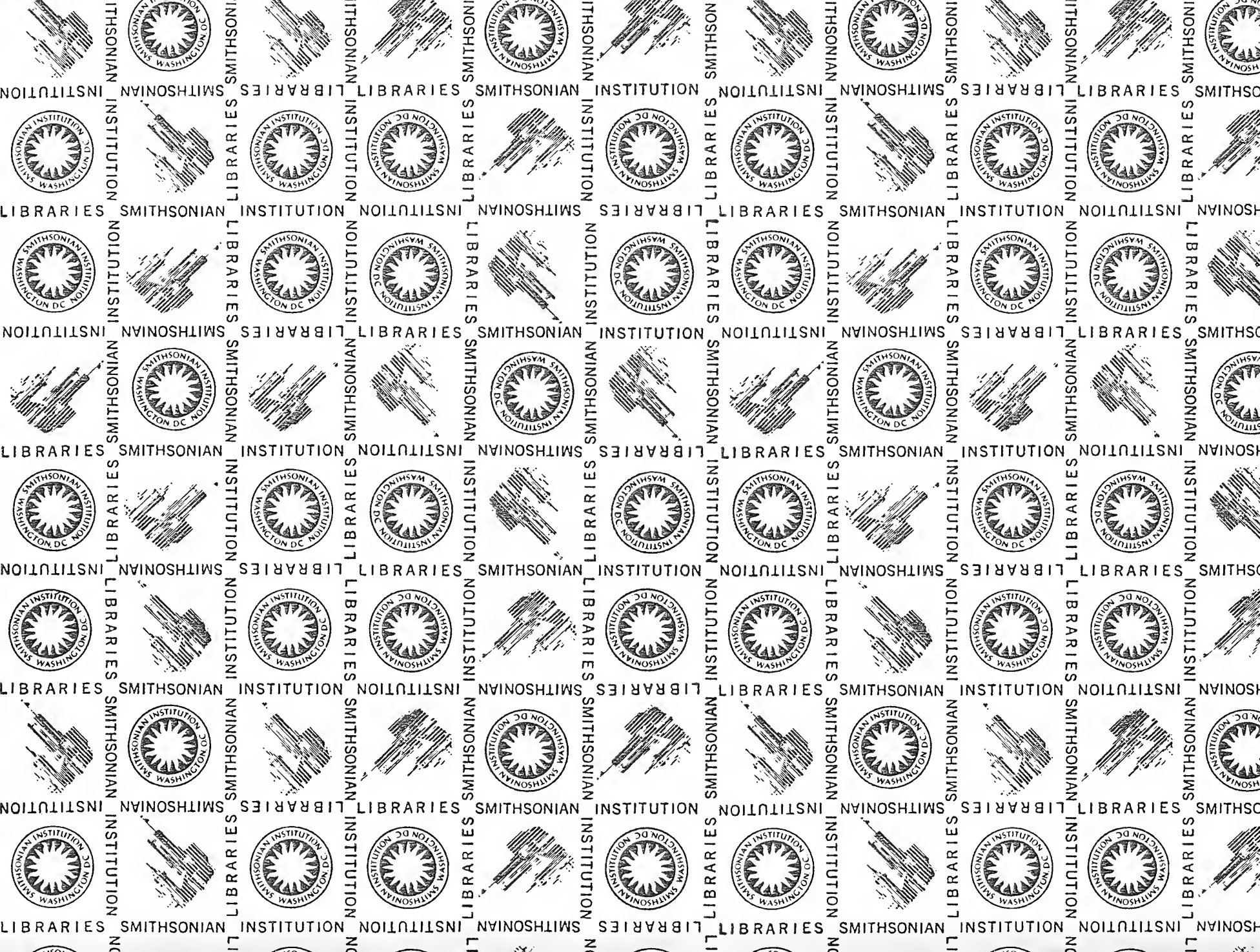
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Polynesian Plant Studies 1-5

F. RAYMOND FOSBERG
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Polynesian Plant Studies 1-5

F. Raymond Fosberg
and Marie-Hélène Sachet

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ABSTRACT

Fosberg, F. Raymond, and Marie-Hélène Sachet. Polynesian Plant Studies 1–5. *Smithsonian Contributions to Botany*, number 21, 25 pages, 1975.—Systematic, nomenclatural, and distributional observations on various genera of Polynesian vascular plants, both indigenous and exotic, with new species, varieties, and nomenclatural combinations in *Myrsine, Geniostoma,* and *Ipomoea*. The island groups on which the plants occur are the Hawaiian, Marquesan, Society, Tuamotu, Austral, Cook, Fiji, and Tonga islands.

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Contents

Polynesian Plant Studies 1-5

F. Raymond Fosberg
and Marie-Hélène Sachet

Introduction

In the course of work on island floras many problems of a taxonomic, nomenclatural, morphologic, ecologic, or phytogeographic nature are brought to light and solved, or at least studied critically. New discoveries are made and new data are accumulated—undescribed taxa, new geographic records, new habitat or ecologic relationships, and new facts on dispersal, especially by human agency. Inclusion of this material in treatments of the floras would unduly delay the availability of the information and would tend to make the floras cumbersome and inconvenient to use for plant identification.

This series is initiated to present this sort of information on plants of Polynesia. The term Polynesia is used in the classical sense, for a vast island-strewn triangle in the central Pacific Ocean with its apices marked by the Hawaiian Archipelago in the north, Easter Island and Sala y Gomez on the east, and New Zealand on the south. The limits are not necessarily adhered to rigidly, as the plant distributions do not necessarily follow them, and information from farther afield may contribute to our understanding of occurrences in Polynesia.

The present paper contains the first five separate studies, pertaining respectively to eastern Polynesian *Vaccinium, Geniostoma,* and *Myrsine,* eastern and western Polynesian *Ipomoea,* and Hawaiian species of several genera. Herbarium symbols, given in parentheses after each specimen citation, are in accord with the Index Herbariorum (Lanjouw) system, except that the symbol "Fo" is used for plants still in possession of the authors and not yet deposited in a herbarium; the symbol "UH" is for the herbarium of the University of Hawaii and not yet included in the system, and the symbol "PTG" is for the new herbarium of the Pacific Tropical Botanical Garden at Lawai, Kauai, Hawaiian Islands.

Elevations recorded on collectors' labels are normally only estimates or, at best, altimeter readings to the nearest 100 feet or other graduation. Wherever original data are recorded in the English system, they have been converted to their nearest metric approximations, which are noted in brackets.

Thanks are due the authorities of the herbaria of the Laboratoire de Phanérogamie, Muséum d'Histoire Naturelle, Paris, the Bernice P. Bishop Museum, the New York Botanical Garden, the California Academy of Sciences, the University of California at Berkeley, and the Université de Montpellier for the privilege of examining many of the specimens on which these studies are based, and to staff members of these institutions for various courtesies and assistance.

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1. *Vaccinium cereum* (L. f.) Forster f. in Tahiti and the Marquesas

Vaccinium cereum (L.f.) Forster f., Prodr. 28, 1786.
Andromeda cerea L.f., Suppl. 238, 1781.
Vaccinium adenandrum Decaisne, Voy. Vénus 23, 1864, pl. 17, 1846.
Vaccinium cereum var. *adenandrum* (Decaisne) F. Brown, Bishop Mus. Bull. 130:215, 1935.

Most of the eastern Polynesian *Vaccinium* are considered to belong to *V. cereum* (L.f.) Forster f., an extremely variable species found on several high island groups. In spite of treatments by Skottsberg (1933, 1934), F. Brown (1935), and Grant, Fosberg, and Smith (1974), some confusion still lingers in the interpretation of the variation in this species. The following remarks are a step toward clarifying it.

Skottsberg (1933) made a detailed study of *V. cereum* and related species, in which he described various specimens from Tahiti that he considered to be *V. cereum* "var. *typicum*" or "var. *genuinum*," i.e. var. *cereum*, with glabrous flowers. Among these, however, he recognized (1933:87) a form with hairy filaments, f. *eriostemon*.

Aside from var. *cereum*, Skottsberg described another variety from Tahiti, with pubescent flowers, var. *pubiflorum* (1933:89). Still among the Tahiti plants, he separated within var. *pubiflorum* a form with hairy filaments, which he also called f. *eriostemon* (1933:90). Thus Skottsberg described two formae *eriostemon*, one in *V. cereum* var. *cereum*, one in *V. cereum* var. *pubiflorum*; this is contrary to the provisions of the 1972 *International Code of Botanical Nomenclature*, Article 64, paragraph 3,which says, in part: "The names . . . of two infraspecific taxa within the same species, even if they are of different rank, are treated as homonyms if they have the same epithet and are not based on the same type." Thus one of the two formae had to be renamed. This was done without explanation by Grant (in Grant, Fosberg, and Smith, 1974:8). The names of the Tahiti plants may be treated as follows: *Vaccinium cereum* var. *cereum* f. *eriostemon* Skottsberg [Acta Horti Gotoburgensis, 1933, 8:87; lectotype: "Society Islands, Tahiti, WILKES, U.S. Expl. Exped." (P); designated by Grant in Grant, Fosberg, and Smith, 1974:8; isolectotype (US) seen by us] and *Vaccinium cereum* var. *pubiflorum* f. *skottsbergii* Grant [in Grant, Fosberg, and Smith, 1974:8; type: Tahiti, 4000 ft [1220m], *Moseley* in 1875 (K); isotype (BM) seen by Fosberg; based on *Vaccinium cereum* var. *pubiflorum* f. *eriostemon* Skottsberg, Acta Horti Gotoburgensis, 1933, 8:90].

For the Marquesan plants, Skottsberg could find no significant difference between *V. adenandrum* Decaisne and his f. *eriostemon*, and considered the correct name to be *Vaccinium cereum* var. *cereum* f. *eriostemon* Skottsberg. However, he examined only one Marquesan collection, *Herbier S.F.I.M. 168* (P). On the basis of more specimens, F. Brown took up the epithet *adenandrum* but changed its status to that of a variety. He discussed Skottsberg's treatment at great length, as well as his own observations. We agree with F. Brown's conclusion, but more on the basis of habit and leaf form than on the detailed measurements cited by him.

We find the Marquesan plants to have the flowers glabrous externally, as in var. *cereum*, young stems glabrous or more rarely puberulent, or still more rarely, both types on the same plant (*Le Batard* in 1844), usually subentire stiff oval to broadly obovate shortly acuminate leaves, and filaments more strongly pilose than in the Tahitian forms. The Marquesan plants with glabrous stems and subserrulate to subentire leaves certainly form a population distinguishable at the varietal level. A very few plants with puberulent stems have also finely serrulate leaf margins. These could perhaps be referred to var. *cereum*, but only additional field study will reveal if they form a separate population or are merely extremes in the variation of var. *adenandrum*.

For the present we regard the correct name of the Marquesan population to be *Vaccinium cereum* var. *adenandrum* (Decaisne) F. Brown.

The question remains as to the type of *V. adenandrum* Decaisne. This was not located in Paris during several recent visits. However, an old specimen sent from the Paris herbarium to the U. S. National Herbarium, Smithsonian Institution, with neither locality nor collector given, but merely bearing the data *"No. 42 Bis Toatoa"* could, on the basis of the vernacular name "toatoa," perhaps be a duplicate of the du Petit-Thouars specimen that Decaisne described, for which he gave *"Toa-Toa"* as the Marquesan name. If this is the case, the type falls among the plants mentioned above with puberulent stems and finely serrulate leaves. The teeth on this specimen are almost spinulose but tend to be appressed forward along the margin. Decaisne's plate 17 (1846) shows definitely serrulate leaves, but the scale of the drawing is such that the details of the teeth are not clearly shown. His description indicates cinereous vestite branches and serrate leaves. If these toothed-leafed plants should prove to be a

separate population, then a new name would have to be applied to that with subentire leaves.

2. *Myrsine* L. in Eastern Polynesia

The species of *Myrsine* L. (or *Rapanea* Aublet) of the Marquesas have previously been referred to the Fijian *Rapanea myricifolia* (A. Gray) Mez (=*Myrsine myricifolia* A. Gray) or to one or more Tahitian species, without very close comparison. A. C. Smith (1973:286) has indicated that *Rapanea myricifolia* is related to a group of seven Tahitian species, but does not unite them. He regards stigmatic characters as indicative of this relationship.

Close study of the available material from the Marquesas, as well as that from other eastern Polynesian islands, suggests a choice between recognizing a vast coenospecies, whose geographic and morphological limits would be difficult to determine without a monographic study of this enormous pantropical genus, and the delimitation of a large number of "microspecies" based on an assemblage of individually minor characters. Some of these species, however, would be strikingly different in appearance. We have chosen the latter course, though it is contrary to our usual inclination to keep specific limits broad and to recognize minor units as varieties and forms. Having the characters of these species pointed out may aid a future monographer to determine what their affinities are; and may also lead to a better understanding of the phytogeographic relationships between the islands within eastern Polynesia.

There has been much discussion of the advisability of merging Aublet's genus *Rapanea* (type *R. guianensis* Aublet) with the older *Myrsine* L. (type *M. africana* L.). The latest contribution to this is by A. C. Smith (1973:278). He says that Degener (1939:240 R.V.) "refuted" the view that the two genera should be united. Actually Degener merely stated that he and his colleague failed to see eye-to-eye on this matter and would henceforth publish their respective findings separately, scarcely an effective refutation. Smith, himself, points out a single character whereby the two genera can be separated; that the staminal tube and filaments in *Rapanea* are completely fused to the corolla while in *Myrsine* "the filaments are connate into a tube that is only proximally adnate to the corolla-tube, being dorsally free from the corolla ["flange"] and distally produced into obvious filaments." This, to us, seems scarcely to justify maintaining two genera. Actually, there are certain habit or appearance differences between *Myrsine africana* L. and its close relatives, on the one hand, and most of the plants of this group in the Pacific on the other, that are very hard to define, and that may not hold up if the entire large pantropical genus is considered. If these characters are found to separate, even vaguely, the same groups as defined on the androecium difference, these groups could very well be given sectional rank. We have far too little information to attempt this, and will follow Hosaka, Walker, Bakhuizen and Li in placing all the eastern Polynesian species in *Myrsine*, where a number of them were originally described by the 19th century French workers on the flora of Tahiti.

In addition to describing eight species and two varieties as new, we present critical remarks on several known species, combine some of them, and provide a complete listing of the recognized *Myrsine* species in eastern Polynesia (the island groups east of Niue and excluding Hawaii and New Zealand), making the required new combinations for those described in *Rapanea* that appear to be separable. Certain of these species have not been critically studied. They are maintained with the reservation that further study, especially with more abundant specimens, may well result in the reduction of some of them. Such further investigation should especially be centered on the species of the Society and Marquesas islands, which present much of the difficulty, as the islands reach higher elevations and their floras are more complex than those of the other groups.

It is unfortunate that publication of Prof. Martin L. Grant's treatment of the Society Islands members of this group (Grant, Fosberg, and Smith, 1974) was delayed for over 35 years, so that it has not yet been available for scrutiny by subsequent workers. We have had to differ from it in a number of particulars after examining most of the collections available to Grant, as well as many of the older ones, which he was not able to see and those accumulated since.

In all, we recognize 24 species, two of which

each have two well-marked varieties, of *Myrsine* in the region covered. We also consider 22 names used by earlier workers as synonymous with some of those used here, or in one case (*M. myricifolia* A. Gray), as applying to a species not found in this area.

Myrsine adamsonii Fosberg & Sachet, new species

Rapanea myricifolia f. *marquesensis* F. Brown, Bish. Mus. Bull. 130:219, 1935.

Frutex gracilis foliis late ellipticis maxime 10 × 4.5 cm, chartaceis, petiolis gracilibus curvatis 8–13 mm longis 1 mm crassis; calyce prope basin lobato lobis ovatis, corollae lobis 2 mm longis ciliolatis, antheris anguste ovatis, stigmatis anguste pyramidalibus 2 mm longis, in fructibus persistentibus, fructibus globosis vel subglobosis maxime 5 × 4.5 mm, stylis brevissime persistentibus.

Rather slender shrub 3–4 m tall, glabrous, branchlets about 3 mm thick, cataphylls tightly wrapped around terminal buds, which are stoutly subulate, 4–5 mm long, leaves not especially crowded, blades broadly elliptic, rather thin, up to 10 × 4.5 cm, apex bluntly acute to obtusish, both surfaces obscurely but rather densely papillate-punctate, venation not prominent but distinct, main veins 16–20 on a side, variously spaced, rather widely divergent from a slender midrib, neither precisely parallel nor opposite, one or two fainter and shorter ones in most intervals, main ones anastomosing about 3 mm from margin to form a somewhat undulating submarginal vein, network obscure, base acutish, slightly decurrent into a slender curved petiole 8–13 mm long; persisting dried flower 4-merous; calyx lobed nearby to base, lobes ovate, obtuse or appearing acutish because infolded, with one to several prominent black spots dorsally, margins thin, glandular, ciliolate, lobes spreading in fruit; corolla with very short tube, lobes elliptic, to about 2 mm long, granulate ciliolate; anthers narrowly ovate, blunt, apically papillate; stigma narrowly pyramidal, fleshy, about 2 mm long, 4-sulcate when dry; fruits on short thick pedicels about 1 mm long and thick, in clusters of 3–5 on very short tubercle-like inflorescences about 2–3 mm long, drupe globose or subglobose, up to 5 × 4.5 mm, surface when dry rugulose with a mixture of obscure pale and dark dots, crowned with a broad disk-like very short style and, until fairly mature, a subulate, sulcate, obliquely projecting stigmatic beak about 1 mm or so long, immature fruits with a subpersistent lanceolate-subulate, somewhat strap-shaped stigma over 1 mm long, caducous before complete maturity, fruit surface with somewhat obscure pale punctation.

Myrsine adamsonii is probably most closely allied to *M. niauensis,* new species, which is described below, and its relationship discussed. *Myrsine adamsonii* also seems related to *M. collina* Nadeaud or its var. *falcata,* of Tahiti, but has broader thinner leaves, thicker branchlets, more prominent inflorescences, and much shorter petioles.

F. Brown's name *"Rapanea myricifolia* f. *marquesensis"* is not used as basionym for the new species because he designated no type and gave no characters that could be used to tell what he had in mind. The species is named for the late Dr. A. Martin Adamson, entomological explorer of the Marquesas.

Specimens Seen.—Marquesas Islands: Nukuhiva I.: s.l. *Quayle 1320* (BISH); 900 m, *Brown 496* (BISH); Tapuaooa, 3100 ft [950 m] fruit said to be purple, *Mumford & Adamson* (NY sheet as *Adamson & Mumford*) *577* (BISH, NY); Toovii Valley, 800 m, near the Tapuaooa shelter, *Gillett 2200* (BISH, US, type, P); Tovii, 1000 m, *Herb. S.F.I.M. 107* (P), Marquesan name *Kautai.*

Myrsine andersonii Fosberg & Sachet, new species

Arbuscula glabra foliis laminis oblongo-obovatis subcoriaceis sparse nigro-punctatis supra papillatis vix venosis, apicibus rotundis basibus subcordatis, petiolis 4 mm longis 1.5 mm latisque vix alatis; floribus masculis subsessilibus, calycibus acetabuliformibus lobis triangularibus, corollis valde lobatis marginibus dense glandulo-ciliolatis, antheris et lobis calycis corollaeque valde nigronotatis.

Shrub to 2 m, branchlets glabrous, about 4 mm thick; leaves oblong-obovate, to 9.5 × 4.5 cm, blades subcoriaceous or thinly coriaceous, rounded at apex, subcordate at base, venation not prominent 12–16 main veins on a side, some lesser ones between them, anastomosing into a rather irregular submarginal vein, network rather obscure, both

surfaces sparsely black punctate, upper surface sparsely papillate, both surfaces also very finely black marked (possibly due to fungus infection), petiole 4 mm long, 1.5 mm thick, very slightly winged by very narrowly decurrent blade tissue; staminate flowers whitish, subsessile in 3–7 flowered fascicles, flowers subtended by broad rounded scales, calyx saucer-shaped, strongly black-dotted without, divided about ⅔ into 4 triangular erose to ciliate lobes about 1 mm long; corolla divided nearly to base into 4 oblong-ovate lobes about 2–2.5 mm long, strongly marked on back with prominent black dots and lines, margins densely glandular-ciliolate, apexes obtuse to acutish; stamens 4, anthers broadly ovate-subsagittate about 1.5 mm long, 1 mm wide, obtuse with a broad blunt terminal umbo, with 1 or 2 rows of prominent very black dots or short lines, filaments flat, shorter than anthers; pistillode low conic or ovoid, with disk- or collar-like stigma. Pistillate flowers and fruits unavailable.

This species differs conspicuously in leaf shape and texture from the other Rapa species, *M. rapensis*. It may be most closely related to *M. taitensis* A. Gray, but differs notably in the smaller, narrower, thinner leaves, and especially in the subsessile rather than long-pedicellate flowers.

It is named for Mr. Donald Anderson, co-collector of the type, our long-time collaborator in Pacific natural history, and stimulating field companion.

Specimens Seen.—Austral Islands: Rapa: slope above Area, 75 m, *Fosberg & Anderson 11421* (BISH, type).

Myrsine brownii Fosberg & Sachet, new species

Rapanea species.—F. Brown, Bishop Mus. Bull. 130:220, 1935.

Arbor 4 m alta glabra, folis ellipticis vel obovatis 1–3 × 1–2 cm, petiolis 5 mm, laminis infra nigropunctatis, vix venulosis venis 8–12 jugatis, fructibus solitariis axillaribus brevipedicellatis, in sicco 4 mm longis 5 mm latisque, nigro-lineo-punctatis, calycibus 4-lobatis, lobis valde nigropunctatis.

Brown described this about as adequately as the material permitted. The species seems adequately distinct, and probably closest to *M. gracilissima* of the Marquesas, from which it differs conspicuously in the less numerous broad obovate to rhombic or broadly elliptic very obtuse leaves. Brown's description may be quoted:

> Tree 4 meters in height; trunk 10 cm in diameter; bark gray marked with prominent corky lenticels; twigs glabrous. Petioles 5 mm; leaf blades elliptical to obovate, 1–3 cm long, 1–2 cm wide, obtuse or subacute at the apex, cuneate or acute at the base, glabrous, resino-punctate, the margin slightly incurved, subcoriaceous. Pedicels commonly single, axillary, 1 mm long; calyx 4-lobed, 1 mm broad, glabrous, the lobes broadly triangular, obtuse, or subacute. Fruits spherical, 5–6 mm in diameter, red, edible.

To Brown's description may be added, from a study of the type: Leaf-blades drying dark above, prominently black-punctate beneath, venation not prominent, main veins varying in strength, 8–12 on a side, anastomosing to form an irregular to obscure submarginal vein; calyx lobes notably black-punctate, minutely erose-ciliolate; dried fruit depressed globose, 5 mm wide, 4 mm high, black-punctate, the punctations irregularly arranged in indistinct lines.

Specimens Seen.—Austral Islands: Raivavae Island, on sheltered side of top of ridge east of Matotea, 300 ft [90m], *A. M. Stokes 75* (BISH, type).

Myrsine cheesemanii (Mez) Fosberg & Sachet, new combination

Rapanea cheesemanii Mez, Pflr. 9(236):371, 1902.

Mez cited a herbarium name by Hemsley in *Myrsine* as a synonym of his *Rapanea cheesemanii* and treated the latter name as a combination by himself. Since it was published in synonymy only, *M. cheesemanii* Hemsley is not valid and the epithet dates only from Mez publication. As we are treating these as *Myrsine,* the above combination is necessary and dates from the present publication.

The species seems closest to *M. collina* Nadeaud, or to *M. falcata* Nadeaud, of Tahiti. The available material is neither very adequate nor very uniform, so no amplification of the description will be attempted here. It is probable that two species are confused in the material cited. We have not seen the type.

Specimens Seen.—Cook Islands: Rarotonga: s.l. *Parks and Parks 22329a* (US), *22340* (US, BISH); Avana stream, 900–1100 ft [275–335m], *Wilder 774* (BISH, US, part). Rarotonga was incorrectly considered by Mez as a part of New Zealand.

Myrsine collina Nadeaud

Myrsine collina Nadeaud, Enum. Pl. Tahiti 61, 1873.
Rapanea collina (Nadeaud) Mez, Pflr. 9(236):372, 1902.—Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:20, 1974.

Described from Tahiti and endemic to the Society Islands.

Myrsine falcata Nadeaud

Myrsine falcata Nadeaud, Enum. Pl. Tahiti 61, 1873.
Rapanea rhomboidalis J. W. Moore, Occ. Pap. Bishop Mus. 16:16, 1940.
Rapanea falcata (Nadeaud) Mez, Pflr. 9 (236):372, 1902.
Rapanea collina var. *falcata* (Nadeaud) Grant in Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:21, 1974.

Although *M. falcata* is undoubtedly close to *M. collina,* it seems about as distinct in habit, leaf-form, size, and texture, as well as in its glabrous young growth as are many others of the exasperatingly close species in this genus. We are maintaining it as a species until some sound criteria are found for grouping the numerous microspecies of this genus into reasonably broad more convincing "real" species. *Rapanea rhomboidalis* does not seem to differ perceptibly, nor did its author point out any distinctions. Described from Tahiti and endemic to the Society Islands.

Myrsine fasciculata (Moore) Fosberg & Sachet, new combination

Rapanea fasciculata Moore, Bishop Mus. Bull. 102:36, 1933.
Rapanea viridis, Moore, Bishop Mus. Bull. 102:38, 1933.
Rapanea fusca var. *fasciculata* (Moore) Grant in Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:22, 1974.

Described from and endemic to Raiatea.

Myrsine fusca (Moore) Fosberg & Sachet, new combination

Rapanea fusca Moore, Bishop Mus. Bull. 102:37, 1933.—Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:21, 1974.

We have not been able to locate with certainty the type-specimen of this species which was described from Raiatea. Material referred to it in the Bishop Museum herbarium differs in aspect, as well as leaf size and shape, so we are maintaining it as distinct from both *M. fasciculata* and *M. falcata,* to which it may be too close. A collection from Borabora, *Grant 4951* (BISH), and one from Huahine, *Grant 5302* (BISH) represent larger-leafed plants, but similar to *M. fusca* in leaf outline. The relationship of these Leeward Society Islands plants, including *M. fasciculata* and the Tahitian *M. falcata* and *M. collina* should be further investigated when more and better specimens become available.

Myrsine gracilissima Fosberg & Sachet, new species

Arbor parva ramulis gracilissimis vix 1 mm crassis, foliis late lanceolatis maxime 4.5 cm longis 1 cm latisque acuminatis infra dense papillato-punctatis, petiolis gracilis 8–12 mm longis; 1–2 floribus in folii axilla 4–meris, calycibus ad dimidium lobatis lobis ovatis carinatis, corollae lobis oblongis cucullatis in anthesi erectis, antheris ovatis vel ovalis mox dehiscentibus.

Small, much-branched tree, foliage mostly at top, branchlets extremely slender, ultimate ones 1 mm or less thick, when older strongly lenticellate; cataphylls lanceolate, closely wrapped around terminal buds; leaves loosely scattered on branchlets, blades broadly lanceolate, up to 4.5 × 1 cm, sharply acuminate or even slightly caudate at apex, attenuate at base, margins somewhat revolute, crispate, venation very obscure, on young leaves faintly impressed above, main veins 8–10, at a small angle to the slender prominent midrib, network scarcely visible, lower surface densely papillate-punctate, punctation scarcely visible above, petiole very slender, 8–12 mm long; inflorescence like a small globose scaly bud, axillary, about 1.5 mm across, very few flowering at this season, pedicels 1–2 from an inflorescence, slender, 2–3 mm long; staminate flowers 4-merous, calyx lobed about half way, lobes ovate, slightly acuminate, carinate; corolla tube very short, completely included, lobes about 2 mm long, oblong, cucullate, black-punctate dorsally, almost erect at anthesis, margins strongly papillate; anthers ovate or oval, about 1.5 mm long, dehiscent while corolla lobes are still not spreading, apex papillate, pistillate flowers and fruits unavailable.

A very striking species, not related to any known

eastern Polynesian species but possibly closest to *M. brownii* Fosberg & Sachet, described above, or possibly to *Myrsine fasciculata* (Moore) Fosberg & Sachet of Raiatea, or *M. myricifolia* A. Gray of Fiji.

Specimens Seen.—Marquesas Islands: Hiva'oa I.: Atuona-Feani Trail, ridge crest and top of leeward slope in cloud-forest, 1200–1300 m, *Sachet & Decker 1154* (US, type, P, Fo, K, MO, UH, A, BISH); north side of Mt. Temetiu, 1100 m, *Mumford & Adamson 148* (UC).

A plant that may be the closest relative of this species is represented by a sterile piece mounted on the same sheet as a fertile specimen of *Wilder 774,* which seems to be *M. cheesemanii* from Rarotonga. This sterile specimen is coarser throughout and with wider, stiffer, not acuminate leaves. The material is too incomplete for description, but probably represents an undescribed species.

Myrsine grantii Fosberg & Sachet, new species

Frutex vel arbor parva, foliis chartaceis vel coriaceis maxime 13.5 cm longis 6 cm latisque ellipticis vel oblongis non valde venulosis; floribus subsessilibus in fasciculis paucifloris squamosis, antheris sagittatis apicibus muticis papillatis; stigmatibus coroniformibus lobatis; fructibus globosis vel subglobosis 5–7 mm longis.

Shrub or small tree, glabrous; leaves chartaceous to coriaceous, small to moderate sized, elliptic or obovate, veins not prominent; flowers subsessile in scaly-bracteate clusters of 3–5 (–7), bracts, calyx-lobes and corolla-lobes glandular-ciliolate; anthers sagittate, apex blunt, papillate, stigma corona-form, irregularly lobed; fruit globose or subglobose, 5–7 mm long.

This new species is notable for its short, thick petioles, firm medium-sized punctate leaves, subsessile flowers in small scaly-bracteate fascicles, the bracts, calyx and corolla glandular-ciliolate; fruit 5–7 mm long. It is dedicated to the late Dr. Martin L. Grant, long-time worker on the Polynesian flora, who had indicated it in the herbarium as a new species.

Two varieties may be distinguished. These we first described as separate species, hence they are described rather fully.

Key to the Varieties of *Myrsine grantii*

Leaves mainly obovate, mainly less than 10 cm long ..... var. ***grantii***
Leaves mainly elliptic-oblong, mainly 9–13 cm long ..... var. ***toviiensis***

Myrsine grantii Fosberg & Sachet var. *grantii*

Frutex vel arbor parva, foliis obovatis vel vix ellipticis vix venulosis coriaceis vel subcoriaceis, petiolis 3–4 mm latis 3–6 mm longisque.

Glabrous shrub or small tree 3–6 m tall; cataphylls caducous, oblong to somewhat obovate, obtuse, 4–13 mm long; leaves coriaceous or subcoriaceous, broadly obovate to broadly oblong or elliptic, blades 4–13 cm × 3–6 cm, apex obtuse to rounded, base acute to obtuse, obscurely punctate beneath, more obscurely so above, veins moderately prominent above, less so beneath, somewhat irregular, 1.5–10 mm apart, depending on size of leaf, anastomosing near margin, merging there into obscure secondary network but not forming a distinct marginal vein, margin slightly revolute, petiole 3–4 mm wide, 3–6 mm long (rarely, in no. *1789,* leaves subsessile); flowers subsessile in few-flowered clusters, subtended by scale-like bracts, tetramerous; calyx 1.3–1.5 mm long, lobes ovate, about 1 mm long, acute to obtuse, usually with a large central dark spot or several dark lines; corolla lobes spreading, broadly elliptic or obovate, obtuse or rounded at apex, somewhat narrowed at base, notably black-punctate, margins irregularly papillate, 1.5–2 mm long, tube 1 mm long; anthers about 1 mm long, curved, narrowly triangular sagittate, apex blunt, papillate; lower lobes rounded at bases; pistillode somewhat ovoid, somewhat over 1 mm long, stigma crownlike, spreading, irregularly undulately lobed; pistillate flowers not available; fruits globose or subglobose, about 5–7 mm diameter, black marked, subtended by spreading persistent calyx, crowned by scar of caducous stigma.

Specimens Seen.—Marquesas Islands: Uahuka I.: s.l., *Whitney Expedition 1837* (BISH), *1789* (BISH). Hiva'oa I.: Tenatinaei, 3620 ft [1100 m], *Mumford & Adamson 492* (BISH, type, NY) (NY sheet as

Adamson & Mumford); Kopaafaa, 2800 ft [850 m], *Mumford & Adamson HO 1008* (BISH, NY) (NY sheet as *Adamson & Mumford*); Atuona-Feani trail, ridge crest, 1200–1300 m, *Sachet & Decker 1180* (US, P, UH, Fo). Fatuhiva I.: Omoa, 700 m, *Brown 915* (BISH). *Brown 915* has leaves narrower than usual, veins more distinct, petioles rather slender.

Myrsine grantii var. *toviiensis* Fosberg & Sachet, new variety

Frutex, foliis elliptico-oblongis chartaceis vel subcoriaceis, petiolis 5–10 mm longis 2 mm latisque, venis in costam decurrentibus.

Shrub to 4 m, branchlets 2–4 mm thick, brown; cataphylls obovate rounded at apex; leaves elliptic-oblong to slightly obovate, 9–13.5 × 4–5.5 cm or smaller, chartaceous to subcoriaceous, apex acute to obtusish in general outline, tip blunt to rounded, base from strongly contracted to cuneate or slightly attenuate to a very slightly winged petiole, 5–10 mm long, 2 mm wide, variably dark punctate and lineate beneath, less so but papillate above, especially when young venation not prominent, less so beneath, main veins rather irregularly spaced, 12–15 (–17) on a side, usually curved downward (or divaricate) to join midrib, anastomosing near margin to form a weak undulating submarginal vein, weaker veins in some intervals not reaching submarginal vein, network rather obscure; inflorescences reduced to very low scaly-bracted tubercles, bracts broadly ovate obtuse with erose brown glandular-ciliate margins; flowers 3–5 (–7) in a cluster, subsessile, calyx united about ⅓, lobes 4, ovate, obtuse to acutish, glandular-ciliolate, dark punctate-papillate, corolla in bud broadly ovoid, lobes about 1.5 mm long, ovate subacute, with black papillae dorsally, or these fused in lines, margins densely glandular-puberulent, in a band both inside and outside the actual margin; tube in bud extremely short; anthers or antherodes broadly sagittate, 1.5 mm long, blunt at apex, which is densely glandular-puberulent; pistil scarcely developed, style flattened, blade-like, ovate, less than 1 mm long; immature fruit on a pedicel 1.5 mm long, 1 mm thick, crowned with a disk-shaped coroniform stigma with several obscure lobes including an elongate 1–1.5 mm long subulate, angled one, caducous before full maturity; mature fruit globose, 5 mm in diameter when dry, crowned with a disk-like stigma scar, surface thickly beset with pale slightly elongate papillae, mixed with scattered black glandular dots.

Differs from var. *grantii* especially in the longer, narrower petioles, distinct submarginal veins in the thinner usually elliptic-oblong leaves with veins curving downward to join the midrib.

Specimens Seen.—Marquesas Islands: Nukuhiva I.: Plateau de Tovii, savane, 2 Mar. 1973, *F. Hallé 2077* (US, type, P, MPU).

Myrsine hartii (Grant) Fosberg & Sachet, new combination

Rapanea hartii Grant in Grant, Fosberg, and Smith, Smithsonian Contr. Bot., 17:16, 1974.

Described from and endemic to Tahiti.

Myrsine longifolia Nadeaud

Myrsine longifolia Nadeaud, Enum. Pl. Tahiti 61, 1873.
Rapanea longifolia (Nadeaud) Mez, Pflr. 9 (236):373, 1902.

Described from and endemic to Tahiti.

Myrsine niauensis Fosberg & Sachet, new species

Folia laminis oblongis supra minutissime punctatis infra papillatis, petiolis gracilibus 6–3 mm longis, venis 12–18 jugis obscuris; fructus globosus valde nigro-punctatus, calyce lobis 4, valde glanduloso-puberulis, pedicillo 2 mm longo 0.5 mm crasso.

Branchlets pale brownish straw-color, about 2.5 mm thick; leaves oblong, to 10 × 4.5 cm, rather stiff, subcoriaceous, densely but minutely black punctate on upper surface, only obscurely and sparsely so beneath, but sparsely papillate beneath, apices rounded, bases acute, main veins 12–18 on a side, uneven in strength, opposite to alternate, anastomosing into a strongly undulate submarginal vein 2–3 mm from margin, network rather obscure, venation not strong, about equally visible above and beneath, base rather abruptly decurrent into a rather slender petiole 6–8 (–10) mm long, about 1 mm thick; flower-bearing tubercles or inflorescences very reduced, 2 mm or less wide and high, scaly bractlets broadly triangular, strongly glandular-puberulent, glands reddish

brown, pedicels slender, few, 2 or 3, about 2 mm long, 0.5 or less mm thick; fruiting calyx lobes 4, united in basal part, broadly ovate-obtuse to almost orbicular, glandular-puberulent, erose-ciliolate, obscurely dark dotted, fruit globose, 3–4 mm diameter strongly black-dotted.

Closely related to the new species *M. adamsonii* of the Marquesas, differing in the broader, more oblong leaves less punctate beneath, apices more rounded, petiole shorter, venation less prominent, fruits smaller, black-dotted, on longer and thinner pedicels, fruiting calyx strongly glandular-puberulent, pedicels less so.

Specimens Seen.—Tuamotus: Niau, s. l. *H. F. Moore 286* (US, type); *H. F. Moore s. n.* in 1899 (NY).

Myrsine nukuhivensis Fosberg & Sachet, new species

Frutex vel arbor glabra; foliis vix coriaceis ellipticis vel elliptico-oblongis maxime 25 × 11 cm, apicibus et basibus acutis subvenulosis utrinque punctatis, petiolis 7–15 mm longis 2–10 mm latisque in sicco; fructibus magis 15–20 mm diametro pedicellis 2–3 mm longis.

Glabrous shrub or tree up to 10 m tall, branchlets 3–5 mm thick; cataphylls ovate strongly acuminate, up to at least 7 mm long; leaves thin coriaceous, elliptic to elliptic-oblong, large, up to 25 cm × 11 cm (mostly 15–20 × 6–8 cm, except *Hallé 2077a,* which has much smaller leaves, narrowly elliptic, or elliptic-lanceolate, 10–14 × 3–4 cm, petiole 9–12 mm), acute at both ends, apex blunt, blade somewhat black-punctate on either side, veins not very prominent, 5–15 mm apart, proximately curving downward to fuse with midrib, some weaker ones between, anastomosing distally into a looping submarginal vein from 3 to 10 mm from margin, network of 2–3 orders of prominence between veins, petiole 7–15 mm long, 2–10 mm thick when dried; dried fruits on pedicels 2–3 mm long, subglobose, to 6 mm long, somewhat narrower when dry (only present on no. *2214,* on label said to be red, 1.5–1.7 cm diameter when fresh; in no. *2180,* said to be bright red, 2 cm, seeds 5 mm diameter).

Possibly related to *M. longifolia* Nadeaud of Tahiti, but differs in the much larger fruit, as well as generally smaller leaves.

Specimens Seen.—Marquesas Islands: Nukuhiva I.: s. slopes of Mt. Tapuaooa, *Gillett 2180* (BISH, US);Toovii Valley near Tapuaooa shelter, 900 m, *Gillett 2214* (BISH, US, type, P); Ooumuu Mt., 3500 ft [1160m], *Mumford & Adamson 581* (BISH); plateau de Tovii, savane, *Hallé 2077a* (US).

Myrsine obovata (Moore) Fosberg & Sachet, new combination

Rapanea obovata J. W. Moore, Bishop Mus. Bull. 102:37, 1933.—Grant, Fosberg, and Smith, Smithsonian Contr. Bot., 17:18, 1974.

Described from and endemic to Raiatea.

Myrsine orohenensis (Moore) Fosberg & Sachet, new combination

Rapanea orohenensis J. W. Moore, Occ. Pap. Bishop Mus. 16:16, 1940.

Described from and endemic to Tahiti.

Myrsine ovalis Nadeaud

Myrsine ovalis Nadeaud, Enum. Pl. Tahiti 61, 1873.
Myrsine coriacea Nadeaud., Enum. Pl. Tahiti 61, 1873 (non R. Brown 1810) [nomen illegit., superfluous].
Rapanea nadeaudii Mez, Pflr. 9(236):372, 1902.—Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:18, 1974.
Rapanea ovalis (Nadeaud) Mez, Pflr. 9 (236):373, 1902.—Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:17, 1974.

From the material available to us, cited below, there seems to be little or no difference between these two species. Although a number of sheets are available, a clear picture of the species cannot be obtained from them, and should be realized from a proper study in the field or of a suite of carefully collected specimens completely representing at least one population. There is no way of being certain that the various fragments available represent a single entity except their superficial similarity.

Drake del Castillo (1892:118) associated *M. ovalis* and *M. taitensis* A. Gray (as *tahitensis*), which does not seem to us a justified reduction as the type of *M. taitensis* (Tahiti, *U. S. Expl. Exped.*), which is before us, is a plant with far heavier coriaceous, subcordate leaves. More material of both of these species is greatly needed.

SPECIMENS SEEN.—Society Islands, Tahiti: Marau, 1000 m, *Nadeaud* (P, type?); s.l., vallées profondes, *Lépine 222* (P, 2 sheets); Sentier de l'Aorai, audessus du col d'Hamuta, 1150 m, *Sachet & Maclet 1022* (US); s.l. *Nadeaud 399* (P); "Novella", *Nadeaud 399* (P) (these two probably not same gathering); Tearapau, *Nadeaud "1896"* (P); s.l. *Nadeaud "1896"* (P). The last three are marked "coriacea" in what is probably Nadeaud's hand. Vaita Valley, Tautira, 300 m, *MacDaniels 1665* (BISH); Lake Vaheria, 500 m, *MacDaniels 1271* (BISH); 650 m, *MacDaniels 1609* (BISH); Paea Distr., Orofere, 1810 ft [550m] *Grant 4617* (BISH); Huahine I.: Mt. Turi, 400 m, *St. John & Anderson 17174* (BISH).

The var. *ovalis* was described from Tahiti and is endemic to the Society Islands.

Myrsine ovalis var. *wilderi* Fosberg & Sachet, new variety

Folia laminis chartaceis obovatis 9–11 cm longis 5–6.5 cm latis apicibus rotundatis vel vix emarginatis, basibus cuneatis, petiolis 3–6 mm longis; fructus subglobosus 3–4 mm longus, calyce lobis 4, oblongo-ovatis, 1 mm longis minute glandulociliatis.

Tree to 5 m tall, leaves chartaceous, broadly obovate, 9–11 × 5–6.5 cm, apex rounded to somewhat emarginate, base rather cuneate, petiole wide, 3–6 mm long, veins obscure above distinct beneath, anastomosing near margin but no clear marginal vein; calyx lobes 4, oblong ovate, about 1 mm long, obtuse, margin rather erose, minutely glandular ciliolate, pedicel in fruit 1–5 mm long 0.5 mm thick, fruit (probably immature) subglobose, 3–4 mm long, densely marked with black raised dots and short lines arranged longitudinally.

SPECIMENS SEEN.—Makatea I.: 200 ft [60m], s.l., *Wilder 1201* (NY, P, US, BISH, type).

Myrsine raiateensis (Moore) Fosberg & Sachet, new combination

Rapanea raiateensis J. W. Moore, Bishop Mus. Bull. 226:30, 32–34, 1963.

Described from and endemic to Raiatea.

Myrsine rapensis (F. Brown) Fosberg & Sachet, new combination

Rapanea myricifolia f. *rapensis* F. Brown, Bishop Mus. Bull. 130:220, 1935.

This plant does not even resemble *M. myricifolia* A. Gray, but seems closest to the new species *M. grantii* Fosberg & Sachet of the Marquesas, from which it differs somewhat in leaf shape and in the more abundant finer black markings on the fruit surface. When its flowers are known it may prove too close to the latter species.

Described from and endemic to Rapa.

Myrsine ronuiensis (Grant) Fosberg & Sachet, new combination

Rapanea ronuiensis Grant in Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:19, 1974.

Described from and endemic to Tahiti.

Myrsine st.-johnii (Grant) Fosberg & Sachet, new combination

Rapanea st.-johnii Grant in Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:19, 1974.

Described from and endemic to Tahiti.

Myrsine tahuatensis Fosberg & Sachet, new species

Frutex robustus foliis in intervalliis congestis maxime 22 × 11 cm obovatis cordatis subcoriaceis sessilis minute punctatis; inflorescentiis basi ramosis facsiculatis; *M. taitensis* valde affinis.

Shrub 4 m tall, glabrous, young branchlets 5–7 mm thick with leaves crowded at intervals, more widely separated between the crowded portions, leaf scars transversely elliptical with a broad depression above; leaves obovate, sessile, up to 22 × 11 cm, apex obtuse to slightly bluntly acuminate, base somewhat auriculate or cordate, blade minutely and irregularly black-punctate, especially beneath, becoming stiff and subcoriaceous, main veins 14–22 on a side, visible above and beneath, irregularly placed, opposite to alternate, diverging at somewhat different angles, decurrent into the broad midrib, forking distally and anas-

tomosing in arches that do not reach the margin, network obscure, especially beneath, older branchlets mottled light gray (possibly from lichens), bearing, below leaves, irregularly spirally disposed fascicles of 4–7 thick scaly divergent inflorescence branches up to 5 mm long and 2.5 mm thick. Flowers and fruits unavailable, except for a single detached fruit with mottled, dark and pale minutely pebbled surface, obviously immature—its sides rather collapsed, presumably subglobose when fresh, 3 mm long, on a thick short pedicel, 1.5 mm long, 1 mm thick, fruit subtended by a whorl of 3 thick calyx-lobes (another perhaps abortive), connate at base, broadly triangular, papillate, apex of fruit crowned by a short coroniform stigma of 3 or 4 lobes (one perhaps damaged or poorly developed), from an extremely low ring-like tube, lobes bluntly acuminate, irregularly incurved.

This species is represented by rather inadequate material but seems closest to *M. taitensis* A. Gray of Tahiti. It differs in larger, somewhat thinner, completely sessile leaves and in the much longer and conspicuously fasciculate (branched at base) inflorescences, as well as in having the leaves tending more to be crowded into intervals on the branchlets ("croissance rythmique nette" *Hallé*).

Specimens Seen.—Marquesas Islands: Tahuata: "Région du sommet de Tahuata," 17 Mar. 1973, *Hallé 2171* (US, type, P, MPU).

Myrsine taitensis A. Gray

Myrsine taitensis A. Gray, Proc. Amer. Acad. 5:330, 1862.—Seemann, Fl. Vit. 149, 1866 [as *M. tahitensis*, orth. mut.].

Rapanea tahitensis (A. Gray) Mez, Pflr. 9(236):373, 1902 [orth. mut.].—Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:15, 1974.

This species has been variously interpreted, but has been fairly well clarified by Grant (1974:15). It is the plant with large stiff leaves with cordate or subcordate bases and thick short petioles.

Described from and endemic to Tahiti.

Myrsine vescoi Drake del Castillo

Myrsine vescoi Drake del Castillo, Ill. Fl. Ins. Pac. 7:227, 1892; Fl. Poly. Fr. 119, 1893.

Rapanea vescoi (Drake del Castillo) Mez, Pflr. 9(236):372, 1902.—Grant, Fosberg, and Smith, Smithsonian Contr. Bot. 17:18, 1974.

What may be the type of this species is an unannotated sterile sheet in the Paris Museum. It is described below, as neither Mez nor Grant saw it.

Leaves narrowly obovate to oblong, bluntly acute to obtuse at apex, cuneate-attenuate at base, about 14 × 5 cm, some slightly wider or slightly longer, mostly smaller, venation not prominent but distinct, main veins up to 25 or more on a side, irregularly spaced, decurrent into the midrib, anastomosing distally into an undulating, not prominent submarginal vein, network fine, rather prominent on both sides, some intervals between main veins with weaker veins that do not reach margin, both surfaces scarcely punctate, blade decurrent at base into a slightly winged (at least above) petiole 5–6 mm long, 2 mm thick; sterile.

It may be distinguished from the similar *M. ovalis* by its narrower leaves and less prominent, more closely spaced veins.

Described from and endemic to Tahiti.

Specimens Seen.—Society Islands: Tahiti, s.l. *M. Vesco* in 1847 (P, type? US, loose fragments).

3. Three Species of *Geniostoma* J. R. & G. Forster

Geniostoma (Loganiaceae) is another genus (vide supra *Myrsine*) where there seems to be a choice between recognizing a vast indefinable coenospecies (*G. rupestre* Forster) or admitting a large number of "microspecies" based on assemblages of minor characters. Smith and Stone (1962) have taken the latter course, Leenhouts (1962:370) the former. We have, in this genus also, chosen to recognize a number of segregate species rather than lumping everything in *G. rupestre*, which was based on a rather different-looking plant from the New Hebrides.

The two new species described here bring the *Geniostoma* species in eastern Polynesia to six, the others being *G. astylum* A. Gray of Tahiti (clarified below), *G. rapense* F. Brown of Rapa, *G. clavatum* Moore of Raiatea, and *G. hendersonense* St. John of Henderson Island. All the records of *G. rupestre* from eastern Polynesia have been disposed of except that by Cheeseman (1903:288) from Rarotonga, of which we have not seen a specimen. Cheeseman says "*Geniostoma rupestre* Forst.?—Southern slopes of Maungaroa, not seen elsewhere. I do not feel quite sure that this species is correctly identified." We would expect it to be close

to our *G. quadrangulare*. An attempt should be made to recollect it. We do not think that *G. rupestre,* sensu stricto, occurs in eastern Polynesia at all.

Geniostoma astylum A. Gray

Geniostoma astylum A. Gray, Proc. Amer. Acad. 4:321, 1860.

This Tahitian species has apparently hitherto only been known from the original collection, *U. S. Exploring Expedition* (US), and was only very briefly described by Gray. The type-specimen is excellent except for lack of flowers and of mature fruit. It is probable that a flowering specimen once existed in the Gray Herbarium, as there is a set of drawings of the flower there, presumably drawn by Gray from the original material. A copy of these has been furnished us by Dr. William T. Gillis, but he was unable to locate the specimen (in litt., 1974).

Duplicates of two old collections, kindly sent by the authorities at the Paris Herbarium, identified by Nadeaud as *G. rupestre* Forster f., and cited as such by Drake del Castillo (1892:126), appear to belong to this species. They, with one other, Lépine 208, which we have not seen, form the basis for the reports of *G. rupestre* from Tahiti. In all probability the latter species does not occur at all in Tahiti, and probably not in southeastern Polynesia.

The following somewhat amplified description, based on the type and the two specimens mentioned, all cited below, is offered to make possible a better understanding of the relationship between this species and the new Marquesan one described below.

Branchlets smooth, terete, 2–3 mm diameter, not conspicuously nodose, internodes 1–4 cm long, leaves oblong to oblong-elliptic, up to 11 × 5 cm, veins inconspicuous, (7–) 8–11 on a side, nearly opposite, network quite visible on upper surface, apex bluntly slightly acuminate, base acutish to rounded, petiole 2–8 mm long; stipular collar early splitting down the sides in the type, but not notably so in other material; inflorescences loosely thyrsoid, to 3 cm long, main axis with 3 or 4 nodes, each ramification with 2 scale-like bracts, these ovate, recurved, acute, mucronulate, basally enclosing the inflorescence branch, ultimate ramifications tending to be irregular, each lower and middle branch trichotomous or at least with a pair of bracts part way up, rarely with a single additional outer dichasium near base, pedicels 1–3.5 mm, puberulent, center ones tending to be short, uppermost branchlets (pedicels?) rarely bearing a pair of reduced ciliolate bractlets under the calyx or a single such bractlet part way down; calyx 1–1.5 mm long, lobed about half-way, lobes ovate-triangular, obtusish to acute, tending to be folded and to appear acuminate, margins papillate-ciliolate; corolla glabrous, or somewhat pilosulous within throat, tube shorter than lobes, lobes imbricate, ovate, obtuse to rounded, faintly 5-nerved, about 1.5 mm long and wide; anthers very broadly oblong-sagittate, rounded at apex but with a very short blunt mucro, on short filaments; ovary broadly ovoid, style almost none, stigma ovoid, slightly bilobed; fruit 8 × 2.5–4 mm, fusiform to oblong, slightly compressed, furrowed along septum, slightly beaked, valves hard, recurved and widely spreading after dehiscence; seeds oval, somewhat irregularly compressed but not at all angulate, about 1 mm long, surface areolate reticulate, embedded in dried remains of soft fleshy placenta, this almost completely shrunken away at dehiscence, the network, or boundaries of the areolae, very minutely crinkly or very closely undulate, the bottoms of the areolae slightly convex.

This species has hitherto been principally characterized by the absence of a style, with little attention paid to other characters. This lack of a style is not altogether unambiguous, as the ovary is gradually narrowed to a point which bears the capitate slightly bilobed fleshy, persistent stigma. As long as the fruit is not fully mature it is gradually narrowed and even at maturity there is an abrupt short beak, which could be interpreted as a very short persistent style. That it has been so interpreted is shown by the placing, by Nadeaud and Drake del Castillo, of the two additional collections cited below in *G. rupestre* rather than in *G. astylum,* where they belong.

The so-called bifid stipules likewise do not effectively separate this species from its congeners, as this is only a rupturing of the stipular collar, which is not evident in the other collections and may be merely a function of vigorous enlargement of the young branchlets on the type-collection.

Although the reduction of the style is a useful character for recognition of this species and its closest relative, described below, a more fundamental feature of *G. astylum* is the thyrsoid inflorescence. Thyrsoid is here used in the sense of having the central axis with more than 2 nodes versus the usual condition in the genus of a dichasium or a compound dichasium. This feature, as well as others noted below, distinguish it from the Marquesan species described below, which on other grounds seems to be its closest ally.

SPECIMENS SEEN.—Tahiti: s.l. *U. S. Exploring Expedition* (US, type); *Nadeaud 363* (US, 2 sheets, one flowering, the other with mature fruits, probably not of the same gathering, the number merely that used by Nadeaud in his Enumeration); *Vesco* in 1847 (US) (inflorescence somewhat more complex than those of the other collections).

Geniostoma hallei Sachet & Fosberg, new species

A *G. astylum* A. Gray foliorum venis alternis obscurioribusque, reticulo obscuriore, dichasio parviore non thyrsoideo, pedicello bracteolato calycis lobis acuminatis ciliatis, corolla intus valde barbata differt.

Shrub to 3 m tall, glabrous, nodes enlarged, internodes irregular in length, 4–20 (–25) mm long; leaves ovate to broadly elliptic, up to 7 × 3.5 (–4) cm, acute or rarely somewhat acuminate and mucronulate at apex, broadly acute at base, venation faint above, not prominent beneath, main veins (7–) 8–9 (–10) on a side, not in regular pairs, bending slightly upward, becoming fainter and anastomosing near margin, network obscure, blade narrowed to a petiole 4–5 mm long, stipular collar truncate, 1.2–1.5 mm long very early rupturing down the interpetiolar sides; inflorescence a compound dichasium about 1–1.5 cm long, rather congested, twice trichotomous on a very short peduncle (very rarely, on the longest inflorescences, the central axis with an extra internode and the lateral dichasia each with a single extra outer pedicel from near base), a pair of ovate acuminate scale-like bracts at each ramification, the lowest connate, margins of bracts ciliolate, pedicels 2–4 (–5) mm long, with or without 1–3 scattered scale-like ovate-triangular ciliolate bracteoles; flowers white, foetid; calyx 2 mm long, lobed about ½ way, lobes triangular acuminate, ciliolate, slightly imbricate at base, corolla about 3 mm long, tube 2 mm, throat densely bearded, lobes suborbicular, imbricate in bud, obtuse, spreading at maturity, inner basal surface crinkly pilose, margins strongly ciliate, edges papillate without, stamens just over 1 mm long, anthers broadly ovate or triangular to broadly oblong, slightly longer than broad, about 0.8 × 0.6 mm, apex rounded, connective conspicuous, filaments very short, ovary broadly ovoid, stigma capitate, fleshy, sessile, constricted vertically and very slightly bilobed; fruit (immature) cylindric-fusiform, 8 × 3 mm, slightly beaked, beak tipped by shrunken stigma.

Very closely allied to *G. astylum* A. Gray of Tahiti, differing in the smaller less oblong leaves, much smaller, more contracted inflorescences, which are not or scarcely thyrsoid, in the more usual presence of bracteoles on the pedicels, in the somewhat acuminate much more ciliate calyx lobes, and in the corolla more densely bearded within.

SPECIMENS SEEN.—Marquesas Islands: Tahuata I.: "Région du sommet de Tahuata, 17 Mars 1973," *F. Hallé 2170* (US, holotype, P, MPU, isotypes).

Apparently very rare, one plant only seen by collector. A sterile specimen collected on Hivaoa, Feani, at 700 m, *F. Brown 1096* (BISH) may probably be the same.

Geniostoma quadrangulare Fosberg, new species

Arbor parva, glabra, ramulis quadrangularibus nodosis, internodis 5–20 mm longis; foliis ellipticis tenuibus petiolatis; dichasiis compositis subthyrsoideis internodis 3–4; fructibus ovoideis 5–6 mm longis, valvis sclerosis.

Tree to 5 m tall, glabrous, branchlets notably quadrangular, nodes prominent, internodes 5–20 (–30) mm long, leaves thin, blades to 7.5 (–9) × 2–3.5 (–4.5) cm, elliptic, rarely ovate or oblong, apex obtusish, slightly acuminate, base cuneate, decurrent to a slender petiole 5–9 (–10) mm long, veins about 4–5 pairs, subopposite, strongly ascending, forking and anastomosing near margin, network rather obscure; stipular collar with lobes very low, broadly rounded; inflorescences, in bud axillary among leaves, in flower among lower leaves and on several nodes below lowest leaves,

in fruit persisting on 3–5 nodes, 4–7 internodes below leaves, compound decussate dichasia thyrsoid to the extent that the main axis has 3 or 4 nodes and internodes below the terminal dichasium, the lateral branches strongly ascending, lower ones on well-developed inflorescences each with an extra outer branch arising just above the base, each ramification subtended by a pair of broadly ovate scale-like bracts enclosing the base of the lateral branch, pedicels 3–5 mm long, with a tiny triangular scale-like minutely ciliolate bractlet slightly below the receptacle; calyx lobed about half-way into 5 triangular bluntly mucronate papillate-ciliolate lobes about 0.7–0.8 mm long; corolla with tube about as long as calyx, lobes about as long again, ovate, with 3 slightly branching veins, margins papillate-ciliolate, inner surface distally minutely puberulent, basally prominently bearded; anthers broadly oblong, about 0.7 mm long, rounded at apex, with short rounded lobes at base, sessile in sinuses of corolla; stigma capitate, on a very short style, included in corolla, exserted from calyx after corolla has fallen.

Specimens Seen.—Austral Islands: Rapa: Mt. Tepiahu, 150 m, *Fosberg 11502* (NY, BISH); southeast ridge of Mt. Pukunia, 350 m, *Fosberg 11431* (BISH); Pake, 100 m, *A. M. Stokes 384* (BISH, type); Titivake, east side of Mt. Vaitau, *St. John & Maireau 15392* (US, BISH); Area, 140 m, *St. John & Fosberg 15332* (BISH, US).

4. *Ipomoea tiliacea* (Willdenow) Choisy in the Pacific

Ipomoea tiliacea (Willdenow) Choisy in de Candolle, Prodr. 9:375, 1845.—Yuncker, Bishop Mus. Bull. 220:227. 1959.
Convolvulus tiliaceus Willdenow, Enum. Pl. 203, 1809.
Convolvulus fastigiatus Roxburgh, Hort. Beng. 13, 1814.
Ipomoea fastigiata (Roxburgh) Sweet, Hort. Brit. 288, 1826.

Two Pacific Island morning-glories, one of them mistakenly placed in the genus *Merremia,* are described as varieties of the tropical American *Ipomoea tiliacea.* They may represent an extension of the natural distribution of this species, or they may be old, well established introductions by human agency.

This species has previously been known from the Pacific only from Fiji and Tonga, where it was formerly usually called *Ipomoea fastigiata* (Roxburgh) Sweet. Otherwise it is tropical American. The Marquesan collections, reported here, and the Fijian-Tongan ones, seem to represent distinctive populations, with a few characters uncommon or absent in the variable, widespread American species.

Ipomoea tiliacea var. *merremioides* Fosberg, new variety

Herba scandens, foliis triangulo-ovato-cordatis valde acuminatis integerrimis, cymis valde pedunculatis umbelloideo-condensatis, sepalis mucronatis, corollis infundibuliformibus limbo distale vix expanso 3–3.5 cm longis.

Glabrous climber but not very conspicuously twining, leaves thin, blades triangular-ovate, much longer than wide, up to 10 × 5 cm, apex tapering-acuminate, base broadly and strongly cordate with a U-shaped sinus and rounded basal lobes, petioles slender, notably shorter than blades; inflorescence umbelloid in appearance but a condensed, once to twice ramified, cymose panicle on a long peduncle, to 13 cm, pedicels much longer than branches, these 1–16 mm, bracts minute, scale-like, sepals elliptic or elliptic-oblong to slightly obovate, about 8 mm long, obtuse, outer ones mucronate, corolla funnelform, 3–3.5 cm long, limb only slightly flaring, 2.5–3 cm wide, "rose-mauve," stamens included in basal ⅓ of throat, unequal in length, shorter than style, anthers very narrowly sagittate, straight, 2–2.5 mm long, filaments subulate, glabrous apically, increasingly beset with short gland-tipped hairs below, pollen grains globose, very shortly spinulose; pistil 16 mm long, ovary subglobose, glabrous, style filiform, glabrous, stigma irregularly capitate, fruit globose, about 5 mm high, subtended by an entire disk, usually somewhat asymmetric, glabrous, beaked with persistent short style-base, this somewhat off-center, only one seed developed, this shot-like, 4 mm across, with 2 basal somewhat flattened areas edged on outer parts with sparse brown wool, scar light brown, obovate, surrounded by horse-shoe-shaped very low ridge, general seed-surface dull sooty brown.

This plant was placed with little hesitation in *Merremia umbellata* (L.) Hall. f., which it resembles closely in habit and appearance, especially when dried. Its straight anthers, purple flowers, and almost glabrous seeds, however, cast

some doubt on this identification. On examination the pollen grains proved to be spinulose, suggesting *Ipomoea*. In van Ooststroom's key (1940: 485–490) to Malaysian species of *Ipomoea* the plant runs readily to *I. gracilis* sensu van Ooststroom, non R. Brown (=*I. littoralis* Blume), which it is clearly not, because of the long many-flowered peduncles. It falls within the range of variation of *I. tiliacea* (Willdenow) Choisy, a principally American species, which occurs also (possibly as an adventive) in Fiji and Tonga. The Marquesan specimens differ from those of Fiji and Tonga, as well as from the vast majority of the American ones, in being glabrous, in the much smaller much more funnel-form, less flaring corollas, enlarging abruptly above the calyx, the abruptly short-mucronate rather than more gradually acuminate-aristate sepals, the usually much longer peduncles, and the entire, long-acuminate leaves rather than more or less orbicular, dentate or lobed.

All of the characters of this variety appear in *I. tiliacea* as represented in the U. S. National Herbarium, but not in this combination and not frequently. We have, at present, no opinion as to whether this and the following variety are indigenous or adventive. The distribution of *I. tiliacea* in the Pacific roughly parallels that of *Cordia lutea* Lamarck which occurs in the Marquesas and Tonga.

Specimens Seen.—Hivaoa I.: Atikoua valley, above Atuona, 20–100 m, *Sachet 1300* (US, type, P, UH); upper Puamau-Atuona trail, 500–650 m, *Decker 1157* (US); Puamau-Eiaone divide, top of ridge, 300 m, *Decker 932* (US); Central Puamau, 800–1000 ft [250–300m] common, *Decker 1071* (US, P, Fo, UC).

Ipomoea tiliacea var. *smithii* Fosberg, new variety

Herba scandens foliis orbiculari-cordatis saepe grandi-dentatis vel lobatis longi petiolatis, cymis pedunculatis congestis, sepalis orbicularibus caudato-aristatis inaequalibus, corollis 4–5 cm longis limbo expanso.

Differs from var. *merremioides* in the usually larger, more orbicular, less long-acuminate, usually remotely coarsely dentate or at least somewhat irregularly margined, rarely lobed leaves, up to 10 × 12 cm, usually much smaller, pilose beneath on lower parts of main veins, petioles much longer; peduncles strong, 2–6 cm long, pedicels 3–5 in a crowded cyme or pseudo-umbel; sepals somewhat unequal, orbicular, gradually caudate-aristate, tending to be very sparsely pilose or long ciliate, corolla 4–5 cm long, white, or "pink-lavender" or "red-pink" with darker center.

The specimens cited below are not very uniform. The Tongan ones have larger leaves and the U. S. Exploring Expedition one has notably lobed leaves. The Tongan ones have colored flowers, the Fijian white; however, they seem to belong together. The U. S. Exploring Expedition collection shows that the plant is probably indigenous, at least not a recent arrival, in the Pacific Islands.

The variety is named for Professor A. C. Smith, collector of the type.

Specimens Seen.—Fiji: s.l., *U. S. Exploring Expedition* (US). Viti Levu Island: Mba: Slopes of Mt. Nairosa, eastern flank of Mt. Evans Range, 700–1050 m, edge of dense forest, *Smith 4057* (US); shores of Mba River near mouth, sea level, *Smith 4740* (US); vicinity of Nalotawā, eastern base of Mt. Evans Range, 550–600 m, *Smith 4468* (US, type, BISH). Tonga: Lifuka Island: North of Pangai Village, *Yuncker 15, 723* (US, BISH), *15,798* (US, BISH). Eua Island: Ha'aluma on southwestern end of island, near sea, *Yuncker 15,587* (US, BISH). Tongan names are *Fue* or *Fue hina*.

5. Annotations to the Hawaiian Flora

Over the past 35 years the senior author has published several series of miscellaneous notes, which either have dealt exclusively with Hawaiian plants (Fosberg, 1936, 1937, 1942, 1948, 1962, 1966b, 1969), or have contained some material on Hawaiian plants along with notes on other Pacific island groups (Fosberg, 1943, 1966a, 1968).

This is essentially a continuation of these observations on the flora of the Hawaiian Islands. Included are distributional records, field and herbarium observations, comments directing attention to items of interest to Hawaiian botany published in literature not primarily concerning Hawaii, and taxonomic and nomenclatural notes and keys to certain groups adventive in Hawaii. The genera included are *Adiantum, Carex,*

Cyperus, Salicornia, Dianthus, Bocconia, Rubus, Crotalaria, Lotus, Polygala, Melochia, Waltheria, Frankenia, Dissotis, Thevetia, Heliotropium, Stenogyne, Solanum, Parentucellia, Tetranema, Plantago, and *Hedyotis.*

Since the greater part of this paper was written, Professor Harold St. John's magnificent *List and Summary of the Flowering Plants in the Hawaiian Islands* (1973) has appeared. Certain of the new records appeared there, but since no details of occurrence are given it seems desirable to give these here, also, to provide verified references to the places of publication and certain subsequent papers of interest.

Adiantum L.

Adiantum raddianum Presl

Adianthum raddianum Presl, Tent. Pterid. 158, 1836.—Tryon, Contr. Gray Herb. 144:169, 1964.—Hoshizaki, Baileya 17: 134, 1970.

Adiantum cuneatum Langsdorff & Fischer, Ic. Fil. 23, t. 26, 1810.—Fosberg, Bull. Torr. Bot. Cl. 70:387, 1943; Occ. Pap. Bishop Mus. 24:11, 1969 [non *A. cuneatum* Forster, Prodr. 84, 1786].

According to Hoshizaki this is the plant commonly known in cultivation as *A. cuneatum,* and undoubtedly the plant widely escaped and naturalized in the Hawaiian Islands. Her illustration shows precisely the pinnule shape and the veins terminating in the sinuses between the lobes on sterile portions of the distal margins of the pinnules shown by the plant introduced in Hawaii. There are numerous horticultural varieties of this species, some of which are illustrated by Mrs. Hoshizaki.

Tryon was apparently the first to indicate that *A. raddianum* Presl is the earliest available name for this species, since *A. cuneatum* is antedated by *A. cuneatum* Forster. We may further point out that *A. cuneatum* Langsdorff & Fischer and *A. raddianum* Presl are nomenclaturally equivalent, as the latter is based on a supposed *A. cuneatum* Raddi (1825: [59, 100] pl. 78, 2a, b). Raddi was merely using Langsdorff's and Fischer's name, though ascribing it to Willdenow (1810:450). Willdenow merely included *A. cuneatum* Langsdorff & Fischer in his account of the genus. Raddi's illustration, though not showing venation, seems clearly to apply to the plant described by Langsdorff and Fischer.

Carex L.

Carex ovalis Goodenough

Carex ovalis Goodenough, Trans. Linn. Soc. 2:148, 1794.

The collection cited below is a member of *Carex* sect. *Ovales,* close to *C. leporina* L., but the perigynia have shorter beaks and are more strongly winged. It matches material of *C. ovalis* from New Zealand where it is usually thought to be introduced. It may have been brought into Hawaii from New Zealand with forage grass seeds, although it was collected in forest. It does not seem to have been reported previously from the Hawaiian Islands. Goodenough's description was of a British plant and Europe is doubtless its original home. No exact locality was cited with the description.

SPECIMEN SEEN.—Hawaii I.: Kohala Mts., Kahūa Ranch, 3300 ft [1000m], *Rubtzoff 2720* (US).

Cyperus L.

Cyperus niger Ruíz & Pavón

Cyperus niger Ruíz & Pavón, Fl. Peruv. 1:47, 1798.

This species is found from the southwestern United States to Andean South America in several forms. This collection matches some specimens from South America in its black spikelets aggregated into single heads. These are generally included in var. *niger.* Other South American material has more open inflorescences, but it is not generally separated taxonomically. I have seen no previous record of *C. niger* from the Hawaiian Islands. The blackish single heads of spikelets distinguish it from other species found in Hawaii. My attention was called to its proper identity by Mr. Peter Rubtzoff, keen amateur student of the California flora and collector of the specimen cited.

SPECIMEN SEEN.—Hawaii I.: Kohala Mts., Kahua Ranch, 3300 ft [1000 m] marsh, *Rubtzoff 2723* (US).

Salicornia L.

Salicornia virginica L.

Salicornia virginica L., Sp. Pl. 4, 1753 [as *S. virginia*].—Herbst, Pac. Sci., in press, 1975.

We are accepting Fernald and Schubert's interpretation of this species (1948:162–163) as the plant that occurs in saline marshes along the Atlantic coast of North America (and South America) generally called *S. ambigua* Michaux or *S. perennis* Miller.

Specimens Seen.—Hawaiian Islands: Leeward Group: French Frigate Shoals, Tern Island. "One small colony on crushed coral between "gas dump" and the ocean, center of north side of island," *Herbst 1213* (US, UH).

This collection seems to correspond best with *S. virginica,* though the spikes of that species seldom reach the length shown by this specimen, about 5 cm. Fernald (1950:599) says they can be 1.5–6 cm long. The width of the joints, as wide as or usually wider than their length, excludes other species with which it might be compared, including *S. subterminalis* Parish (*Arthrocnemum subterminale* (Parish) Standley), which it resembles in having the spikes occasionally continuing as vegetative branches. The essential distinction of the latter lies in its glabrous seeds. This could not be checked as this specimen, though flowering abundantly and bearing old, opened-up parts of spikes, seems to have no seeds at all. Possibly it is self-sterile, and only one plant was seen. It was doubtless introduced in some manner during the U. S. Coast Guard activity on the island. The genus is not known from Polynesia or other parts of the oceanic central and western Pacific, nor have we encountered records of it from any Pacific coral atoll. It is a leafless succulent with jointed stems, opposite branching, prostrate to ascending, each joint about 1 cm long or less, sheathing at the top with two opposite low scale-like projections on the sheath; flowers borne in threes on shortened joints compressed into a spike, the perianth reduced and closely appressed to the side of the joint, stamens 1 or 2, exserted slightly, seeds pubescent (lacking on our material).

Dianthus L.

Dianthus armeria L.

Dianthus armeria L., Sp. Pl. 410, 1753.

This was reported by Neal in *Gardens of Hawaii* (1948:346) but as an annual. Fernald (1950:636) also refers to it as an annual or biennial, and so it generally behaves in the eastern United States. However, the following collections appear more like a perennial, branching profusely from a root crown and deep tap root.

Specimens Seen.—Hawaiian Islands, Hawaii I.: Kukaiau Ranch, 5000 ft [1500m], *Rubtzoff 2622* (US); N. W. slope of Mauna Kea, Puu Makahalau, 4000 ft [1200 m], *Kawasaki* in 1964 (BISH). The Kawasaki specimen is also heavy and almost woody at base, though most of it is broken off.

Dianthus prolifer L.

Dianthus prolifer, L., Sp. Pl. 410, 1753.

An annual with several stems from base, linear leaves, several flowers in a terminal involucre of broad papery mucronate bracts. It has apparently not been reported from Hawaii previously.

Specimen Seen.—Hawaii I., S. Kohala, Waimea, Puu Holoholoku, 2600 ft [800m], *Hosaka ·2110* (BISH).

Bocconia L.

Bocconia frutescens L.

Bocconia frutescens L., Sp. Pl. 505, 1753.

In 1961 this species was very sparingly and locally naturalized, a few plants only, in East Maui, just south of Ulapalakua Ranch, as reported by Fosberg (1969:17).

On 14 April 1974, it was seen to have spread some distance from the locality noted in 1961. Many well-grown shrubs were seen for some distance along the road south. A single seedling several decimeters tall was seen in the fenced nature preserve at Auwahi, and a mature shrub was growing in Kula, along the road to Haleakala Crater some hundreds of meters above the junction with the

Upper Kula Road at perhaps 1200 m elevation. It would seem to be still possible to eradicate this shrub if desired. The fleshy aril or caruncle of its seed probably assures its wide distribution by mynahs and other introduced frugivorous birds.

Rubus L.

Rubus ellipticus Smith

Rubus ellipticus Smith, in Rees Cycl. 30, n. 16, 1815.

Specimens Seen.—Hawaii I.: Wright Road Farm lots, just below Kilauea, 1140 m, *Fosberg 41609* (US, BISH, Fo).

Rubus moluccanus L.

Rubus moluccanus L., Sp. Pl. 1197, 1753.

In 1971, this plant was very locally established in pastures. It is not known how it was introduced. The plant is a rhizomatous, coarse, tangled prickly shrub, growing to a height of 3–4 m or more, and, in other countries, overgrowing small trees and bushes. It is found from Madagascar to New Guinea, Fiji, and Kusaie; in parts of this area, such as Mauritius and Madagascar at least, it is probably introduced. In Mauritius and Madagascar, it is regarded as a serious pest in forests. It should be eliminated from Kauai without delay, lest it get completely out of hand. The Kauai plant belongs to var. *moluccanus*.

Specimens Seen.—Kauai I.: Lawai Valley, 200 m, 3 April 1971, *Fosberg 53650* (US, BISH, Fo, PTG).

Crotalaria L.

Crotalaria pallida Aiton

Crotalaria pallida Aiton, Hort. Kew. 3:20, 1789.—Polehill, Kew Bull. 22:262, 1968.
Crotalaria mucronata Desvaux, Desv. Jour. Bot. 3:76, 1814.
Crotalaria striata de Candolle, Prodr. 2:131, 1825.

According to Polehill this widespread species, in recent years generally known as *C. mucronata* Desvaux, must be called *C. pallida* Aiton. Besides the more or less brown striate keel, which is the usual identifying mark, it may be distinguished from *C. incana* L. (a very similar species), by appressed pubescence on rachis and pods (rather than spreading, as in *C. incana*) and by narrower pods.

Lotus L.

Lotus hispidus Desfontaine ex Loiseleur

Lotus hispidus Desfontaine ex Loiseleur, Fl. Gallica 2:490–491, pl. 16, 1807.

This is a native of Eurasia and has been known from Hawaii since 1933.

Specimens Seen.—Hawaiian Islands: s.l., *Ripperton* in 1937 (US). Hawaii I.: Kukaiau Ranch, slopes of Mauna Kea, 3500 ft [1050 m], *Rubtzoff 2612* (US); Parker Ranch, Kaola, 2750 ft [850 m], *Ewart 296* (BISH), "planted in Hilo grassland 1933." "E. Hawaii," *Lyman* in 1950 (BISH). Maui I.: "Makawao, Ulupalakua, Mohopilo," 3200 ft [975m], 1937, *Hosaka 1714* (BISH); Makawao, Haleakala Br. Sta. 2100 ft [640 m], *Hosaka 2672* (BISH, 2 sheets); "Olinda, Makawao," *Hosaka 3576* (US); N.W. slope of Haleakala Massif, east of Olinda, 3700 ft [1125 m], *Iltis H-440* (US).

Polygala L.

Polygala paniculata L.

Polygala paniculata L., Syst. ed. 10:1154, 1759.

This widespread tropical weed has apparently not previously been reported from the Hawaiian Islands. A small colony was found on 15 April 1974 near the north coast of East Maui. It is a slender herb with short linear leaves and paniculately arranged racemes of tiny white flowers. The roots smell strongly of wintergreen, as do those of many other species of *Polygala*. The genus, also, is not previously known from the state.

Specimens Seen.—Hawaiian Islands: Maui: Kakipi Gulch, 6 km east of Haiku, 40 m, *Fosberg & Sylva 55450* (US, UH, Fo, MO, L).

Melochia L.

Melochia umbellata (Houttuyn) Stapf

Melochia umbellata (Houttuyn) Stapf, Kew Bull. 1913:317, 1913.—Goldberg, Contr. U.S.N.H. 34 (5):220–222, 1967.
Visenia umbellata Houttuyn, Handleidung 8:309, 1777.

This species was apparently reported under this name first from the Hawaiian Islands by Neal (1948:503). Goldberg (1967:221) reports it only from Oahu in his monograph. He gives its indigenous range as India to New Guinea. It is probably the same plant reported from Hawaii by L. W. Bryan (1947:34) as *M. indica* A. Gray. It has for a number of years been increasingly abundant along the lower stretches of the Volcano Road above Hilo and along the Stainback Highway. I saw it there in 1961, but did not collect it. It has been in the state at least since 1929 and was probably first introduced around Honolulu, possibly in the Manoa Arboretum. It is a very aggressive plant in disturbed or cleared areas and soon forms a tall secondary scrub. It has large hirsute cordate leaves and cymose panicles of pink flowers.

SPECIMENS SEEN.—Oahu I.: Kapalama "Tip", 2000 ft [600m], *Ewart* in 1929 (BISH); Punaluu Valley, *Judd* in 1931 (BISH); near Puu Kaui, Kaunala, Koolau Range, 1500 ft [450m], *Webster 1197* (BISH); Kahuku Mauka, *Degener et al. 15548* (US, BISH); Manoa Valley, Arboretum, *Caum et al.* in 1930 (BISH). Lanai, Waiakeakua, 2300 ft [700m], *Munro 270* (BISH) (undated), said to have been obtained from Haiku Board of Agriculture and Forestry Nursery. East Maui I.: Hamakuapoko, *Crosby* in 1939 (BISH). Hawaii I.: South of Glenwood, *Mueller-Dombois H-143* (UH); Stainback Highway, 800 ft [250m], *Herbst 882* (BISH).

Waltheria L.

Waltheria indica L.

Waltheria indica L., Sp. Pl., 673, 1753.

This species was published by Linnaeus simultaneously with *W. americana*. The two were combined by R. Brown, as detailed below. Var. *indica* does not occur in Hawaii.

Waltheria indica var. *americana* (L.) R. Brown ex Hosaka

Waltheria indica var. *americana* (L.) R. Brown ex Hosaka, Occ. Pap. Bishop Mus. 13:224, 1937.
Waltheria americana L., Sp. Pl. 673, 1753.

SPECIMEN SEEN.—"Owhai-hee" (Hawaii) *David Nelson* (MO).

This specimen, collected on Captain Cook's Third Voyage, shows that this species is either indigenous in Hawaii or was brought by the Hawaiians (or the Spaniards, if they really visited Hawaii earlier than 1776).

Hawaiian material agrees with that from America in being densely velutinous rather than thinly so, as is that from the western Pacific and southern Asia. The two forms are often regarded as belonging to one species for which *Waltheria indica* L. is the correct name, or to two distinct species.

We are accepting the view that one pantropical species is involved. The rather conspicuous difference in density of indument may be recognized by maintaining var. *americana* for the predominantly American densely hairy form and var. *indica* for the more thinly pubescent Old World plant. Over its wide geographic range *Waltheria indica* produces many local forms distinguishable by other characters, but these have usually not been afforded taxonomic recognition.

Robert Brown (1818:484) said, "*Waltheria indica* L. I consider *W. americana* to be a variety of this sportive species, which seems to be common to all equinoctial countries." Although this satisfies Article 57 of the *International Code of Botanical Nomenclature* on choice of name when two simultaneously published species are united, and, indeed, is cited as one of the examples to illustrate the application of this article, it does not constitute valid publication of the required combination for var. *americana* according to Article 33, as it does not indicate that the epithet *indica* is to be used in the combination *W. indica* var. *americana*. Apparently the first usage of this combination was by Hosaka as cited above. He did not cite the basionym but according to Article 33 this only seems to have been a requirement for valid publication of a new combination since 1 January 1953. Citation of R. Brown as author with "L." in parentheses can be considered a sufficient indirect reference.

Guillemin (1837:365) made the reverse reduction, making the combination "*Waltheria americana* β *indica* Linn. Spec. 941." This was done later than Robert Brown's publication, so may be disregarded except in synonymy of *Waltheria indica* var. *indica*.

Frankenia L.

Frankenia grandiflora Chamisso & Schlechtendal

Frankenia grandiflora Chamisso & Schlechtendal, Linnaea 1: 35, 1826.

This is a depressed herb with small pink flowers, native to salt marshes of the Pacific Coast of North America. It is pubescent, has opposite obovate leaves with axillary fascicles, appearing verticillate, prismatic ribbed calyces and 5 free petals.

SPECIMENS SEEN.—French Frigate Shoals: Fern Island, "On crushed coral around the barrels in the "gas dump," *Herbst 1217* (US, UH).

Dissotis Bentham

Dissotis rotundifolia (Smith) Triana

Dissotis rotundifolia (Smith) Triana, Trans. Linn. Soc. 28:58, 1871.
Osbeckia rotundifolia Smith, in Rees Cycl. 25:1813.
Melastoma plumosa D. Don, Mem. Wern. Soc. 4:291, 1823.
Heterotis plumosa (D.Don) Bentham, Fl. Niger 348, 1849.
Dissotis plumosa (D.Don) Hooker f., in Oliver, Fl. Trop. Africa 2:452, 1871.

This is planted occasionally as an attractive ground cover. It forms a loose mat up to several decimeters high. The leaves are ovate and trinerved, the veins not prominent. The flowers are rose-pink and have 5 long purple anthers and 5 shorter yellow ones. We hope it will not get out of hand as have several other Melastomaceae.

SPECIMENS SEEN.—Kauai I.: Lawai Valley, seen but not collected, planted as ground cover in Botanical Garden, 1974. Oahu I.: Foster Gardens, *Potter* in 1960 (BISH), *Potter & Neal* in 1958 (BISH); H. L. Lyon Arboretum, Manoa, *Nagata 399* (BISH). Maui I.: Kahului Airport, *Fosberg 50524* (US).

Thevetia L.

Thevetia peruviana (Persoon) K. Schumann

Thevetia peruviana (Persoon) K. Schumann, in Engler and Prantl, Nat. Pfl. 4(2):159, 1895.
Cerbera peruviana Persoon, Syn. Pl. 1:267, 1805.

This species has long been known in cultivation in Hawaii, but does not commonly become naturalized. It is present here in substantial numbers, apparently naturalized.

SPECIMENS SEEN.—Kauai I.: Lawai Valley (Pacific Tropical Botanic Garden), "Big Valley," 3 Apr. 1971, *Fosberg 53654* (US, Fo, PTG, BISH).

Heliotropium L.

Heliotropium anomalum Hooker & Arnott

Heliotropium anomalum Hooker & Arnott, Bot. Beechey's Voyage in *Blossom*, 66, 1832.

This is certainly not the normal variety of Hawaii, but resembles var. *mediale* (Line Islands) or var. *anomalum* from southeastern Polynesia. It is only thinly strigose, leaves are linear-oblanceolate, cymes long-pedunculate.

SPECIMEN SEEN.—Oahu I.: Honolulu, tip of Laniloo Point, ½ mile [.8 km] east of Laie, on bare rock, *Iltis H-395* (US).

Stenogyne Bentham

Stenogyne scrophularioides Bentham

Stenogyne scrophularioides Bentham, Bot. Reg. 15, no. 1292, n. 88, 1830.

SPECIMEN SEEN.—Hawaii I.: Hilo, in woods, 28 Feb. 1887, *Rev. T. S. Lea* (BM).

This sterile sheet is of a slender herbaceous climber, tending to root at the nodes, with opposite exstipulate leaves, palmately tripartite to the base, the segments deeply lobed and the lobes of the lateral segments lobed again; stems squarish, pilose in lines. The long petioles conspicuously hirsute pilose, blades pilosulous and beset with sessile glands. At first this specimen was not placed even to family, but on a hunch was compared with *Stenogyne*. At Kew a specimen, *Hillebrand 351*, shows a series of stages from having the leaves ovate and undissected, with crenate-serrate margins, to almost as dissected as those of the *Lea* specimen, indicating that the latter is probably a juvenile plant of *S. scrophularioides*.

Solanum L.

Solanum repandum Forster f.

Solanum repandum Forster f., Prodr. 18, 1786.

SPECIMEN SEEN.—Hawaii I.: s. l., *Hillebrand 112* (K).

This specimen has leaves narrower than is usual for this species and more unequal at base, but otherwise seems to match New Zealand material of this species. It has not recently been found in Hawaii, at least no material was found in the Bishop Museum herbarium in 1971. It was described from the Marquesas and Society Islands.

Parentucellia Viviani

Parentucellia viscosa (L.) Caruel

Parentucellia viscosa (L.) Caruel, in Parlatore, Fl. Ital. 6:480, 1885.
Bartsia viscosa L., Sp. Pl. 602, 1753.

This is a Eurasian species but introduced into Oregon and various other cool parts of the world. It has apparently not been found previously in Hawaii.

SPECIMEN SEEN.—Hawaii I.: Kukaiau Ranch north slopes of Mauna Kea, 4800 ft [1450 m], *Rubtzoff 2609* (US).

Tetranema Bentham

Tetranema mexicanum Bentham

Tetranema mexicanum Bentham, Bot. Reg. 29, t. 52, 1843.

SPECIMENS SEEN.—Oahu: Old Pali Road, *Neal* in 1953 (BISH); *Clay* in 1956 (BISH); Manoa, *Neal* in 1940 (BISH). (This sheet is named by the collector *Mazus japonicus*).

These three specimens are identical and certainly seem to be *Tetranema,* rather than *Mazus.* Apparently the Manoa specimen is the only basis of Neal's (1965:158–159) report of *Mazus japonicus* from Hawaii. Therefore, *Mazus* should be deleted from the flora unless other material exists.

The leaves are in rosettes, obovate, crenulate, with scapes up to 15–20 cm, inflorescence umbelloid with proliferations, corolla violet with the three large lobes whitish at least at tips. It is a native of Mexico.

Plantago L.

Plantagos found in ruderal situations and pastures in the Hawaiian Islands are almost certain to be introduced species. Of these there are at least 5 species which may be distinguished by the following key:

Key to the Introduced Species of *Plantago* in the Hawaiian Islands

1. Leaves linear, bracts linear, stiff, straight, ascending, conspicuously protruding from spike ..... ***P. aristata*** Michaux
1. Leaves broader, bracts not as above.
   2. Leaves lanceolate to oblanceolate.
      3. Spikes short, cylindric, very densely flowered, on long peduncles, leaves entire ..... ***P. lanceolata*** L.
      3. Spikes slender, long, sparsely flowered, peduncles relatively short, leaves remotely lobed to subentire ..... ***P. debilis*** R. Brown
   2. Leaves ovate.
      4. Plants essentially glabrous, seeds 6 or more ..... ***P. major*** L.
      4. Plants more or less pubescent, seeds 3 ..... ***P. australis*** Lamarck

Plantago aristata Michaux

Plantago aristata Michaux, Fl. Bor. Am. 1:95, 1803.

SPECIMEN SEEN.—Hawaii I.: Kapapala, rare in pasture, dry locality, 5000 ft [1500 m] 19 June 1941, *Hosaka 2595* (BISH).

Plants very large for this species, up to 35 cm tall, leaves erect, linear, spikes to 9 cm long, on peduncles to 20 cm long. These plants are more caulescent than is usual in the eastern U.S., where the species is usually acaulescent. Here they have above-ground stems several centimeters long.

Plantago australis Lamarck

Plantago australis Lamarck, Tabl. Encycl. Genres 1:339, 1792.

Examination of the Hawaiian material that has been generally called *Plantago virginica* L. shows that it has 3 seeds in a capsule, rather than 2 as in *P. virginica,* and is generally less hirsute. In general aspect it is much like *P. virginica.* Of Pacific Island plants this resembles very much a species in New Zealand referred to the American *P. australis.* The latter is found in many slightly differing forms, from Mexico to Chile and Argentina. Many of these have been given names. Rahn (1964) has described a number of them as subspecies, but has provided no key to them. Until he does the Hawaiian plants can be called *P. australis* Lamarck, sensu lato. Several of the specimens cited below in the Bishop Museum herbarium bear undated annotations as *P. australis* by M. F. Tessene, showing that he arrived independently at this determination.

Two quite distinguishable forms can be recognized, one from Hawaii, one from Maui.

The Hawaii form has elliptic to oblanceolate leaves on winged petioles 1–8 cm long, blade ovate remotely denticulate, glabrous to somewhat appressed hirsute; peduncle elongate in maturity to as much as 22 cm, appressed hirsute, especially above to almost glabrous, especially below, floriferous part of spike 10–15 cm long, rachis loosely woolly; corolla lobes erect, ovate-lanceolate, acuminate or mucronate, capsule oblong-ellipsoidal, circumscissile just below middle, seeds 3, dull black. The Maui specimens are larger and much more robust, with leaves up to 38 cm long, spikes more conspicuously woolly, peduncles to 36 cm long, spikes to 45 cm, denser, flowers tending to be subverticillately arranged.

Specimens Seen.—Hawaii I.: Kohala Mts., Kahua Ranch, 3900 ft [1200 m], *Rubtzoff 2726* (US); Parker Ranch Paauhau, Kauahi'okaoka, *Rock 3138* (BISH), *Rock 3139* (BISH); Parker Ranch, Puu Kapu, 2700 ft [825 m], *Ewart 265* (BISH); Halealoha, *Forbes 799.H* (BISH); South Kohala, Puukapu, Waimea, *Hosaka 2140* (BISH); Volcano Kilauea, *Forbes et al.* in 1908 (BISH); Kilauea, Kipuka Puaulu, 4000 ft [1220 m], *Meebold* in 1932 (BISH); 1–3 miles [1.5–5 km] to left of Chain of Craters Road about 4 miles [6.5 km] down, *Newell 241* (BISH); Paauhau No. 1, *Rock 3246* (BISH); Paauhau No. 2, *Rock* in 1909 (BISH); E. of Humuula below Kalaeeha, 6200 ft [1900 m], *Neal & Hart 691* (BISH); Volcano Road, *Forbes 1042.H* (BISH); top of Kulani, *Forbes 984.H* (BISH). Maui I.: Kaupo Gap, Crater of Haleakala in 1919, *Forbes 1249.M* (BISH); Ukulele, *Forbes 169.M* (BISH); ¼ mile [.4 km] south of Paliku Cabins, Haleakala Crater, 6200 ft [1900 m], *Henrickson 3893b* (US, BISH); Waikomoi, 4250 ft [1300 m], *Neal & Hartt* in 1933 (BISH); along Olinda Flume, Waikamoi, 4000 ft [1220 m], *Crosby & Anderson 1783* (BISH).

Plantago debilis R. Brown

Plantago debilis R. Brown, Prodr. 425, 1810.

Apparently not reported from the Hawaiian Islands previously. Matches Australian material reasonably well but lobes on the Degeners' specimen much more developed. Leaves oblanceolate to elliptic with remote blunt lobes, spike very slender, rather sparsely flowered. This material has previously mostly been confused with *P. major* and *P. virginiana.*

Specimens Seen.—Oahu I.: Waialua, "locally naturalized weeds," *Degener & Degener 30730* (NY); Honolulu, Bishop Museum grounds, *Bryan* in 1952 (BISH). *Anderson* in 1949 (BISH); H.S.P.A. Experiment Station grounds, *s. coll.* in 1934 (BISH).

Plantago lanceolata L.

Plantago lanceolata L., Sp. Pl. 113, 1753.

Known from all the major islands and Midway. Very common in lawns and weedy places generally.

Plantago major L.

Plantago major L., Sp. Pl., 112–113, 1753.

This species is found occasionally, in places abundantly, in paths, lawns, roadsides, and disturbed places generally, even on Midway Island, *Meagher* in 1933 (BISH). A specimen from Maui, Puu Ouli, south slope of Haleakala, 6 April 1920, *Forbes 2163.M* (BISH), looks like a giant *P. major*

with leaf blades up to 18 × 11 cm, on broadly winged petioles to 18 cm long, spikes a little shorter than leaves, peduncles ephemerally appressed-pilose, with several scattered bracts below the main part of the spike, the lowest of these 1 cm long, obtuse. The fruits are too young to have any seeds. The corolla lobes are triangular lanceolate.

Plantago psyllium L.

Plantago psyllium L., Sp. Pl. 115–116, 1753.

This plant was mentioned by Neal (1948:694, 1965:791) as used medicinally. Careful reading suggests that she did not intend to imply that this species was found in Hawaii, nor have we found any Hawaiian specimens. It should be deleted from lists of the Hawaiian Flora. It is a bushy branched plant, not easily confused with ordinary plantains.

Hedyotis L.

Hedyotis corymbosa (L.) Lamarck

Hedyotis corymbosa (L.) Lamarck, Tabl. Encycl. 1:272, 1792. *Oldenlandia corymbosa* L., Sp. Pl. 119, 1753.

The drawing of *Heyotis biflora* (L.) Lamarck in Haselwood and Motter (1966:370–371) is certainly *H. corymbosa* (L.) Lamarck. The latter species was hitherto known from the Hawaiian Islands only from a collection from the 1955 lava flow in Puna, *Fosberg 46025,* but apparently occurs elsewhere in the islands, according to Haselwood and Motter. *Hedyotis biflora* is not, to the best of our knowledge, found in the State of Hawaii, though it is common in the western Pacific. The small axillary 3-flowered cymes and linear oblong or linear lanceolate leaves distinguish *H. corymbosa.*

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ADDENDUM

Of the specimens cited by Brown under his *Rapanea myricifolia* f. *marquesensis,* we have referred *Brown 496* to *Myrcinsine adamsonii* Fosberg & Sachet (p. 4) and *Brown 915* and *Mumford and Adamson 492* to *Myrsine grantii* Fosberg & Sachet var. *grantii* (p. 7).

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(Names in italics are those of new taxa or new combinations)

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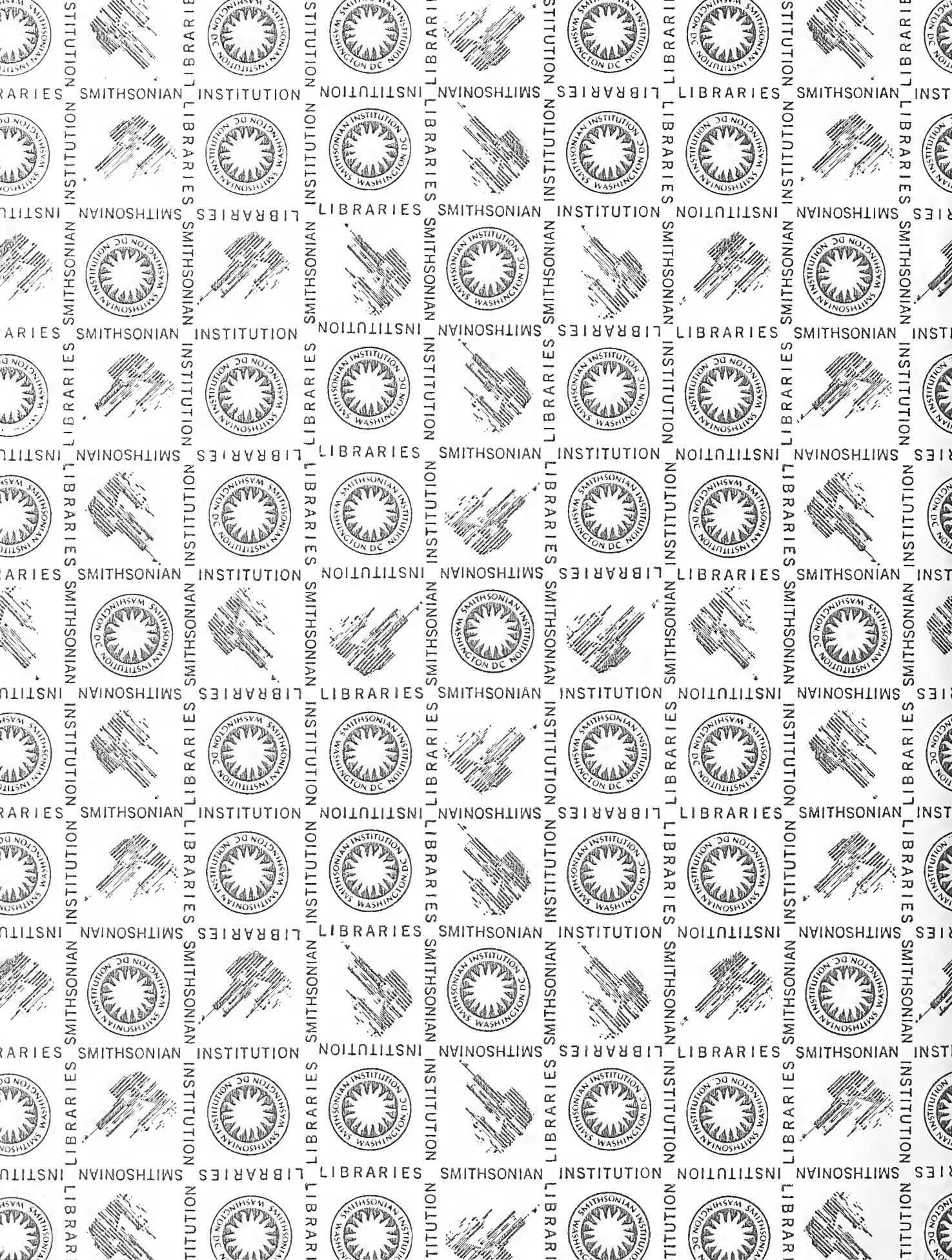
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