hairs 0.2–0.5 mm. long, the indument rich brown, the branchlets terete, slender, 2–4 mm. in diameter toward apices, at first similarly pilose, soon glabrate; leaves numerous but evenly spaced along distal parts of branchlets, the petioles slightly flattened or semiterete, 7–15 mm. long, pilose like young parts, subglabrate; leaf-blades chartaceous or subcoriaceous, drying dark green or pale brown, elliptic or ovate, 4–7 cm. long, 2–3.5 cm. broad, acute or obtuse at base and shortly decurrent on the petiole, rounded or broadly obtuse at apex and often slightly callose-thickened, narrowly recurved at margin and entire or obscurely undulate-crenulate (crenations about 2 per centimeter), glabrous on both sides (or when young pilose like petioles toward base and on costa), the costa slightly elevated above, sharply raised beneath, the secondary nerves 5–8 per side, subspreading, curved and anastomosing toward margin, nearly plane above, elevated beneath, the veinlet-reticulation intricate, immersed above, plane or prominulous beneath; racemes solitary in leaf-axils or arising from branchlets below leaves, the peduncle short, the axis 1–2.5 cm. long, slender, copiously tomentellous with pale golden hairs 0.2–0.5 mm. long, the maturing flowers 3–8, the flower-subtending bracts oblong, obtuse, 2–3 mm. long, pilose like rachis, caducous; pedicels slender, 15–20 mm. long at anthesis, tomentellous like rachis; sepals 5, thin-carnose, oblong-lanceolate, 12–13.5 mm. long, 2.5–3 mm. broad, subacute at apex, copiously puberulent-tomentellous without and on margins (hairs 0.1–0.3 mm. long), carinate and sericeous within, the hairs 0.3–0.5 mm. long; petals 5, thin-carnose, obovate-oblong, 13–15 mm. long, 4–5 mm. broad, slightly

thickened and carinate within toward base, sparsely ciliolate-pilose on basal margins and sometimes sparsely sericeous on both sides near base (hairs to 1 mm. long), otherwise glabrous, fimbriate at apex with 8–12 lobes, these lanceolate, subacute, 1.5–2.5 mm. long, each with 1 or 2 ultimate veinlets, subequal; disk pulvinate, about 1 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, sericeous and apically hispidulous with hairs 0.5–1.5 mm. long; stamens 28–30, 1- or 2-seriate, 10–11 mm. long, the filaments terete, 3–5 mm. long, copiously sericeous with pale hairs 0.7–1 mm. long, the anthers 5–7 mm. long, sericeous dorsally and sparsely so ventrally, the dorsal awn lanceolate, acute, 0.8–1 mm. long; ovary ellipsoid, copiously sericeous with pale yellow hairs 0.4–0.7 mm. long, the style stout, 10–12 mm. long, glabrous except at base, the ovary-wall thick, sparsely sericeous within, the locules 2, each with 6 biseriate ovules; fruits (only detached and broken ones with *Gillespie* 3863 seen) ellipsoid, up to 25 mm. long and 15 mm. broad (immature?), rounded at both ends, the pericarp glabrous, inconspicuously rugulose, thin, brittle.

TYPE LOCALITY: Nandarivatu, Viti Levu, Fiji; type, *Gibbs* 808, cited below.

DISTRIBUTION: Fiji, but apparently limited to the region of north-central Viti Levu near Nandarivatu, at an elevation of 800–970 m. It is a large tree of the rain-forest, indicated as 26–30 m. in height and with a trunk diameter of about 60 cm., with a spreading rounded crown. The sepals are greenish at base and white distally, the petals and anthers pure white, and the filaments greenish.

LOCAL NAME: *Kambi* (Gibbs).

FIJI: VITI LEVU: Mba: Nandarivatu, *Gibbs* 808 (BM TYPE, K), *Gillespie* 3863 (Bish, GH, NY); hills east of Nandala Creek, about 3 miles south of Nandarivatu, *Smith* 5954 (A, US).

Elaeocarpus kambi, indicated as "very general" in the Nandarivatu region by Gibbs, in my observation is quite rare, but perhaps this is because it is a stately and consequently overlooked tree. Its crown merges with the upper storey of the forest but, when the tree is felled, is seen at the right season to bear a mass of beautiful white flowers. On the basis of my No. 5954, the species must be considered one of the most striking trees in Fiji. It is without close allies in our area, being characterized by its comparatively small and short-petiolate leaves and its large flowers.

17. **Elaeocarpus** (§ *Blepharocera*) **milnei** Seem. Fl. Vit. 28. 1865.

Tree, up to 13 m. high, the young parts densely hispidulous-puberulent (hairs ferrugineous, 0.1–0.2 mm. long), the branchlets subterete, stout, 10–12 mm. in diameter toward apices and cicatricose with the crowded scars of fallen leaves, soon glabrate; leaves congested toward apices of branchlets, the petioles stout (2–3 mm. in diameter), semi-

terete or shallowly canaliculate, 2.5–5 cm. long, closely and subpersistently cinereous-puberulent (hairs scarcely 0.1 mm. long); leaf-blades subcoriaceous, brownish when dried, obovate, 14–19 cm. long and 7–10 cm. broad (up to 25×13 cm. ex Seemann, but such leaves not now with type), gradually narrowed toward base and then obtuse and abruptly decurrent on the petiole, short-cuspidate at apex, closely crenate-serrulate nearly to base (teeth 2–5 per centimeter, distally terminated by a callose apiculum 0.5–0.8 mm. long), obscurely puberulent toward base and along costa above but soon glabrate, beneath subpersistently strigose-puberulent on costa and nerves, otherwise glabrous, the costa strongly elevated and rounded above, prominent beneath, the secondary nerves 13–15 per side, spreading, slightly curved and anastomosing toward margin, nearly plane above, sharply elevated beneath, the veinlet-reticulation intricate, prominulous on both sides; racemes lateral below leaves, the peduncle short, the rachis slender, 10–15 cm. long, many-flowered, like the pedicels copiously puberulent (hairs 0.05–0.1 mm. long) and also with a few scattered longer hairs to 0.4 mm. long, the pedicels 4–7 mm. long at anthesis; sepals 5, thin-carnose, lanceolate, 9–10 mm. long, 2–2.5 mm. broad, subacute, puberulent without like pedicels, carinate within and sparsely sericeous with hairs 0.4–0.5 mm. long; petals 5, thin-carnose distally, thickened toward base, oblong-obovate, 10–11 mm. long, 4–4.5 mm. broad, very sparsely sericeous within at base, otherwise glabrous, fimbriate at apex with 7 or 8 lobes, these subequal, obtuse, 2–2.5 mm. long, each with several terminal veinlets; disk pulvinate, about 0.8 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, copiously hispidulous with hairs 0.1–0.2 mm. long; stamens 23–25, uniseriate, 6–7 mm. long, the filaments terete, 2.5–3.5 mm. long, minutely hispidulous with hairs about 0.05 mm. long, the anthers 3.5–4 mm. long, minutely tuberculate-hispidulous, the dorsal awn lanceolate, 0.5–0.7 mm. long, the ventral apex subacute, often slightly recurved but not aristate; ovary ovoid, copiously sericeous with hairs 0.1–0.2 mm. long, the style subulate, 4–5 mm. long, sericeous in the lower half, glabrous distally, the ovary-wall thick, sparsely sericeous within, the locules 2, each with 6 biseriate ovules.

TYPE LOCALITY: Viti Levu, Fiji; the type, collected by Milne, is cited below.

DISTRIBUTION: Fiji, known only from the type collection. Milne's precise locality is in doubt, being indicated on his label as "Nisana, by the margin of stream in the forest." I do not find a settlement of this name on recent maps, but the *Herald* conceivably anchored near the town of Sanasana, on the southwestern coast of Viti Levu near the mouth of the Tuva River, in the present Province of Nandronga & Navosa.

FIJI: VITI LEVU: *Milne* 81 (K TYPE).

With the two species immediately following, *E. milnei* forms a well-marked group characterized by very stout branchlets and large leaves; the flowers in general characters are similar to those of *E. graeffei* and its allies, but they agree in having very short anther-awns.

18. Elaeocarpus (§ *Blepharoceras*) magnifolius Christophersen in Bishop Mus. Bull. 128: 135. *fig. 17.* 1935; non Knuth (1938).

Tree, up to 8 m. high, the young parts copiously sericeous (hairs ferrugineous, 0.3–0.6 mm. long), the branchlets subterete, stout, 5–10 mm. in diameter toward apices and there densely cicatricose, eventually glabrate; leaves congested toward apices of branchlets, the petioles shallowly canaliculate, swollen at base and apex, (3.5–) 5–10 cm. long, sparsely strigose-puberulent (hairs 0.2–0.4 mm. long), at length glabrate; leaf-blades chartaceous, drying dull or pale green, elliptic or elliptic-ovate, (9–) 14–30 cm. long, (5–) 6–14.5 cm. broad, rounded to a shallowly cordate base, short-acuminate or cuspidate at apex (acumen up to 1 cm. long, obtuse or callose-subacute), undulate-crenulate at margin (crenations remote, often 1–3 cm. apart on larger leaves, rounded, obscurely callose-spinulose distally), sparsely pilose on costa above or completely glabrous, beneath sparsely strigose-puberulent like petioles especially on costa and secondaries and at length sometimes subglabrate, the costa nearly plane above, prominent beneath, the secondary nerves 11–14 per side, spreading, slightly curved and anastomosing toward margin, nearly plane above, sharply elevated beneath, the veinlet-reticulation intricate, prominulous on both sides; racemes axillary or arising from branchlets just below leaves, the peduncle short, the rachis slender, 3–7.5 cm. long, with 3–11 maturing flowers, like the pedicels copiously sericeous-hispidulous or short-tomentellous (hairs golden or reddish, 0.2–0.4 mm. long), the pedicels 6–10 mm. long at anthesis; sepals 5, carnose, lanceolate, 7.5–9 mm. long, 2–2.5 mm. broad, subacute, pilose without like pedicels, conspicuously carinate within and somewhat less densely pilose; petals 5, thin-carnose distally, thickened toward base especially at center, oblong- or cuneate-obovate, 9–13 mm. long, 4–6 mm. broad, sometimes sparsely strigillose without toward base (hairs golden, 0.2–0.3 mm. long), otherwise glabrous, rounded at apex and irregularly fimbriate into 3 principal divisions and 12–18 lobes, these lanceolate, subacute, 1.5–4 mm. long, each 1-nerved; disk carnose, 1–1.2 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, copiously sericeous-hispidulous with hairs 0.3–0.4 mm. long; stamens 25–30, about 2-seriate, 4.5–5 mm. long, the filaments terete, 1.5–2 mm. long, obscurely strigillose-hispidulous (hairs about 0.1 mm. long) and soon glabrate, the anthers 2.5–3.5 mm. long, minutely hispidulous, the dorsal awn subulate, 0.5–0.6 mm. long, the ventral apex rounded; ovary

ovoid, slightly flattened, copiously sericeous with golden hairs 0.3–0.5 mm. long, the style stout, 2–4.5 mm. long, sericeous near base, glabrous distally, the locules 2, each with 4 biseriate ovules; infructescence thickened but not elongating, the rachis and pedicels subpersistently pilose; fruits usually 1 or 2 per infructescence, ellipsoid, slightly flattened, up to 4 cm. long and 3 cm. broad, rugose when dried and sparsely strigose or glabrate, rounded at base and apex, the epicarp hard, 0.1–0.2 mm. thick, the mesocarp presumably spongy when fresh and apparently not more than about 2 mm. thick, the endocarp bony, 2–3 mm. thick, forming an ellipsoid and strongly flattened putamen, this up to 37×25×15 mm., coarsely rugose, the lateral angles strongly projecting and undulate with 4–6 oblong lobes up to 6 mm. long, the dorsiventral angles obtuse, the seed ellipsoid, acute at both ends, about 25 mm. long.

TYPE LOCALITY: Near Malololelei, Upolu, Samoa; type, *Christophersen* 257, cited below.

DISTRIBUTION: Samoa, thus far known from the islands of Savaii and Upolu at elevations of 700–1,300 m., occurring in wet forest or on high ridges. The plant is noted as a tree 3–8 m. high, with white petals and (no. 246 only) a blue fruit.

SAMOA: SAVAII: Above Salailua, *Christophersen* 2758 (Bish): Le To, above Salailua, *Christophersen* 2919 (Bish, K, NY); above Ngangamalae, *Christophersen* 3438 (A, Bish, K, NY, US). UPOLU: Above Malololelei, *Christophersen* 246 (Bish, NY), 257 (Bish TYPE).

Elaeocarpus magnifolius is closer to *E. milnei* than to *E. graeffei*, with which Christophersen compared it, but it is readily distinguished from *E. milnei* by characters pertaining to the shape and base of the leaf-blades, its more obvious indument, comparatively short racemes, fewer petal-laciniae, and by having 4 rather than 6 ovules per locule.

19. **Elaeocarpus** (§ *Blepharoceras*) **roseiflorus** A. C. Sm. sp. nov.

Elaeocarpus milnei sensu A. C. Sm. in Bishop Mus. Bull. **141**: 95. 1936; non Seem.

Arbor foliis magnis ellipticis vel obovato-ellipticis longe petiolatis basi rotundatis, racemis pedicellisque longis pendentibus, rhachium et pedicellorum indumento tomentello copioso, petalis roseis apice copiose laciniatis distinguitur; ab *E. milnei* Seem. et *E. magnifolio* Christophersen racemis pedicellisque elongatis valde differt.

Tree, up to 10 m. high, the young parts copiously sericeous (hairs ferrugineous, 0.6–1 mm. long), the branchlets subterete, hollow, stout, 6–15 mm. in diameter toward apices and there densely cicatricose, soon glabrate; leaves congested toward apices of branchlets, the petioles semiterete, swollen at base and apex, (2–) 3–9 cm. long, obscurely puberulent and soon glabrate; leaf-blades chartaceous, drying brownish, broadly elliptic or obovate-elliptic, (10–) 17–23 cm.

long, (5–) 9–12 cm. broad, rounded at base and abruptly decurrent on the petiole, obtusely cuspidate at apex (acumen up to 1 cm. long), inconspicuously undulate-crenulate at margin (crenations about 1 per centimeter, distally tipped by a callose apiculum about 0.5 mm. long and eventually rounded), glabrous on both sides, the costa strongly elevated and rounded above, prominent beneath, the secondary nerves 10–13 per side, spreading, curved, anastomosing toward margin, plane or slightly raised above, prominent beneath, the veinlet-reticulation intricate, prominulous on both sides; racemes copiously spreading from branchlets below leaves, the peduncle up to 10 cm. long or more, forming with the rachis a slender pendent many-flowered axis 22–40 cm. long, this and the pedicels closely tomentellous with reddish hairs 0.3–0.7 mm. long, the flower-subtending bracts oblong, 1.5–2 mm. long, pilose like the rachis on both sides, soon caducous, the pedicels very slender, 15–55 mm. long at anthesis; sepals 5, thin-carnose, lanceolate, 9–10 mm. long, 2–2.5 mm. broad, puberulent-tomentellous without (hairs minute or up to 0.3 mm. long), carinate within and sericeous with hairs about 0.5 mm. long; petals 5, thin-carnose distally, thickened toward base, oblong-obovate, 10.5–11 mm. long, 3.5–4 mm. broad, sparsely sericeous within toward base (hairs 0.5–0.6 mm. long), otherwise glabrous, copiously fimbriate at apex with 13–17 lobes, these 1–3 mm. long, lanceolate, obtuse, each with 1 or 2 ultimate veinlets; disk carnose, 1–1.3 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, copiously hispidulous with hairs 0.2–0.4 mm. long; stamens 28–32, uniseriate, 5.5–7 mm. long, the filaments terete, 2.5–3 mm. long, copiously hispidulous with hairs about 0.1 mm. long, the anthers 3–4 mm. long, minutely tuberculate-hispidulous, the dorsal awn subulate, 0.5–0.7 mm. long, the ventral apex obtuse; ovary ovoid, copiously sericeous with golden hairs 0.2–0.3 mm. long, the style subulate, about 6 mm. long, sericeous in lower half, glabrous distally, the ovary-wall thick, sparsely sericeous within, the locules 2, each with 6 biseriate ovules.

Type in the herbarium of the New York Botanical Garden, collected in dense forest along stream on the southwestern slope of Mt. Mbatini, Province of Thakaundrove, Vanua Levu, Fiji, alt. 700 m., November 29, 1933, by A. C. Smith (No. 670). Duplicates at Bish, GH, K, US, etc.

DISTRIBUTION: Known only from the type collection, taken from a spreading tree 10 m. high, indicated as having the petals rich pink, whitish distally.

In identifying the cited specimen as *E. milnei* in 1936 I did not make a sufficiently careful comparison, as it is now seen to be quite different from Seemann's type. The new species is remarkable for the extreme length of its graceful racemes and pedicels, and it is further characterized by its more obvious indument and by details of leaf-shape and petal-laciniation.

20. **Elaeocarpus** (§ *Blepharoceras*) **graeffei** Seem. in Journ. Bot. 2: 76. 1864, Fl. Vit. 28. *pl.* 8. 1865.

Tree, up to 25 m. high, the young parts copiously sericeous with pale-ferrugineous or fulvous hairs 0.3–0.5 mm. long, the branchlets subterete, 3–8 (–10) mm. in diameter toward apices and there copiously sericeous-puberulent (hairs 0.1–0.3 mm. long), at length glabrate; leaves spaced on distal parts of branchlets or somewhat congested, the petioles slender, shallowly canaliculate, slightly swollen at base and apex, (2.5–) 3–8 cm. long, pilose like young branchlets or copiously puberulent, the indument long-persistent; leaf-blades chartaceous, brownish or olivaceous and often paler beneath when dried, elliptic to elliptic- or lanceolate-ovate, (7–) 12–20 cm. long, (3–) 4.5–11 cm. broad, rounded to subcordate or very broadly obtuse at base, acuminate at apex (acumen up to 15 mm. long, callose-tipped), inconspicuously crenulate at margin (crenations 1 or 2 per centimeter or somewhat more remote, distally obscurely callose-spinulose and becoming rounded), above sparsely strigose on costa and soon glabrate, strigose-puberulent beneath (hairs grayish, 0.1–0.3 mm. long) especially on nerves, the indument often long-persistent, the costa nearly plane or slightly rounded above, prominent beneath, the secondary nerves 8–11 per side, subascending, slightly curved, irregularly anastomosing, nearly plane above, sharply elevated beneath, the veinlet-reticulation intricate, prominulous on both sides; racemes axillary or lateral just below leaves, the peduncle 1–2 cm. long, forming with the rachis a slender axis 6.5–10 cm. long, this 8–15-flowered, like the pedicels copiously sericeous-puberulent or tomentellous with golden or fulvous hairs 0.2–0.5 mm. long, the flower-subtending bracts lanceolate, 2–3 mm. long, pilose on both sides like the rachis, caduous, the pedicels curved, 8–13 mm. long at anthesis; sepals 5, thin-carnose, lanceolate, 7–8 mm. long, 1.5–2.5 mm. broad, subacute, copiously sericeous on both sides with golden hairs 0.1–0.2 mm. long (or slightly longer within), carinate within; petals 5, submembranaceous distally, thickened and carnose at center toward base, cuneate-obovate, 9.5–10 mm. long, 5–6 mm. broad, very sparsely sericeous-puberulent within toward base, otherwise glabrous, conspicuously fimbriate at apex with 12–16 lobes, these 1.5–3 mm. long, often unequal in length and breadth, with 1–3 ultimate veinlets; disk carnose, about 1 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, densely sericeous-hispidulous with golden hairs 0.1–0.2 mm. long; stamens 28–41, 2- or 3-seriate, 5–5.5 mm. long, the filaments terete, 1.2–1.6 mm. long, distally very minutely hispidulous-puberulent, the anthers 3.8–4.2 mm. long, minutely hispidulous-tuberculate, terminated by a dorsal awn 1–1.2 mm. long; ovary ovoid, copiously sericeous with golden hairs about 0.2 mm. long, the style subulate, about 4 mm. long, sericeous near base, glabrous distally, the ovary-wall inconspicuously sericeous within, the locules

2, each with 4–7 biseriate ovules; infructescences not elongating, usually with 1–3 mature fruits, the rachis and pedicels thickened, persistently pilose; fruits ellipsoid, strongly flattened, at apparent maturity up to 4 cm. long and 2.5 cm. broad, puberulent with minute yellowish long-persistent hairs, broadly obtuse at both ends, the epicarp brittle, about 0.1 mm. thick, the mesocarp spongy, fibrous, probably 2–3 mm. thick when fresh, the endocarp hard but not bony, with a fibrous layer in the center, 2–3 mm. thick, forming an ellipsoid and strongly flattened putamen, this up to 35×23×12 mm., the lateral angles subacute, undulate into 3 or 4 oblong lobes 2–3 mm. long, the dorsiventral surfaces rounded, shallowly sulcate, the seed ellipsoid, acute at both ends.

TYPE LOCALITY: Viti Levu, Fiji, without specific locality; the type is *Graeffe* 59, cited below.

DISTRIBUTION: Fiji, thus far known only from Viti Levu and the Lauan island of Kambara, at elevations from near sea-level up to 600 m. The species is a tree up to 25 m. in height, occurring in forest; the petals are white (*Smith* 1266).

LOCAL NAMES AND USES: *Mindri* (*Smith* 4447); *ndrivi* (*Degener* 15369a); *vathea* (*Smith* 1266). Degener reports that in Ra an extract made by boiling the leaves in water is taken internally for stomach ailments.

FIJI: VITI LEVU: *Graeffe* 59 or s. n. (BM TYPE, K). Mba: Mountains near Lautoka, *Greenwood* 1096 (A, US); vicinity of Nalotawa, eastern base of Mt. Evans Range, *Smith* 4447 (A, US). Ra: Hills near Penang, *Greenwood* 751 (K); Tuvavatu, between Rewasa and Nokonoko, *Degener* 15369a (A, Bish, K, NY, US). KAMBARA: On limestone formation, *Smith* 1266 (Bish, GH, K, NY, US). Fiji, without definite locality: *Horne* (GH), 15 (K).

Elaeocarpus graeffei and its immediate allies (the three species which follow) form a species-group very similar to the group centering around *E. milnei*. However, *E. graeffei* and its relatives are comparatively slender in habit, their leaves being smaller and with fewer secondaries. Although vegetative characters separating the two groups are not absolute, they are sufficiently stable so that the groups are readily differentiated. In addition, *E. graeffei* and its allies have comparatively long anther-awns (with the exception of *E. degenerianus*, a species with unmistakably small leaves).

21. **Elaeocarpus** (§ *Blepharoceras*) **ulianus** Christophersen in Bishop Mus. Bull. 128: 138. *fig. 19.* 1935.

? *Elaeocarpus graeffei* sensu Lauterb. in Bot. Jahrb. 41: 230. 1908; non Seem.

Tree, up to 20 m. high or more, the young parts densely sericeous with ferrugineous or fulvous hairs 0.3–0.5 mm. long, the branchlets subterete, 2–5 mm. in diameter toward apices and copiously sericeous-puberulent (hairs 0.1–0.3 mm. long), glabrate; leaves mostly congested toward apices of branchlets, the petioles slender, shallowly

canaliculate, (1.5–) 2–6 cm. long, subpersistently pilose like young branchlets; leaf-blades chartaceous, drying olivaceous, elliptic- or ovate-lanceolate, (7–) 9–15 cm. long, (3–) 4–8 cm. broad, rounded or subcordate at base, short-acuminate or cuspidate at apex (acumen up to 15 mm. long, callose-obtuse), obviously crenulate at margin (crenations 1 or 2 per centimeter, obscurely callose-spinulose distally, soon rounded), above inconspicuously strigose toward base and on costa but soon glabrate, sparsely strigose-puberulent beneath (hairs 0.1–0.3 mm. long), glabrate, the costa sharply elevated above, prominent beneath, the secondary nerves 6–10 per side, subascending, prominulous above, strongly elevated beneath, the veinlet-reticulation intricate, prominulous on both sides; racemes axillary or arising below leaves, the peduncle 1–2 cm. long, forming with the rachis a slender axis 5–10 cm. long, this 4–10-flowered, like the pedicels copiously spreading-pilose or subsericeous, the hairs reddish or pale, 0.2–0.4 mm. long, the flower-subtending bracts lanceolate, 1.5–3 mm. long, pilose on both sides like the rachis, caducous, the pedicels 5–8 mm. long at anthesis; sepals 5, carnose, lanceolate, 6.5–8 mm. long, 1.5–2 mm. broad, subacute, tomentellous-puberulent without (hairs 0.1–0.2 mm. long), densely sericeous within (hairs 0.2–0.5 mm. long); petals 5, thin-carnose, thickened toward base, cuneate-obovate, 7–10 mm. long, 3.5–5 mm. broad, obscurely sericeous near base within, otherwise glabrous, laciniate at apex with 8–14 lobes, these oblong-lanceolate, subacute, 2.5–4 mm. long, subequal, each with 1–3 ultimate veinlets; disk carnose, about 1 mm. high, the lobes 5, confluent, dorsally sulcate, copiously sericeous-hispidulous with golden hairs 0.4–0.5 mm. long; stamens 26–34, 1- or 2-seriate, 4.5–5.5 mm. long, the filaments terete, 1.5–2 mm. long, glabrous or sparsely pilose at base, the anthers 3.5–4 mm. long, minutely tuberculate-hispidulous, the dorsal awn subulate, 1–1.6 mm. long, the ventral apex rounded; ovary ovoid, slightly flattened, densely sericeous with golden hairs 0.3–0.4 mm. long, the style subulate, 3–4 mm. long, sericeous in basal half, glabrous distally, the ovary-wall thick, obscurely sericeous within, the locules 2, each with 6 biseriate ovules; infructescences not elongating, the maturing fruits 1–3, the rachis and pedicels thickened, persistently pilose; fruits ellipsoid, slightly flattened, rugose when dried, up to 5 cm. long and 4 cm. broad, puberulent with yellowish hairs and at length glabrate, obtuse at both ends, the epicarp about 0.1 mm. thick, the mesocarp fibrous, probably 3–4 mm. thick when fresh, the endocarp hard, fibrous, 1–2 mm. thick, forming an ellipsoid and strongly flattened putamen, this up to 45×32×13 mm., the lateral angles strongly produced into 3 or 4 irregular oblong lobes 5–8 mm. long, the dorsiventral angles prominent distally, the seed ellipsoid, acute at both ends.

TYPE LOCALITY: Above Salailua, Savaii, Samoa; type, *Christophersen* 2696, cited below.

DISTRIBUTION: Samoa, known from Savaii and Upolu at elevations from 350 to 900 m., most often occurring in wet forest. The species is a tree up to 20 m. or more in height, with a trunk diameter up to 1 m.; the petals are white and the fruit green.

LOCAL NAMES: *T'aputoi* (*Christophersen* 327); *sagavao* (ex Lauterbach, if *Funk* 215 represents this species).

SAMOA: SAVAII: Above Salailua, *Christophersen* 2696 (Bish TYPE, US), 2891 (A, Bish, NY, US); Le Vai, above Salailua, *Christophersen* 3005 (A, Bish, K, NY, US); above Siuvao, *Christophersen* 3307 (Bish); Siuvao-Auala, *Christophersen* 3381 (Bish, US), 3382 (juvenile leaves?) (Bish, NY). UPOLU: Near Malololelei, *Christophersen* 327 (Bish, K, NY).

Elaeocarpus ulianus is an extremely close ally of the Fijian *E. graeffei*, the two being nearly indistinguishable in foliage. However, slight differences in leaves can be discerned by direct comparison, *E. ulianus* having its costa slightly the more slender and more sharply raised above, and the secondary nerves also more obvious. Differences in the inflorescences are also very slight and of dubious value, and only in the putamen of the fruit are characters found that seem significant. In addition to the degree of lateral lobing mentioned in my key, there is a difference in the texture of the endocarp, which in *E. graeffei* is harder and less inclined to flatten under pressure, being fibrous only in the middle portion when examined in cross section; in *E. ulianus* the endocarp is uniformly fibrous throughout. These slight differences should perhaps not be considered specific in nature, but I hestitate to reduce the Samoan plant to synonymy without a more extensive suite of specimens. Lauterbach's record of *E. graeffei* in Samoa is based upon *Funk* 215, from Upolu, which I have not seen but which probably represents *E. ulianus*.

22. **Elaeocarpus** (§ *Blepharoceras*) **degenerianus** A. C. Sm. sp. nov.

Arbor ramulorum et petiolorum indumento copioso et persistente, petiolis brevibus, foliorum laminis parvis ovatis basi cordatis, pedicellis brevibus, petalis copiose fimbriatis in lobos 3 primarios fissis, staminibus circiter 35 distinguitur; *E. graeffei* Seem. et *E. uliano* Christophersen affinis, foliorum laminis ovatis minoribus integris, floribus majoribus, antheris breviter aristatis differt.

Tree, the young parts copiously sericeous-tomentellous with fulvous hairs 0.3–0.6 mm. long, the branchlets subterete, slender, 2–3 mm. in diameter toward apices, densely tomentellous or puberulent with long-persistent hairs; leaves spaced on distal parts of branchlets, the petioles slender, finely canaliculate, 1.5–3.5 cm. long, persistently brown-pilose like young branchlets, the blades chartaceous, drying brownish, ovate, 5–9 cm. long, 3–6.5 cm. broad, shallowly but obviously cordate at base, obtuse or cuspidate at apex (acumen up to 5 mm. long, callose-tipped), narrowly recurved and subentire or inconspicu-

ously undulate at margin, densely tomentellous on costa and some secondaries above but otherwise glabrous, finely puberulent beneath (hairs pale, spreading, 0.1–0.3 mm. long or slightly longer on nerves, subpersistent), the costa slightly elevated above, prominent beneath, the secondary nerves 5–8 per side, spreading, curved, prominulous above, sharply elevated beneath and with axillary domatia of an unusually projecting type, the veinlet-reticulation intricate, prominulous on both sides; racemes in very young bud (*Degener* 14527) up to 3 cm. long, about 10-flowered, the rachis densely pilose like young branchlets, the flower-subtending bracts about 3 mm. long, similarly pilose on both sides, 3-lobed, the lateral lobes basal, inconspicuous, the middle lobe lanceolate, subacute; mature inflorescences not seen but a few flowers available with the type; pedicels curved, 3–5 mm. long at anthesis, copiously tomentellous-puberulent with pale reddish hairs 0.2–0.4 mm. long; sepals 5, thin-carnose, lanceolate, 9–10 mm. long, 1.5–1.8 mm. broad, subacute, copiously tomentellous without like pedicel, carinate and densely sericeous within; petals 5, submembranaceous distally, thickened toward base, obovate-cuneate, 12–12.5 mm. long, about 6 mm. broad, sparsely sericeous within toward base, otherwise glabrous, copiously fimbriate at apex with 16–19 laciniae, these lanceolate, acute, 2–4 mm. long, variously connate into 3 primary petal-lobes, the ultimate laciniae inconspicuously 1-nerved; disk annular-pulvinate, 0.8–1 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, copiously sericeous and apically hispidulous with hairs 0.1–0.2 mm. long; stamens about 35 and approximately 2-seriate, 5.5–6 mm. long, the filaments terete, 2–2.5 mm. long, essentially glabrous or very obscurely hispidulous-puberulent, the anthers 3.2–3.5 mm. long, minutely tuberculate-hispidulous, the dorsal awn subulate, 0.6–0.8 mm. long, the ventral apex subacute; ovary ovoid, copiously hispidulous-tomentellous with hairs about 0.2 mm. long, the style subulate, 3.5–4 mm. long, puberulent proximally, glabrous above, the ovary-wall thick, sparsely sericeous within, the locules 2, each with 5 (or 6?) biseriate ovules; infructescences not seen, but a few detached fruits available with the type, the pedicels not elongating, persistently pilose; fruits narrowly ellipsoid, slightly flattened, about 4.5 cm. long and 2.5 cm. broad at apparent maturity, faintly puberulent, glabrate, obtuse at base, gradually narrowed to a subacute apex, the epicarp brittle, very thin, the mesocarp spongy, fibrous, 4–6 mm. thick when dried (perhaps thicker when fresh), the endocarp 1.5–2 mm. thick, hard only on outer and inner surfaces, with a wide and comparatively soft fibrous intermediate layer, forming an ellipsoid putamen up to 40×18×10 mm., the lateral angles produced into several conspicuous flattened lobes, the dorsiventral surfaces rounded.

Type in the herbarium of the Bishop Museum, collected in dark woods on the slopes of Mt. Nanggaranambuluta [Lomalangi], Province of Mba, Viti Levu,

Fiji, alt. about 1,000 m., December 13, 1927, by J. W. Gillespie (No. 4285). Duplicate at GH.

ADDITIONAL SPECIMEN EXAMINED:
FIJI: VITI LEVU: Mba: Nauwanga, near Nandarivatu, *Degener* 14527 (A).

DISTRIBUTION: Fiji, known only from the vicinity of Nandarivatu, in north-central Viti Levu, at an altitude of 750–1,000 m. The species is presumably a large forest tree, but no habitat data are supplied.

Although the available material is not entirely satisfactory, it is sufficiently ample so that an adequate description can be drawn up of what is patently a very distinct new species. The basic characters demonstrate its affinity with *E. graeffei*, but it differs in having its small ovate leaf-blades more distinctly cordate at base and with a shorter apex, its flowers larger and shorter-pedicellate, its short-awned anthers, and in the characteristically persistent indument of its branchlets and petioles.

23. **Elaeocarpus** (§ *Blepharoceras*) **xanthodactylus** A. C. Sm. sp. nov.

Arbor ramulis petiolisque gracilibus strigoso-puberulis mox glabratis, foliorum laminis ellipticis vel obovato-lanceolatis, petalis roseis in laciniis 7 vel 8 luteis fissis, staminibus circiter 15 uniseriatis, antheris conspicue aristatis distinguenda; *E. graeffei* Seem. et *E. uliano* Christophersen affinis, staminibus et petalorum laciniis paucioribus, foliorum laminis basi obtusis vel subacutis margine subintegris, ramulis petiolisque mox glabratis valde differt.

Tree, up to 10 m. high, the young parts copiously sericeous with pale reddish hairs 0.4–0.6 mm. long, the branchlets slender, subterete, 2–3 mm. in diameter toward apices, strigose-puberulent distally (hairs 0.1–0.3 mm. long), glabrate; leaves spaced or somewhat congested on apical parts of branchlets, the petioles slender, shallowly canaliculate, swollen at base and apex, (0.7–) 1.5–3 cm. long, sparsely strigose like young branchlets, soon glabrate; leaf-blades papyraceous or chartaceous, drying dark green, narrowly elliptic or obovate-lanceolate, (5–) 7–12 cm. long, (2–) 3–5.5 cm. broad, obtuse to subacute at base and short-decurrent on the petiole, cuspidate at apex (acumen up to 1 cm. long, callose-obtuse), narrowly recurved at margin and entire or very obscurely crenulate with remote and shallow indentations, sparsely strigose on costa above or completely glabrous, beneath strigose on costa and nerves with hairs up to 0.5 mm. long but soon glabrate, the costa plane or slightly raised above, prominent beneath, the secondary nerves 7–10 per side, spreading, curved, anastomosing toward margin, prominulous above, sharply elevated beneath, the veinlet-reticulation intricate, prominulous on both sides; racemes axillary or arising below leaves, the peduncle 1–2 cm. long, forming with the rachis a slender axis 5–7 cm. long, this 5–10-flowered, like the pedicels puberulent or spreading-pilose, the hairs golden,

0.2–0.4 mm. long, the flower-subtending bracts lanceolate, about 1.5 mm. long, pilose on both sides like the rachis, caducous, the pedicels slender, 7–10 mm. long at anthesis; sepals 5, thin-carnose, oblong-lanceolate, 7.5–9 mm. long, 1.5–2 mm. broad, subacute, carinate within, sericeous on both sides with golden hairs 0.2–0.4 mm. long; petals 5, submembranaceous distally, slightly thickened toward base, often remaining involute at basal margins, oblong-cuneate, 9.5–10.5 mm. long, 4–4.5 mm. broad, sparsely golden-sericeous within toward base, otherwise glabrous, conspicuously fimbriate at apex with 7 or 8 lobes, these subequal, 2–3.5 mm. long, each with 1 or 2 ultimate veinlets; disk carnose, 0.5–0.8 mm. high, 5-lobed, the lobes confluent, dorsally sulcate, hispidulous with golden hairs about 0.2 mm. long; stamens uniseriate, 15 (in several flowers dissected), 5.5–6.5 mm. long, the filaments terete, distally minutely hispidulous, 2.2–2.7 mm. long, the anthers 3.3–3.8 mm. long, minutely hispidulous-tuberculate, terminated by a subulate dorsal awn 0.8–1 mm. long; ovary ellipsoid, puberulent-sericeous with pale golden hairs 0.1–0.3 mm. long, the style subulate, 5–6 mm. long, pilose near base, glabrous distally, the ovary-wall obscurely sericeous within, the locules 2, each with 4–6 biseriate ovules.

Type in the herbarium of the Arnold Arboretum, collected in dense forest on the summit ridge of Mt. Numbuiloa, east of Lambasa, Province of Mathuata, Vanua Levu, Fiji, alt. 500–590 m., November 3, 1947, by A. C. Smith (No. 6471). Duplicate at US.

DISTRIBUTION: Known definitely only from the type collection, taken from a tree 10 m. high; the petals are at first greenish yellow, then rich pink with yellowish lobes, and the stamens are pale yellow.

From its only close allies, *E. graeffei* and *E. ulianus*, the new species is readily distinguished by its few stamens, its colored petals with comparatively few apical laciniae, by having its leaf-blades obtuse to subacute at base, and by its more readily glabrate habit. Petal-color is probably a very dependable character in *Elaeocarpus*, within reasonable limits, as it seems correlated with other floral characters; unfortunately it is not always noted by collectors.

Another specimen which suggests *E. xanthodactylus* is *Smith* 6555 (A, US), from essentially the type locality (summit of southwestern ridge of Mt. Numbuiloa, alt. about 500 m.; tree 12 m. high, in dense forest). This specimen has leaves essentially like those of No. 6471, but the petioles are 3–6 cm. long and the base of the blade is more acute. The infructescence is greatly swollen, the pedicels 18–20 mm. long, and the persistent disk with hairs 0.3–0.7 mm. long; the flower-subtending bracts are persistent and 3–4 mm. long. Although the foliage differences are slight, I hesitate to refer No. 6555 to the new species because ordinarily, in *Elaeocarpus*, the flower-subtending bracts, pedicels, and disk-indument do not lengthen much with matu-

rity. The fruit of No. 6555 is of an unusual type; it is ellipsoid, up to 5 by 3 cm., the epicarp is tough and comparatively thick (0.3–0.4 mm. thick), the mesocarp is fibrous and apparently at least 5 mm. thick, and the endocarp is very thin, scarcely more than 0.3 mm. thick, forming an irregularly angled (not flattened) putamen. This is not the type of putamen found in other Pacific species of this alliance. More evidence is needed before this specimen can be definitely connected with *E. xanthodactylus*, but it obviously does not represent any other described species.

6. § CHASCANTHUS

Elaeocarpus § Chascanthus Schlechter in Bot. Jahrb. 54: 115. 1916.

Section *Chascanthus* is represented by at least 4 species from New Guinea and 1 from the Solomon Islands. It seemed to be quite sharply characterized (Smith, 1944, p. 225–227) on the basis of these species, but the advisability of retaining it as distinct from § *Blepharoceras* should be considered. Apparently the reduced number of ovules in § *Chascanthus* is the most obvious separating basic character, but it is possible that fruiting characters of consequence will be recognized. I refer here a single Samoan species, which superficially suggests § *Blepharoceras*.

24. Elaeocarpus (§ *Chascanthus*) tuasivicus Christophersen in Bishop Mus. Bull. 128: 137. *fig. 18.* 1935.

Tree, up to 12 m. high, the young parts sericeous with golden hairs 0.3–0.5 mm. long, the branchlets obtusely angled distally and there 2–4 mm. in diameter, minutely strigose-puberulent, soon glabrate; leaves abundant, closely spaced along branchlets toward apices, the petioles flattened or broadly canaliculate, drying rugulose, 10–25 mm. long, strigose like young branchlets, glabrate; leaf-blades subcoriaceous to chartaceous, drying brownish, lanceolate to oblanceolate, (4–) 7–13.5 cm. long, (1.5–) 2–4.5 cm. broad, attenuate at base and long-decurrent on the petiole, obtuse or obtusely cuspidate at apex and sometimes faintly emarginate, slightly recurved at margin and undulate-crenulate (crenations about 1 per centimeter, rounded), glabrous on both sides or very sparsely strigose beneath when young, the costa elevated and rounded above, prominent beneath, the secondary nerves 6–10 per side, spreading, curved, anastomosing toward margin, prominulous above, conspicuously raised beneath, the veinlet-reticulation intricate, prominulous on both sides or immersed above; racemes axillary or lateral below leaves, the peduncles 2–3 cm. long, forming with the rachis a slender axis 4–8 cm. long and 5–10-flowered, this puberulent or tomentellous with golden hairs 0.1–0.2 mm. long, at length subglabrate, the flower-subtending bracts oblong-lanceolate, 1.5–3 mm. long, strigose on both sides, soon caducous, the pedicels

8–15 mm. long at anthesis, pilose like rachis; sepals 5, thin-carnose, lanceolate, 6.5–7.5 mm. long, 1.7–2 mm. broad, subacute, pilose on both sides like pedicel and carinate within; petals 5, thin-carnose, thickened toward base, obovate-cuneate, 9–10.5 mm. long, 4.5–6 mm. broad, glabrous on both sides, conspicuously fimbriate at apex, the lobes 14–18, lanceolate, subequal, 4–5 mm. long, acute, usually 1-nerved; disk carnose, 0.7–0.8 mm. high, 5-lobed, the lobes confluent, inconspicuously dorsally sulcate, sericeous-hispidulous with golden hairs 0.2–0.4 mm. long; stamens 18–22, 1- or 2-seriate, 4.5–5 mm. long, the filaments terete, 1.5–2.2 mm. long, glabrous, narrowed distally, the anthers 2.5–3 mm. long, minutely hispidulous, the dorsal awn subulate, 0.5–0.8 mm. long, the ventral apex acute; ovary ellipsoid-ovoid, copiously sericeous with golden hairs 0.2–0.3 mm. long, the style terete, 2.2–2.5 mm. long, sericeous in lower half, glabrous distally, the ovary-wall thick, the locules 2, each with 2 collateral ovules.

TYPE LOCALITY: Above Letui, Savaii, Samoa; type, *Christophersen* 776, cited below.

DISTRIBUTION: Samoa, apparently limited to the main mountain range of Savaii (hence the specific epithet) at an elevation of 1,350–1,700 m., occurring as a shrub or tree 3–12 m. high, in wet or low forest or in open scrub forest.

SAMOA: SAVAII: Above Letui, *Christophersen* 776 (Bish TYPE, US); on rim of Papafu Crater, *Christophersen* 2723 (Bish, K); above Salailua, *Christophersen* 3115 (A, Bish, US); on crater rim above Aopo, *Christophersen* 3458 (Bish, K, NY, US).

This apparently very limited endemic is a sharply marked species, without close allies in Samoa or the adjacent archipelagos. Its closest relative may be *E. salomonensis* Knuth (in Rep. Sp. Nov. 50: 87. 1941; syn.: *E. solomonensis* A. C. Sm. in Journ. Arb. Arb. 25: 225. 1944). However, the species of the Solomon Islands has the racemes 15–30 cm. long, the petals with 60–90 laciniae arranged in 5 or 6 primary lobes, 30–35 stamens, and a 3-loculed ovary, as well as acuminate and closely crenate-serrate leaf-blades. The basic features of the Samoan plant seem to indicate its position in Schlechter's § *Chascanthus*, the ovary-locules being clearly biovulate; however, since this feature may not be readily observed, I have also keyed the plant in § *Blepharoceras*, although it certainly has no close relatives in that section.

7. § COILOPETALUM

Elaeocarpus § Coilopetalum Schlechter in Bot. Jahrb. 54: 134. 1916.

This section contains at least 28 species in New Guinea and 1 in the Solomon Islands; in the Pacific it extends eastward to the Cook Islands, being represented in our region by a species common to

Samoa, Tonga, and Niue; its occurrence in the New Hebrides is also indicated by a fragment which apparently represents an undescribed species. The basic characters of § *Coilopetalum* seem adequately to characterize it; the flowers are comparatively small, the petals resembling the sepals in size and texture and often conspicuously retrorse-sericeous within, the ovary is 2–4-locular, the ovules numerous, and the fruits small, the scarcely ornamented pyrene being nearly round in cross section. It appears to me a fairly sound section (for discussion see Smith, 1944, p. 259). Merrill (1951, p. 173) implies that it is not readily separable from § *Monocera*, although elsewhere in the same paper (1951, p. 192) he accepts it as distinct. The very characteristic fruits, to say nothing of the different floral features, seem to forbid the reduction of § *Coilopetalum* to § *Monocera*.

25. **Elaeocarpus** (§ *Coilopetalum*) **tonganus** Burkill in Journ. Linn. Soc. Bot. **35**: 29. 1901.

Elaeocarpus samoensis Lauterb. in Bot. Jahrb. **41**: 230. 1908; Christophersen in Bishop Mus. Bull. **128**: 136. 1935; Yuncker in Bishop Mus. Bull. **178**: 80. 1943.

Tree, up to 15 m. high, glabrous throughout except inflorescences, the young parts apparently viscid when fresh, the branchlets subterete, often striate-rugulose and cicatricose, 2–4 mm. in diameter toward apices; leaves closely spaced along distal parts of branchlets or congested, the petioles slender, shallowly canaliculate, slightly swollen at base and apex, 1.5–4.5 cm. long, the blades chartaceous or thin-coriaceous, drying olivaceous, ovate to elliptic, (5–) 6–13.5 cm. long, 2.5–6 cm. broad, broadly obtuse or rarely rounded at base, obtusely cuspidate at apex (acumen less than 1 cm. long), shallowly crenulate at margin (crenations 0.5–2 cm. apart, obscurely callose-spinulose and soon rounded), the costa nearly plane or rounded above, prominent beneath, the secondary nerves 5–8 per side, spreading, slightly curved, irregularly anastomosing, prominulous or nearly plane above, sharply elevated beneath and usually with obvious axillary domatia, the veinlet-reticulation prominulous on both sides or nearly plane above; racemes axillary or arising below leaves, the peduncles 2–4 cm. long, soon glabrate, forming with the rachis a slender axis 5–13 cm. long and 5–25-flowered, the rachis and pedicels sericeous-puberulent with silvery-gray hairs 0.1–0.3 mm. long, the flower-subtending bracts oblong-lanceolate, 2–3 mm. long, sericeous, caducous before anthesis, the pedicels slender, curved, 7–15 mm. long at anthesis; sepals 5, thin-carnose, lanceolate, 6.5–9 mm. long, 1.5–2.3 mm. broad, acute, copiously pilose without like pedicel, conspicuously carinate and glabrous within; petals 5, thin-carnose, oblong, 6.5–8.3 mm. long, 1.5–3 mm. broad, conspicuously carinate within toward base, very densely sericeous on both sides (hairs without ascending, 0.3–0.7

mm. long, within retrorse, 0.5–1 mm. long), fimbriate at apex, the laciniae 6–11, subequal, lanceolate, subacute, 1–1.5 mm. long; disk carnose, 0.4–0.6 mm. high, deeply 5-lobed, the lobes confluent, bilobed, strongly projecting, hispidulous distally with hairs 0.1–0.3 mm. long; stamens 31–52, 2- or 3-seriate, 3.5–5 mm. long, the filaments slender, terete, 0.8–2.2 mm. long, copiously hispidulous with subascending hairs 0.1–0.3 mm. long, the anthers 2.5–3.3 mm. long, minutely tuberculate-hispidulous, the dorsal awn subulate, 0.5–0.9 mm. long, the ventral apex rounded; ovary ovoid, glabrous, the style slender, 2.5–3.3 mm. long, inconspicuously 3- or 4-angled, the ovary-wall thick, the locules 3 or 4, each with 6–8 biseriate ovules; infructescence slightly thickening but not elongating, the rachis and pedicels often pilose but at length glabrate, the disk persistent and obvious; fruits ellipsoid, coriaceous and rugose when dried, up to 18 mm. long and 12 mm. broad, obtuse or rounded at both ends, the epicarp thin, hard, less than 0.05 mm. thick, the mesocarp coarsely granular, 1–1.5 mm. thick, the endocarp very hard and bony, 1–2 mm. thick, forming an ellipsoid putamen, this coarsely and irregularly rugulose without, smooth within, inconspicuously 3- or 4-angled, the angles obtuse, shallowly sulcate, the seed ellipsoid, acute at both ends, occupying the entire cavity.

TYPE LOCALITY: Vavau Island, Tonga; the type, *Crosby* 15, is cited below. Isotypes of *E. samoensis*, *Vaupel* 390, are also cited.

DISTRIBUTION: Samoa, Tonga, and Niue, but known from very few islands. It occurs at elevations close to sea level in Tonga and on Niue, but in Samoa is reported from 300–750 m. The species has been noted as a tree 4–15 m. high, growing in various types of forest, thickets, woodland, and on dry ridges; the fruits are blue or brownish purple, often glaucous.

LOCAL NAMES AND USES: In Samoa: *A omatie* (name from a Kraemer specimen cited by Lauterbach). In Tonga: *Masi* (ex MacDaniels). On Niue: *Malalava, mamalava* (ex Yuncker, who notes that the wood is used for timbers in house construction).

SAMOA: SAVAII: Olonono, *Vaupel* 390 (type coll. of *E. samoensis*, Bish, K, NY, US); near Olo, above Safotu, *Christophersen & Hume* 2325 (Bish), 2526 (A, Bish, K, NY, US); above Sili, *Christophersen* 3222 (Bish, K, NY, US). UPOLU: Above Malololelei, ridge to Mt. Vaitou, *Christophersen* 263 (Bish, NY).

TONGA: VAVAU: *Crosby* 15 (K TYPE); east of Neiafu, *MacDaniels* 1101 (Bish).

NIUE: *Jensen* 1 (BM); south of Alofi, *Yuncker* 9612 (Bish, US), 9898 (A, Bish), [9870 also cited by Yuncker, not seen].

The above reduction of *E. samoensis* to *E. tonganus*, not previously suggested, is made only after very detailed study of the cited specimens, including type material of both names. In foliage the material from Tonga and Niue is essentially identical with that from Samoa.

In flower, the Tonga-Niue specimens have slightly the larger sepals and petals, the latter tending to have the more numerous apical laciniae, more numerous stamens (41–52 as opposed to 31–41), and slightly longer filaments. These are the only differences I can note, and they are so inconsequential that it seems inadvisable to retain *E. samoensis* even as an infraspecific taxon.

Elaeocarpus tonganus is probably most closely allied to *E. rarotongensis* Hemsl. (1896), which unfortunately is not adequately described, although points of the original description show beyond doubt that the species also belongs to § *Coilopetalum*. On the basis of specimens of *E. rarotongensis*, from the Cook Islands, now available (*Parks* 22040 and 22517), the species has longer petioles and larger leaf-blades, with more numerous secondaries, than *E. tonganus*, although such differences are not absolute. The disk, in fruiting condition, in *E. rarotongensis* has 10 conspicuous and acute costae, whereas in *E. tonganus* the disk is composed of 10 rounded and projecting lobes. I think that the two taxa will prove amply distinct when the Rarotonga plant is fully known.

Elaeocarpus floridanus Hemsl. (1896), of the Solomon Islands, is also of this general relationship; as compared with *E. tonganus* it has its leaf-blades proportionately somewhat longer and more obviously crenulate, while its disk in fruit is of the type discussed above for *E. rarotongensis*. It is evident that the species of § *Coilopetalum* in the area from the Solomons to the Cook Islands are very closely related, and the absence of this complex from Fiji, on the basis of present collections, is puzzling.

Elaeocarpus sp.

NEW HEBRIDES: ANEITYUM: Anelgaubat Bay, *Kajewski* 938 (A, US) (common tree, up to 15 m. high, in rain-forest at about 300 m. alt.).

The cited specimen appears to represent an undescribed species, but the material is inadequate for description. The leaves have petioles 1.5–3 cm. long and lanceolate subentire blades up to 15×6 cm. The infructescence is not more than 2 cm. long, and detached fruits are ellipsoid, about 25×18 mm.

Another interesting specimen from the New Hebrides, without further locality, is a flowering fragment collected by R. E. Burton (A) on Sept. 15, 1944. This specimen, consisting of a single leaf and a detached inflorescence in full anthesis, definitely represents an undescribed species of § *Coilopetalum*. The leaf is remarkably similar to that of *Kajewski* 938, but the inflorescence is about 8.5 cm. long, and the disk is of a different type; the fruit accompanying the Kajewski specimen does not necessarily represent § *Coilopetalum*.

These two specimens are discussed because they clearly indicate that at least one undescribed species of *Elaeocarpus* occurs in the New Hebrides and awaits description.

BIBLIOGRAPHY

GUILLAUMIN, A.

1948. Flore analytique et synoptique de la Nouvelle-Calédonie. Phanerogames. Paris.

MERRILL, E. D.

1945. Plant life of the Pacific world. i-xv, 1–295. New York.

1951. Notes on *Elaeocarpus* Linnaeus. Journ. Arn. Arb. 32: 157–200.

SCHLECHTER, R.

1916. Die Elaeocarpaceen Papuasiens. Bot. Jahrb. 54: 92–155. *fig. 1–9.*

SMITH, A. C.

1944. Studies of Papuasian plants, VI. Elaeocarpaceae. Journ. Arn. Arb. 25: 104–121, 222–298.

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