

NEW HAWAIIAN PLANTS

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The first two plants here considered, *Gunnera kauaiensis* and *Hibiscus brackenridgei* var. *molokaiana*, were found a number of years ago by Dr. J. F. Rock, who drew up the descriptions and deposited the type specimens in the Herbaria of the Board of Agriculture and Forestry and the University of Hawaii, respectively. Both these herbaria have since been combined with that of the Bernice P. Bishop Museum. As these two descriptions had not been given publication prior to Dr. Rock's departure from Hawaii and the type material accordingly was not recognized as such, it seems appropriate to include them in this paper, especially as the second variety of *Hibiscus brackenridgei* (here described as *kauaiana*) was found by Dr. Rock, and specimens of the original collection preserved. One of the palms, *Pritchardia elliptica*, is here described under joint authorship because the name was suggested by Dr. Rock, when he recognized a few stray fruits as being those of a species of *Pritchardia* hitherto unknown, although the description of the species is mine.

HALORAGACEAE

GUNNERA Linnaeus

Gunnera kauaiensis Rock, new species (Pl. I).

Plant 1.5-2 meters high, caudex semierect or more or less prostrate, sometimes rising 1 meter or more, 15 cm. or more thick, fleshy, with a huge crown of leaves measuring about 3 meters in diameter. Leaves peltate, not reniform, perfectly orbicular, 1-1.5 meters in diameter, 10-lobed, on petioles more than 1 meter in length and several cm. in diameter, distinctly muricate throughout and pubescent with brownish hair, the apex of the petiole attached to the center of the orbicular leaf and radiating into five main veins which branch dichotomously, the lateral veins again forking several times, rugose and muricate at the upper surface and with scattered short brownish hair, glabrous beneath save the veins and numerous prominent nerves which are covered with a fawn-colored pubescence. Panicle terminal, the deeply grooved rachis 1 meter or more long, hirsute, branching from near the base, the undivided branches about 14 cm. long, hirsute. Bracts linear-oblong, 12-14 mm. long, 5 mm. wide, triplinerved, obtuse, rounded at the apex. Flowers unknown. Fruits sessile, clustered in threes or fours or single the entire length of the branches, bright red, ovoid, 3-4 mm. long, 2.5 mm. in diameter near the base, crowned by the two calycine lobes.

Kauai, along the stream beds of Kaluiti and Kailiili, just below the summit of Waialeale, elevation 4800 to 5000 feet, September 22, 1909 (fruiting), J. F. Rock no. 5053. Type, B. P. Bishop Mus.

This species is at once distinguished from *G. petaloidea* Gaudichaud, occurring on nearly all the other islands of this group, by the distinctly peltate leaves and smaller bracts; there may be floral differences also, but in the absence of flowers this cannot be determined. The leaves of *G. petaloidea* are decidedly reniform and have broad and open basal sinuses.

The species found on Kauai is evidently related to *G. peltata* Philippi, which was once considered identical with *G. chilensis* Lamarck. *G. petaloidea*, though of course closest to *G. kauaiensis*, is nevertheless closely allied to the second species from Juan Fernandez, *G. masafuerae* Skottsberg.

The genus *Gunnera* inhabits in the Hawaiian islands the steep cliffs along mighty waterfalls, as in the Kawainui gorge in the Kohala Mountains on Hawaii, the deep ravines of West Maui, and along the stream beds of Waikamoi and Puohokamoa on the northern slopes of Haleakala, East Maui, at an elevation of between 3000 and 4000 feet and higher. On Molokai, *G. petaloidea* occurs on the palis of Pelekunu, as well as in the forest on the high swampy plateau of the same island. On Oahu the same species occurs in the Waianae Mountains on the summit of Puu Kaala, and also in the Koolau Range. *G. kauaiensis* is peculiar to the oldest island of the group, Kauai.

G. kauaiensis is associated with *Hillebrandia sandwicensis*, *Trematolobelia kauaiensis*, *Tetraplasandra waialealae*, *Labordia waialealae*, *Schiedea lychnoides*, *Cyanca hirtella*, *Gahnia beecheyi*, species of *Pelea*, etc. The locality which this new species inhabits receives an enormous rainfall, amounting to 60 inches and more per month.

MALVACEAE

HIBISCUS Linnaeus

Hibiscus brackenridgei Gray var. **molokaiana** Rock, new variety (Pls. II, III).

Involucral bracts 8-9, linear, subulate, terete, decidedly glanduliferous especially on the inner side, 2.5 cm. long, 2.5 mm. thick, hirsute with long yellowish hair, adnate to the base of the calyx. Calyx campanulate, carmine-red, the tube

about 10 mm., the lobes lanceolate, 1.5 cm. long, 7 mm. wide at the base, each lobe with a thick midrib without an oblong gland at the base, the margins thickened, hirsute with yellowish hair throughout but more so towards the base, paler and pubescent inside. Corolla canary-yellow, the tube deep purple; tube 25 mm. deep, the petals then spreading, pubescent beneath, glabrous above, 10-12-nerved, the nerves dichotomous at the apex, 5 cm. long, 4.5 cm. wide. Ovary densely villous-pubescent with whitish hair. Staminal column thick, 4 cm. long, irregularly antheriferous with anthers scattered or in groups at intervals of 4-10 mm., naked at the base for 10 mm., pubescent. Filaments 2.5 mm. long or the uppermost shorter. Stigmatic lobes 2 mm. long, hirsute. Stigmas depressed, capitate.

Molokai, west end, back of Kalaeokalaau, 1910 (fruiting only), J. F. Rock. Molokai, west end, February, 1920, J. F. Rock; type, B. P. Bishop Mus. After the discovery of this variety Mr. James Munro found a number of plants, and in the spring of 1920 fine flowering material was collected and photographed. Cuttings grown on the campus of the University of Hawaii flowered January 20, 1919.

This variety differs from *H. brackenridgei* in the glandular hirsute involucreal bracts, the deep-purple corolla tube, the petals horizontally spreading and not reflexed, the irregularly scattered stamens, and in the absence of the oblong gland at the base of the median nerve of each calycine lobe in the species. The calyx is 5-nerved instead of 10-nerved.

Hibiscus brackenridgei Gray var. **kauaiana** Caum, new variety (Pl. IV).

An erect to spreading light-wooded shrub, to about 1 meter tall, with stiff leafy branches tomentose at the ends and beset below with short hairlike spines. Leaves dentate, cordate, shallowly 3-lobed, 8 cm. long, 8 cm. broad, densely pubescent on both surfaces, on densely pubescent petioles of 4-5 cm. Stipules setaceous. Peduncles solitary in the axils of the uppermost leaves, 1.5 cm. long. Involucreal bracts 5, halberd-shaped, not terete, not glanduliferous, 3 cm. long, 8 mm. broad, running out to a fine hairlike tip, hirsute with short hair, adnate to the base of the calyx. Calyx campanulate, green, the lobes triangular, adnate for a distance of 1 cm., the free end 1.5 cm. long, 1 cm. broad at the base, each with an oblong gland at the base of the thick midrib, hirsute with colorless hair throughout on the outer side but more so toward the base and particularly on the veins, glabrous on the inner side. Corolla to 12 cm. in diameter, light lemon-yellow to canary-yellow, the throat dark reddish-purple, 3 cm. deep. Petals spreading and slightly reflexed at the tip, 6 cm. long, 5 cm. broad, imbricate, slightly pubescent at the base beneath, glabrous above, 14-16-nerved, nerves branching at the apex. Ovary pubescent with short colorless hair. Staminal column thick, 3 cm. long to the base of the stigmatic lobes, irregularly antheriferous for its entire length, glabrous. Lower filaments 5 mm. long, the upper ones shorter. Stigmatic lobes 2 mm. long, hirsute. Stigmas

approximate, capitate, depressed, deep reddish-purple. Capsule woody, ovoid, acute at the tip, 2.5 cm. high, 17 mm. in diameter at the widest part, glabrate with short colorless hair. Seed broad-reniform, 3 mm. long, hirsute with short gray hair, with longer golden-brown hair around the hilum.

In the spring of 1919 Dr. J. F. Rock brought from the island of Kauai (the particular locality not stated) two plants of a species of *Hibiscus* which was unknown to him. They were in neither flower nor fruit. One of these plants was given to me, and I have had it and its progeny growing in my garden since that time. It is in flower and fruit almost constantly and volunteers freely, preferring partial shade for its best development. The plant is apparently very close to *H. brackenridgei* Gray, from which it differs in several points, and as it likewise differs from the only known variety of this species, it is here considered as a new variety. Material from the type plants is in the Herbarium of Bernice P. Bishop Museum.

In this Herbarium also are two collections of this plant, Rock nos. 16038 and 17141, two sheets each, labeled in Rock's handwriting "Hibiscus, collected April 1919, at Waiawa, Kauai," no. 16038 with the additional note "V. Knudsen's home." It seems probable that these specimens were taken from the plants brought to Honolulu by Dr. Rock.

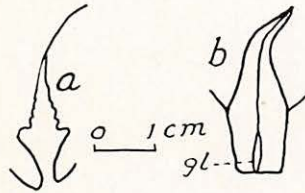


FIGURE 1.—*Hibiscus brackenridgei* var. *kauaiana*: a, involucre bract; b, calyxine lobe (gl, gland).

The plant differs from *H. brackenridgei* but resembles the variety *molokaiana* in the 5-nerved calyx, the hirsute involucre bracts, and the dark reddish-purple throat. (See fig. 1.) It differs from this variety but resembles the species in the nonglanduliferous involucre bracts, the color of the calyx, the presence of a gland at the base of the midrib of each calyxine lobe, and the greater number of petaline nerves. It differs from both forms in the very shallowly lobed leaves, the shape, form, and number of involucre bracts, the completely antheriferous staminal column, and the conspicuous purple color of the stigmas.

Hibiscus kokio Hillebrand var. **pukoonis** Caum, new variety
(Pl. V).

A light straggling shrub, to 2 meters tall. Leaves ovate to elliptico-oblong, acuminate, sinuately crenate, 10-12 cm. long, 5.5-6.5 cm. broad, bright green, scarcely palmately nerved, the lateral nerves not extending beyond the middle, soft-chartaceous, on petioles 3-4 cm. long. Stipules setaceous, 5-8 mm. long, 0.3-0.5 mm. wide. Peduncles solitary, axillary near the ends of the branches, 2-4.5 cm. long, articulate within the distal quarter, pubescent. Involucral bracts 6-8, linear, half-terete, 10-13 mm. long, 1 mm. broad, not adnate to the calyx, glabrate. Calyx tubular, 2.5 cm. long, 10 mm. in diameter, cleft for about 1 cm., each lobe acute, glabrate, tripli-nerved, the nerves swollen, not glanduliferous, the lateral nerves fusing 5-10 mm. below the cleft, the calyx tube thus being 10-nerved at or near the base only. Corolla 6.5 cm. in diameter, light red throughout; throat 2.5 cm. deep, the petals spreading slightly upward from the horizontal. Petals very slightly ciliate at the edge, obovate, the outer edge below coincident with the notch of the calyx, slightly reflexed at the tip, 5.5 cm. long, 3 cm. broad, imbricate, 6-nerved, the nerves branching, often near the base. Staminal column 5 cm. long, slender, glabrous, light red, acutely 5-lobed at the top. Filaments 3-4 mm. long, crowded in the distal fifth of the column. Style extending 2 mm. above the column, then branching, the branches 7 mm. long, spreading slightly upward from the horizontal, light red, ciliate. Stigmas capitate, 1 mm. in diameter, red. Ovary truncate-conical, 5 mm. high, 3 mm. in diameter at the base, sparsely pubescent with short appressed colorless hair, this heavier at the apex, where it stands erect. Capsule glabrous, 17.5 mm. long, much exceeded by the dried sepals. Seed reniform, 4 mm. long, covered with a coarse brown pubescence.

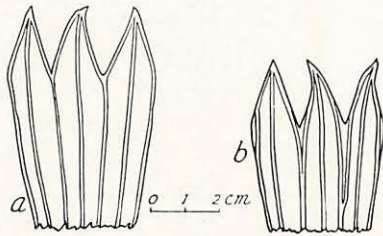


FIGURE 2.—Venation of calyxes: a, *Hibiscus kokio*; b, *Hibiscus kokio* var. *pukoonis*.

Molokai, bottom of Pukoo Valley, just inside the native forest (neither flower nor fruit), February, 1921, E. L. Caum, no. 155. Material from the type plants in the Herbarium of B. P. Bishop Mus.

Cuttings brought to Honolulu rooted readily, and two plants in my garden have flowered frequently. These plants do not flower freely and very rarely set fruit, even when hand-pollinated. The plant under consideration differs from the species in the texture and other characters of the leaf, in the shape and color of the petals, and hence in the

general appearance of the flower, in the venation of the calyx and in other less conspicuous characters. (See fig. 2.)

Hibiscus kokio, the *kokio ulaula* of the Hawaiians, was described by Hillebrand in *Flora*, p. 173, 1873, and republished in his *Flora of the Hawaiian islands*, p. 48, 1888, where it is recorded from Oahu, Molokai, and Kauai. The true species, as generally accepted today, is restricted to Oahu. As Hillebrand's specimens are not available for examination, I am not familiar with his collection from Molokai, but it is not improbable that it may be accounted for by the variety here considered. It is entirely probable that the record of specimens from Kauai is covered in part by *Hibiscus kahili*, described by Forbes (B. P. Bishop Mus., Occ. Papers, vol. 5, p. 4, 1911) and in part by other forms of red *Hibiscus* known to occur on that island, but which have not been critically studied. *Hibiscus kokio*, as known on Oahu today, is rather variable, and several geographic races are recognized and known locally as the "Mokuleia red," the "Kawaihapai red," the "Ahuimanu red," etc. The plant here considered comes nearer to the general form from Oahu than does *H. kahili*, but seems farther removed from it than are the various geographic races mentioned above. It is not sufficiently different to warrant specific rank, but seems worthy of varietal distinction. Hillebrand's description is somewhat too general to show the differences between the form from Oahu and the variety from Molokai, and to make these differences clear a new description of Hillebrand's species was drawn up from a typical plant from Oahu, which was collected some years ago by Dr. Rock and planted on the campus of the University of Hawaii, and is here given for comparison.

Hibiscus kokio Hillebrand.—A tall shrub, 2.5-5 meters high, dividing from near the base into long straggling branches, the young shoots with discreet stellar pubescence. Leaves oblong-ovate, serrate, 11.5-12.5 cm. long, 5.5-6.5 cm. broad, deep green to yellowish-green, glossy, stiff, scarcely palmately nerved, the lateral nerves not extending beyond the middle, on petioles 1.5-3 cm. long. Stipules linear, 12-15 mm. long, 1 mm. wide. Peduncles solitary, axillary near the ends of the branches, averaging about 3.5 cm. long, articulate in the distal third, pubescent. Involucral bracts 8-9, broad-linear, acute, 12-15 mm. long, 2 mm. wide, not adnate to the calyx, glabrate. Calyx tubular, 3 cm. long, 12 mm. in diameter, cleft for about 1 cm., each lobe acute, glabrate, tripli-nerved, the nerves swollen, not glanduliferous, the lateral nerves fusing immediately below the cleft, the calyx tube thus being 10-nerved throughout. Corolla 6 cm. in diameter, bright red throughout; throat 3 cm. deep, the petals then spreading horizontally to slightly downward. Petals strap-shaped, 5.5 cm. long, 1.5 cm. wide, standing well apart, imbricate at the base only, curled upward at the tip,

the outer edge below not coincident with the notch of the calyx, ciliate at the tip and along the outer edge, 3-4-nerved, the nerves branching near the base. Staminal column 6 cm. long, rather heavy, glabrous, white to pinkish in color, acutely 5-lobed at the top. Filaments 3-4 mm. long, crowded in the upper quarter of the column. Style extending 5 mm. above the column, then branching, the branches 8 mm. long, spreading horizontally, red, ciliate. Stigmas capitate, 1.5-2 mm. in diameter, red. Ovary truncate-conical, 6 mm. high, 4 mm. in diameter at the base, pubescent with short colorless hair. Capsule glabrous, 2.5 cm. long, exceeded by the dried sepals. Seed reniform, 4 mm. long, covered with a coarse brownish pubescence.

LABIATAE

PHYLLOSTEGIA Bentham

Phyllostegia longiflora Caum, new species (Pl. VI).

Plant suberect, woody, the new growth pubescent with short, appressed, gray, silky hairs. Leaves glabrous above, the veins pubescent beneath with similar hairs, ovate, crenate, almost truncate at the base, narrowing sharply into the petiole, 3.5-4.5 cm. long, 3.3-3.5 cm. wide, on petioles of 1.4-1.8 cm. Racemes axillary near the tips of the branches, semierect, 8 cm. long, the flowers 2 in each leaf axil, but sometimes crowded into whorls of 6 in a seemingly terminal raceme, when each pair is subtended by a minute bract; pedicels 5-8 mm. long. Calyx puberulous, 9-12 mm. high, with broad, blunt teeth. Corolla white, pubescent (decidedly so in the bud), 6-7.5 cm. long, the tube far exserted, being 4.5-6 cm. long, the limb 1.5 cm. long. Style branches subulate, blunt. Fruit not known.

East Maui, Kula Pipe Line trail, edge of a gulch in deep forest. February 7, 1929, H. L. Lyon and E. L. Caum, no. 150. Type, B. P. Bishop Mus.

Only one plant was seen of this extremely large-flowered species (the corolla tube is twice the length of that of *P. grandiflora* from West Maui, the largest species previously known). It was rather low and diffuse, being semierect to semiscandent, and was immediately noticeable by its conspicuous large white flowers, clustered near the ends of the branches.

RUBIACEAE

STRAUSSIA Gray

Straussia grandiflora Caum, new species (Pl. VII).

Leaves ovate to obovate, obtuse at either end, 6-8.5 cm. long, 4-4.5 cm. wide, on petioles of 5-10 mm., chartaceous, the nerves little prominent, glabrous. Stipules long-triangular, acute, 6-10 mm. high, deciduous. Panicles nodding.

7.5-10 cm. in length, the peduncles 4.5-6 cm. long to the proximal whorl, puberulous. Calyx 2 mm. long, the limb very bluntly dentate, glabrate. Corolla tube 15 mm. long, the lobes 5 mm., waxy white, becoming reddish-brown to maroon in dried specimens. Drupe ovoid to suborbicular, 12-15 mm. long, 8-14 mm. in diameter, prominently ribbed when dry, crowned by the calycine limb.

Kauai, near Kokee, February 28, 1925, H. L. Lyon and A. W. Duvel, no. 5012 L. Type, B. P. Bishop Mus.

This very distinct species is a small tree, 15 to 20 feet tall, and may be distinguished at once by its flowers, which are by far the largest of any known species. The corolla tube is four to five times the length of that of any species previously described, and the lobes are only one-third the length of the tube, whereas in the other species they are at least equal to the tube in length.

PALMAE

PRITCHARDIA Seemann and Wendland

Pritchardia kamapuaana Caum, new species (Pl. VIII; Pl. XIV, fig. 2).

A small palm, 4-5 meters tall, trunk about 30 cm. in diameter. Leaf blade large, 1.3 meters from the tip of the ligule to the apex, deep green above, covered below with a closely appressed silvery tomentum; segments about 52, 5 cm. wide at their disjunction places, the median segment divided for a distance of 16 cm. Ligule asymmetric, cuspidate, 5 mm. high. Petiole about 90 cm. long, glabrous above, with a closely appressed silvery tomentum on the edges below, glabrous in the central part with occasional scattered hyaline, much-fringed lepidia. Spathes tubular at the proximal part, expanded above into a broad lanceolate blade. Spadix paniculate, 70-75 cm. long, the peduncle 45-50 cm., the panicle 25 cm. The rachis is finely rusty-tomentose, flattened, the diameters 15 and 10 mm. at the base of the first branch. The panicle consists of a few 2-4-partite branches at the proximal end and simple branches elsewhere, these being finely rusty-tomentose, 10-14 cm. long, 4 mm. in diameter. Flowers (unopened) 15 mm. long, 5 mm. in diameter near the base, narrowed above to an obtusely trigonous acute point. Calyx ventricose-cylindric, 6 mm. long, slightly tomentose at the upper part, with three acute teeth. Corolla 9 mm. long, the segments elongate-triangular, acute, with 15 explanate ribs. Staminal ring included within or protruding very slightly beyond the calyx; filaments heavy-filiform, anthers elongate-sagittate. Ovary turbinate, strongly sculptured above, narrowing sharply into a trigonous, sulcate, thick style; stigmas punctiform. Fruit large, ovoid, 5-5.5 cm. long and 3.5-3.8 cm. in diameter at the center. The young fruit is distinctly pointed at the distal end. Walls of the pericarp (in undried fruit) are 5-6 mm. thick at the sides and distal end, 9 mm. at the proximal end. Seed ovoid, rounded at both ends, 20 mm. in diameter, 30 mm. long, approximately centered in the fruit; hilum orbicular; embryo 8 mm. from the center of the hilum. Fruiting perianth shortly pedicelliform, 4-5 mm. high, 7-8 mm. wide.

Oahu, Koolau Range, Hauula-Kaluanui ridge, elevation about 2300 feet, January 7, 1927, E. L. Caum, no. 151. Type, B. P. Bishop Mus.; cotype, Herbarium of L. H. Bailey, Ithaca, N. Y.

The stand consists of some 15 or 20 trees, scattered for some distance along the Kaluanui side of the ridge. The species is apparently closely related to *P. rockiana*, occurring along the main ridge of the Koolau Range above Punaluu, about three miles to the south of this station in a direct line, and to the following species, *P. maedanielsi*. It differs from *P. rockiana* in the silvery tomentum and larger size of the leaf and in the internal anatomy of the fruit, as well as in minor characters. Its principal distinctions from *P. maedanielsi* lie in the panicle.

The species is dedicated to the Swine God Kamapuaa, whose ancient home was in Kaluanui Valley and whose people still range these mountains.

Pritchardia maedanielsi Caum, new species (Pl. IX; Pl. XV, fig. 3).

A small palm, trunk to 5 meters tall, 30 cm. in diameter. Leaf blade 1-1.5 meters from the ligule to the tips of the median segments, deep green above, covered below with a closely appressed gray tomentum, as are the upper edges of the costae; segments 42 in one specimen, 4.5 cm. wide at their disjunction places, the median segment divided for a distance of 28 cm. Ligule asymmetric, cuspidate, 15 mm. high. Petiole about 90 cm. long, glabrous above, with a closely appressed gray tomentum on the edges below. Spathes tubular at the proximal part, expanded above into a broad-lanceolate blade. Spadix paniculate, about 80 cm. long, the peduncle 60-65 cm., rusty-tomentose, the panicle 15-20 cm. Rachis glabrous, flattened, the diameters at the base of the first branch 10-18 mm. by 7-12 mm. The panicle consists of a few 2-4-partite branches at the proximal part and simple branches elsewhere, these 9-11 cm. long, 1-2 mm. thick. Flowers (unopened) 10 mm. long, 3.5 mm. in diameter at the base, narrowed above to an obtusely trigonous point. Calyx ventricose-cylindric, 4 mm. long, glabrous, with three acute teeth. Corolla 6 mm. long, the segments elongate-triangular, acute, with 12 explanate ribs. Staminal ring protruding slightly beyond the calyx; filaments filiform; anthers linear. Ovary turbinate, strongly sculptured above, narrowing sharply into a trigonous, sulcate, thick style; stigmas punctiform. Fruit ovoid, 4 cm. long, 2.5 cm. in diameter at the center, pointed at the distal end. Walls of the pericarp 6 mm. thick. Seed ovoid, rounded at both ends, 25 mm. long, 15 mm. in diameter, centered in the fruit; hilum irregularly orbicular; embryo 4 mm. from the center of the hilum. Fruiting perianth shortly pedicelliform, 4.5 mm. high, 7-8 mm. wide.

Oahu, Koolau Range, Hauula-Kaluanui ridge, elevation about 2000 feet, January 7, 1927, L. H. MacDaniels, no. 168. Type, B. P. Bishop Mus.; cotype, Herbarium of L. H. Bailey, Ithaca, N. Y.

The stand consists of a few scattered trees only, on the Kaluanui side of the ridge. The species is related to *P. rockiana*, the palm from Punaluu, and more closely to *P. kamaŋuaana*, near which it occurs. It differs from *P. kamaŋuaana* principally in the size of the leaf, the smaller, more delicate, and glabrous panicles and smaller flowers.

The species is named for Dr. L. H. MacDaniels of Cornell University, a member of the party that discovered this palm and *P. kamaŋuaana*, and who collected and brought down the specimens from which this description was drawn.

Pritchardia donata Caum, new species (Pl. X; Pl. XIV, fig. 1).

A medium-sized palm, trunk about 3 meters tall. Leaf blade 1.5 meters from the ligule to the tips of the median segments, equally green on both surfaces, rather thickly sprinkled beneath with minute irregular punctiform to linear lepidia, the proximal parts of the costae densely lanate with large fringed lepidia; segments numerous (82 in one specimen), stiff, divided for $\frac{1}{5}$ their length into two acuminate lacinae which taper gradually to very fine filamentose apices, the largest intermediate segments 25-28 mm. wide at their disjunction places, and 55 cm. long to the capillary end, the outer segments similar but smaller. Petiole about 1 meter long, quite glabrous except at the distal end where it is slightly lanate; ridged in the center of the upper side. Ligule asymmetric, pyramidal, apiculate in the middle. Spadix elongate, 1.75 meters long to the first branches of the panicle, bifid from the middle or above. Each inflorescence a loose panicle with its own broad-lanceolate spathes, which are furnished with a few scattered large, fringed lepidia. Panicle entirely glabrous, the fructiferous branchlets slightly angled, about 15 cm. long, 4 mm. thick at the base. Flowers spirally arranged, widely spaced on the branchlets, large, only a small proportion maturing. Unopened flowers 14 mm. long, acuminate, the calyx 6 mm. high to the tips of the sharp teeth, 5 mm. in diameter at the base; petals 8 mm. long, lanceolate, sharply ridged on the inner surface. Staminal ring protruding 1-1.5 mm. beyond the calyx; filaments rigid, nearly erect. Ovary turbinate. Fruit globose-ovoid, acutely mucronate by the remains of the sterile carpels, asymmetric at the proximal end, 45 mm. long, 35 mm. in diameter, surface slightly ridged. Walls of the pericarp 5 mm. thick, grumose. Seed ovoid, centered in the fruit. Fruiting perianth depressed-pedicelliform, 4 mm. high, 6 mm. in diameter, the staminal and corolla tube forming a narrow toothed ring.

Oahu, Honolulu, E. L. Caum, May 11, 1927, no. 152, and September 14, 1927, no. 153. Type, B. P. Bishop Mus.

This species is thus far known from a single tree, which is growing in premises on Keeaumoku Street, Honolulu, formerly belonging to the late Walter M. Giffard, by whom the palm was planted. As far as the history of the tree is known, it was given to Mrs. Giffard as a small seedling, about the year 1900, by Hawaiian friends who

brought it from Molokai. Its nearest relatives seem to be *P. lozweyana* and *P. brevicalyx*, both from Molokai.

Pritchardia kahukuensis Caum, new species (Pl. XI; Pl. XV, fig 5).

A tall palm, trunk to 10 meters high to the lower leaves. Leaf blade 1.3 meters from the ligule to the tips of the median segments, bright green on the upper surface, the lower surface thickly covered with a silvery tomentum; segments numerous (68 in one specimen), stiff, divided for $\frac{1}{3}$ their length into two acuminate laciniae, which taper to blunt apices, the largest intermediate segments 25 mm. wide at their disjunction places, and 46 cm. long to the tip, the outer segments similar but smaller. Petiole 1 meter long, slightly glaucous with minute lepidia in the upper central part, lanate at the edges on both surfaces, slightly ridged in the center of the upper side. Ligule decidedly asymmetric in the younger leaves, more symmetrical in the older, distinctly mucronate in the middle. Spadix elongate, simple, 1.5-2 meters to the first branches of the panicle. Panicle rusty-tomentose, 30-50 cm. long, the proximal branches 5-8-partite, the distal simple. Fructiferous branches round, 9-15 cm. long, 4-8 mm. thick at the base. Spathes broad-lanceolate, rusty-villous. Flowers spirally arranged, rather closely set on the branches. Mature flowers not known. Immature flowers, from unopened panicle, 6-7 mm. long, acuminate; calyx 4 mm. high to the tips of the sharp teeth, 3 mm. broad at the base (probably full size). Petals too immature to afford data of diagnostic value. Fruit ovoid, bluntly mucronate by the remains of the sterile carpels, slightly asymmetric at the proximal end, 15 mm. long, 11 mm. in diameter. Walls of the pericarp 1 mm. thick. Seed ovoid, centered in the fruit. Fruiting perianth pedicelliform, 2 mm. high, 3 mm. in diameter, the staminal and corolla tube forming a rather prominent toothed ring.

Oahu, Kahuku uka, Pupukea-Malaekahana trail, elevation about 1600 feet, September 29, 1927, E. L. Caum, no. 154. Type, B. P. Bishop Mus.

Six widely scattered adult and several immature trees were seen of this tall, heavy-crowned palm. The species differs from any with which I am acquainted in its habit of holding the long flowering and fruiting spikes at an angle of about 45 degrees to the trunk, above and often somewhat exceeding the leaves in the axils of which they arise.

Pritchardia kaalae* var. *minima Caum, new variety (Pl. XII).

Leaf blade 75 cm. long from the ligule to the tips of the median segments, which are parted for about $\frac{1}{3}$ of their length. This separation is proportionately much greater than in the typical form. Petiole 50-60 cm. long, 3 cm. wide at the ligule, 14 cm. at the base. Ligule very low, decidedly oblique, linear, not triangular. Peduncle about 2 meters long to the first branches of the panicle; panicle 20 cm. long. Floriferous branches 7.5-12.5 cm. long, not angled, the proximal ones flattened, the distal cylindrical. Petiole and lower costae of the leaf are much less densely lanate than in the species, and the transverse veinlets

are not at all distinct on the lower surface. Calyx not strongly striate, with short and broadly acute teeth. Mature fruit not known.

Oahu, Waianae Mountains, Makua-Makaha ridge, elevation about 2600 feet, July 12, 1928, Max F. Landgraf, no. 25. Type, B. P. Bishop Mus.

This variety differs from the species in minor details, mainly of size. It is rather consistently smaller than typical *P. kaalae*, but otherwise quite similar. These differences may be mainly environmental, *P. kaalae* occurring at an elevation of 1200 feet in the deep, wet forest of a valley bottom on the north side of Puu Kaala, while the variety grows at more than twice that elevation on open, wind-swept ridges on the west side of that mountain. But considering the extreme localization of the Hawaiian species of *Pritchardia*, as these species are now interpreted, the plant in question seems worthy of varietal rank.

Pritchardia elliptica Rock and Caum, new species (Pl. XIII; Pl. XV, fig. 4).

A medium-sized palm, trunk to about 3 meters tall, slender. Leaf blade large, to 1.3 meters from the tip of the ligule to the apex, by 1.6 meters in width, according to the collector. The leaf in the type specimen is smaller, being 70 cm. long by 95 cm. wide, equally green on both surfaces, the proximal part of the costae on both surfaces covered with a closely appressed ferruginous tomentum, the lower surface closely sprinkled with ferruginous punctiform lepidia; segments about 56, the median segments 4 cm. wide at their disjunction places, and divided for a distance of 25 cm., the laciniae stiff. Ligule asymmetric, mucronate, 5 mm. high in the center, 10 mm. near the ends. Petiole length not taken, width 25 mm. at the distal end, glabrous except for a closely appressed ferruginous tomentum on the outer edges below and a little above at the ligule. Spathes tubular with broad-lanceolate blades. Spadix paniculate, about 1 meter long, the unbranched peduncle about 75 cm. in length. Rachis glabrous, 6 mm. in diameter at the base of the first branch of the panicle, which consists of several 2-3-partite branches at the proximal end and simple branches elsewhere, these being glabrous, to about 10 cm. long. Flowers small, closely set on the branches, the calyx ventricose-cylindric, 3 mm. high to the tips of the acute teeth, 2 mm. in diameter at the base. Staminal ring protruding 1 mm. beyond the calyx; filaments heavy-filiform; anthers elongate-sagittate. Ovary turbinate, lightly sculptured above, narrowing gradually into a long trigonous, sulcate, thick style; stigmas punctiform. Fruit (mature) elliptic, about 3 cm. long, 2.5 cm. in diameter, with two rather prominent lateral ridges; immature fruit long-elliptic, 18 mm. long, 10 mm. in diameter, distinctly pointed at the distal end. Seed elliptic, centered in the fruit, rounded at the distal end, pointed at the proximal. Walls of the pericarp, in dried specimens, 1 mm. thick. Fruiting perianth pedicelliform, 2 mm. high, 3 mm. in diameter.

Lanai, Kunoa Valley, elevation 2500 feet, October 18, 1927, George C. Munro. Type, B. P. Bishop Mus.

The plants were growing in thick scrub on a very steep hillside. According to the collector the trunks bore distinct swellings on the under side at the ground level, where they project out from the hillside. The existence of this species was surmised long before the date of the collection, as Rock states¹ that fruits belonging to an entirely different plant were found by him mixed with those of *P. lanaiensis* in the Herbarium of the Bishop Museum, and he designated this otherwise unknown species *P. elliptica*. I have, of course, retained this name for the species, adequate material of which was collected after Dr. Rock had left Hawaii. There is no doubt that this is the plant referred to, as not only do the fruits compare well with those mentioned by Rock, but Mr. Munro, who is thoroughly familiar with Lanai, remembered collecting those fruits, and took the specimens here described from the same grove of palms.

¹ Beccari, O., and Rock, J. F., A monographic study of the genus *Pritchardia*: B. P. Bishop Mus., Mem., vol. 8, no. 1, p. 17, 1921.



PLATE I.—*Gunnera kauaiensis* Rock, growing along Kailili Stream, near the ridge leading to the summit of Waialeale, Kauai, at an elevation of about 4800 feet.



PLATE II.—*Hibiscus brackenridgei* var. *molokaiana* Rock.



PLATE III.—*Hibiscus brackenridgei* var. *molokaiana* Rock, photographed in situ on the western end of Molokai, growing in arid regions at an elevation of 600 feet.



PLATE IV.—*Hibiscus brackenridgei* var. *kawaiiana* Caum.

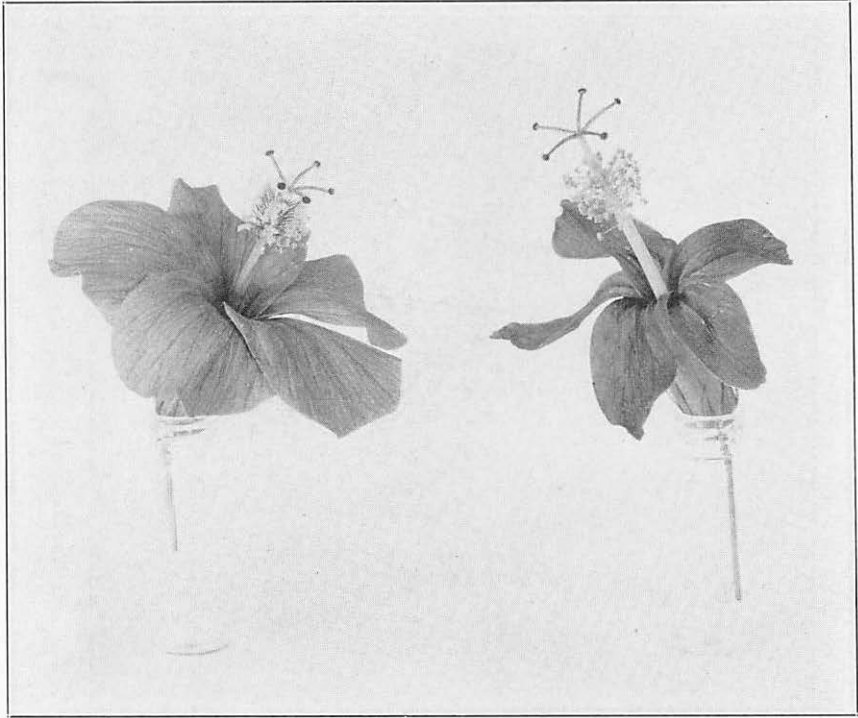


PLATE V.—*Hibiscus kokio* Hillebrand (right), *Hibiscus kokio* var. *pukoonis* Caum (left).

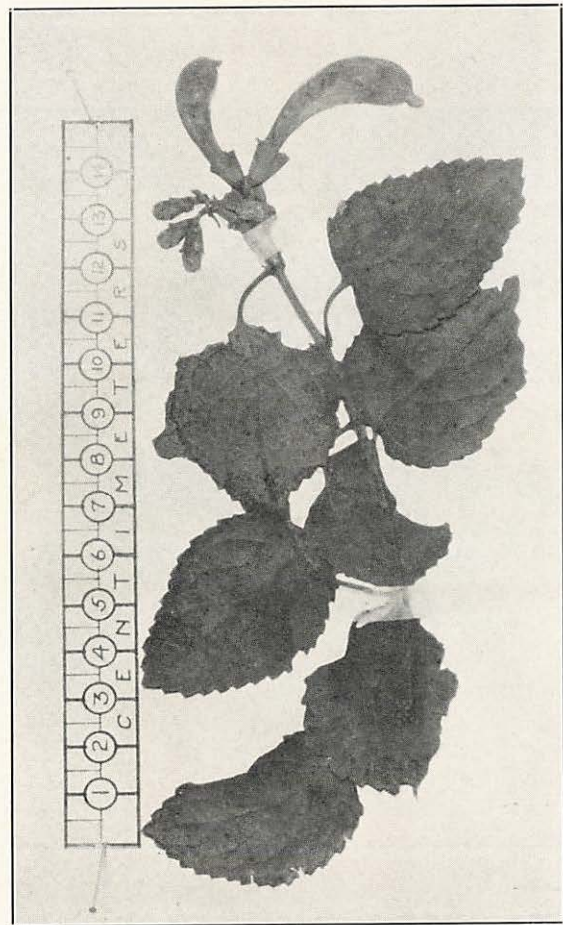
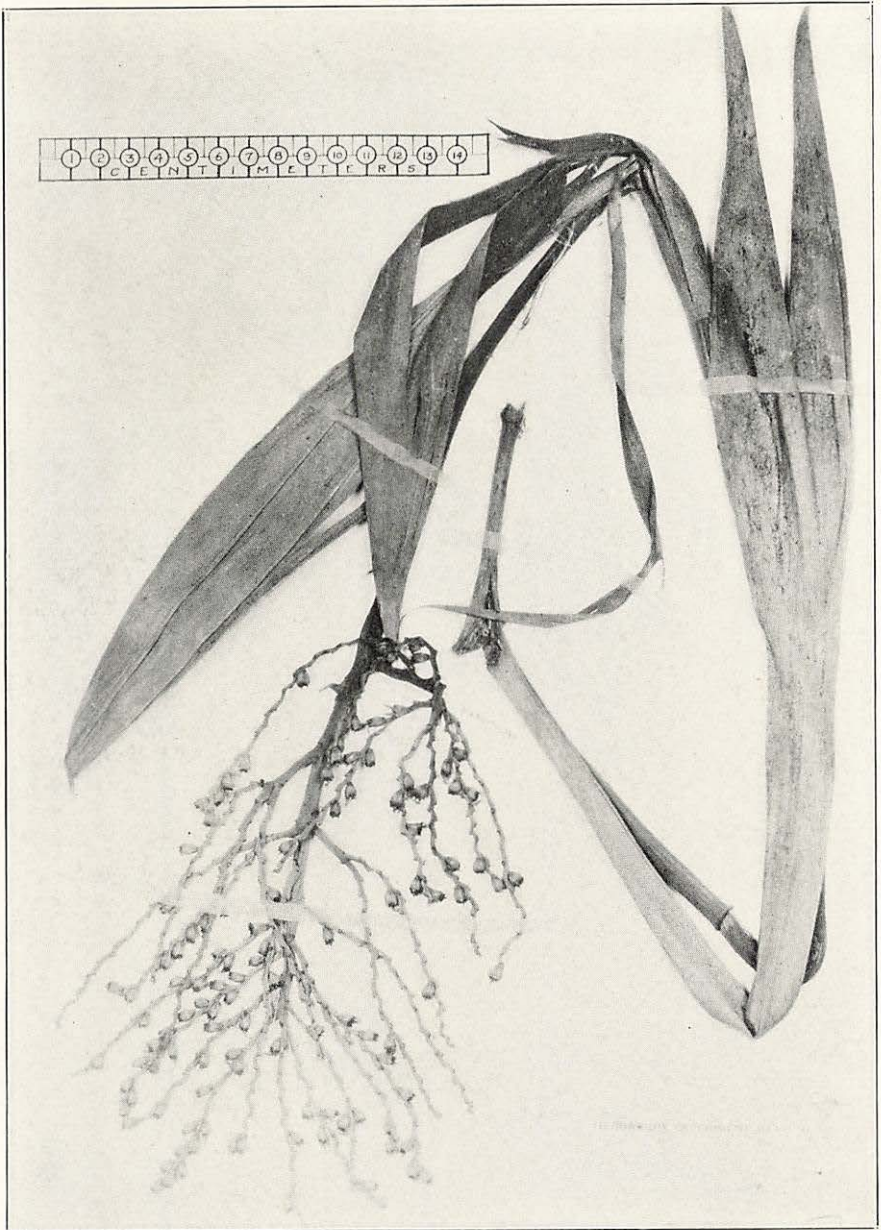


PLATE VI.—*Phyllostegia longiflora* Caum.

PLATE VII.—*Straussia grandiflora* Caum.



PLATE VIII.—*Pritchardia kamaupuaana* Caum, flowering panicle.

PLATE IX.—*Pritchardia macdanielsi* Caum, flowering panicle.

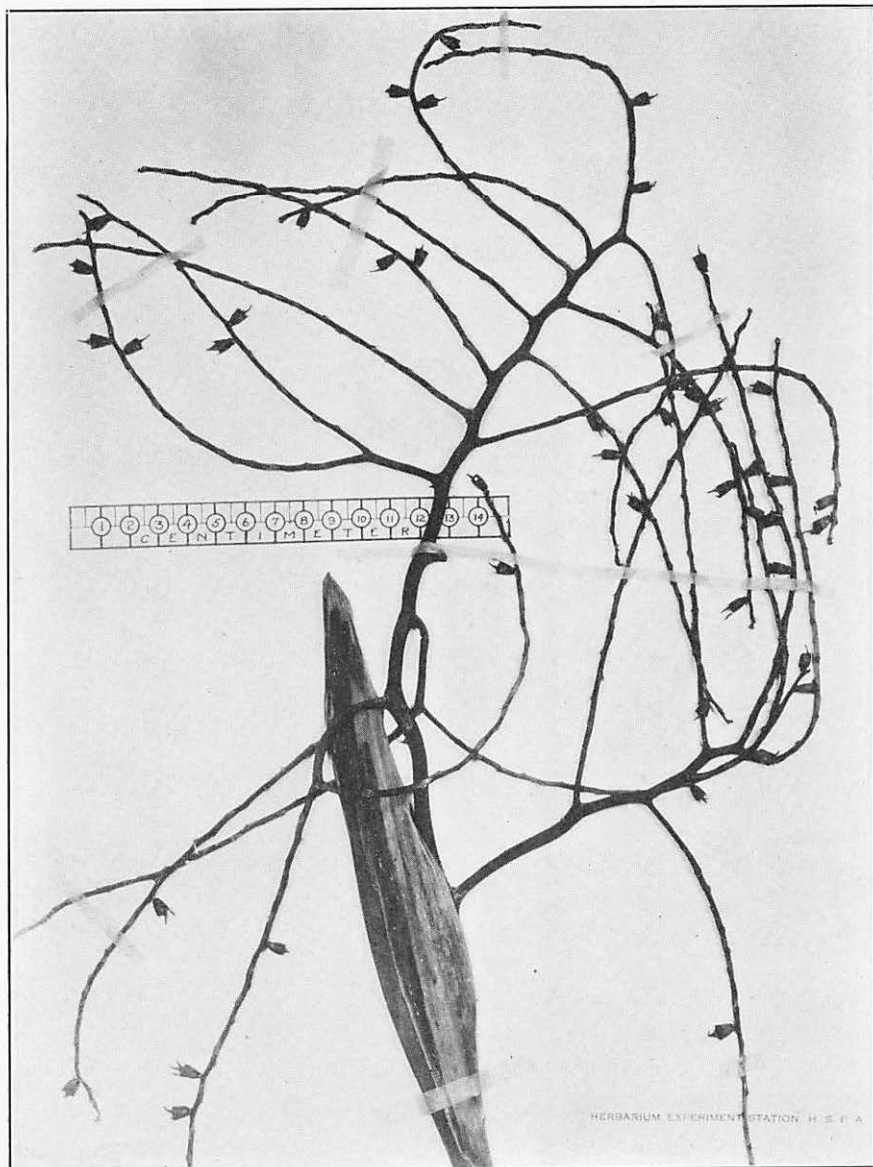


PLATE X.—*Pritchardia donata* Caum, flowering panicle.

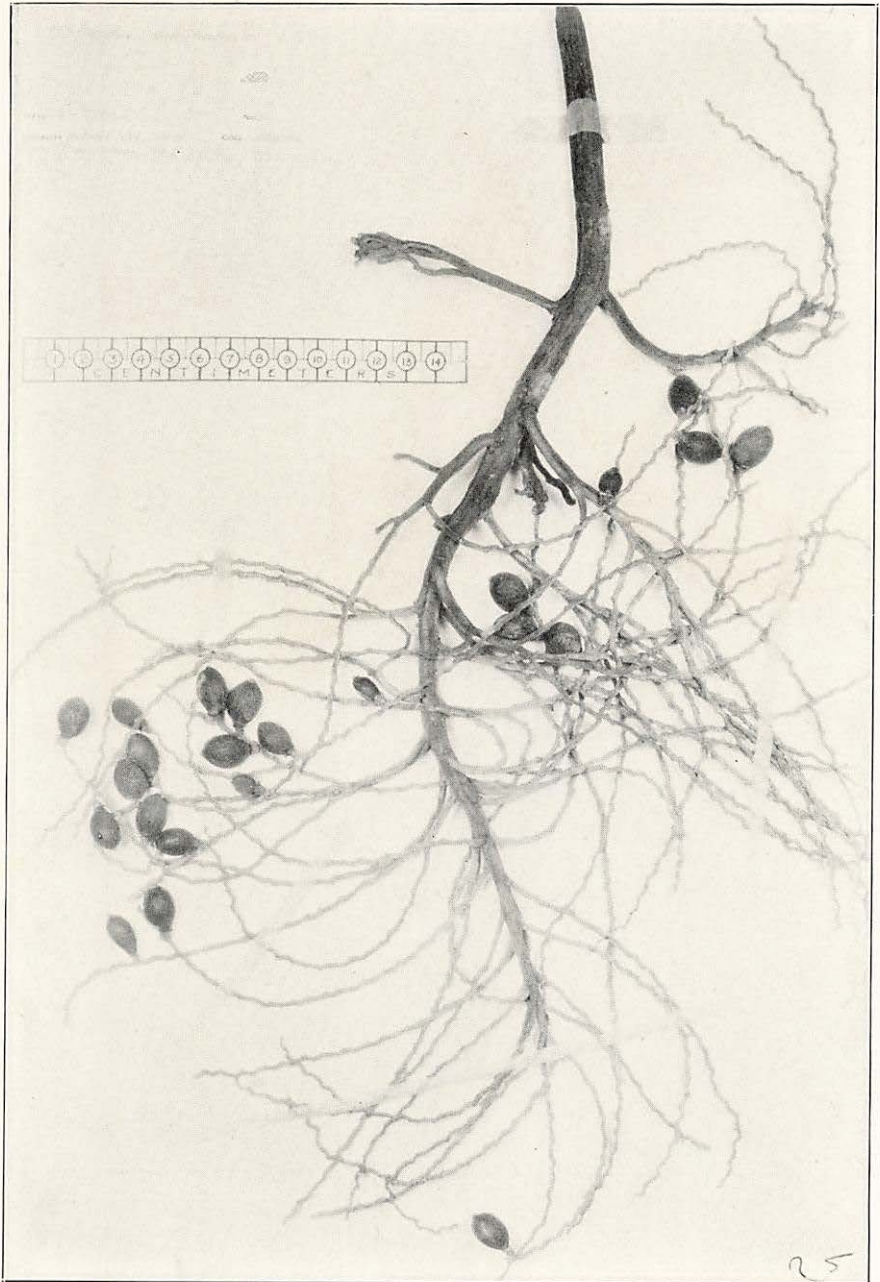


PLATE XI.—*Pritchardia kahukuensis* Caum. fructing panicle.



PLATE XII.—*Pritchardia kaalae* var. *minima* Caum, flowering panicle.

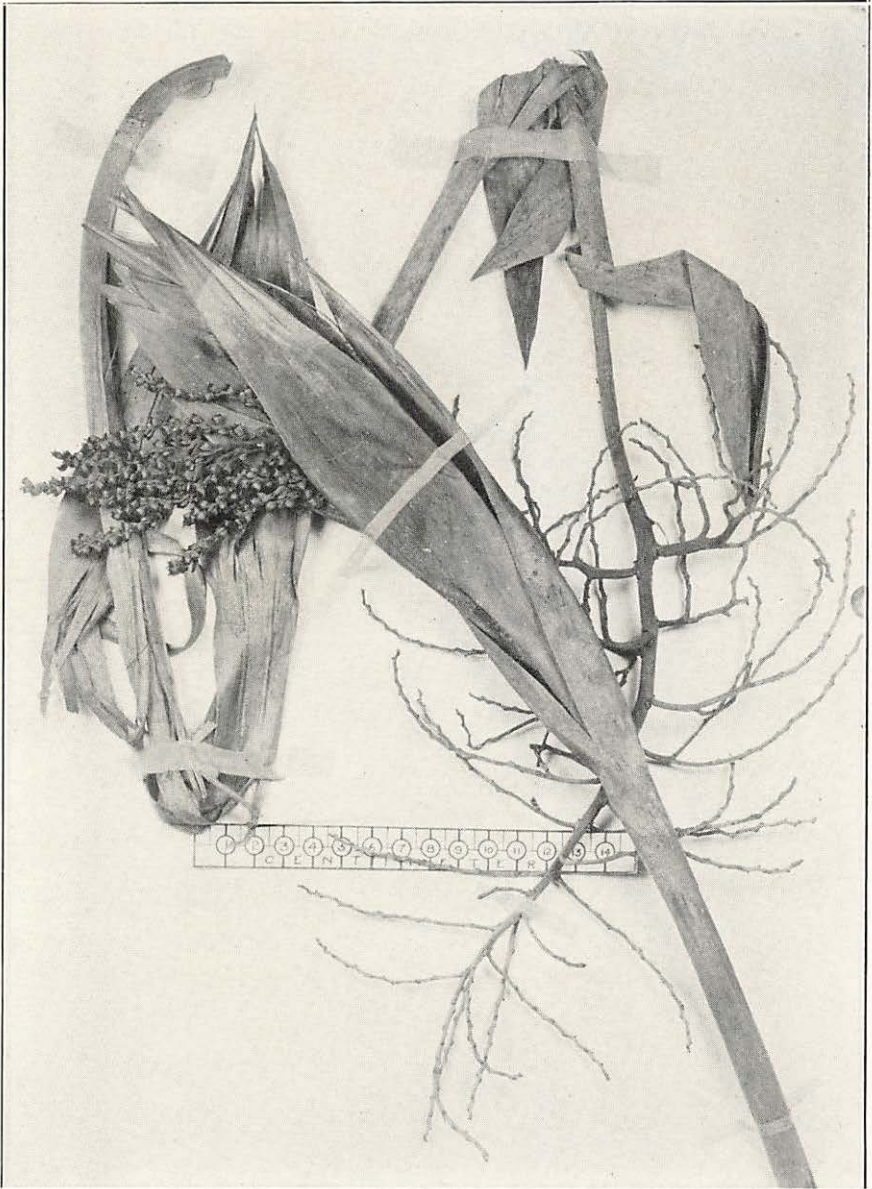


PLATE XIII.—*Pritchardia elliptica* Rock and Caum, old spadix and flowering panicle.

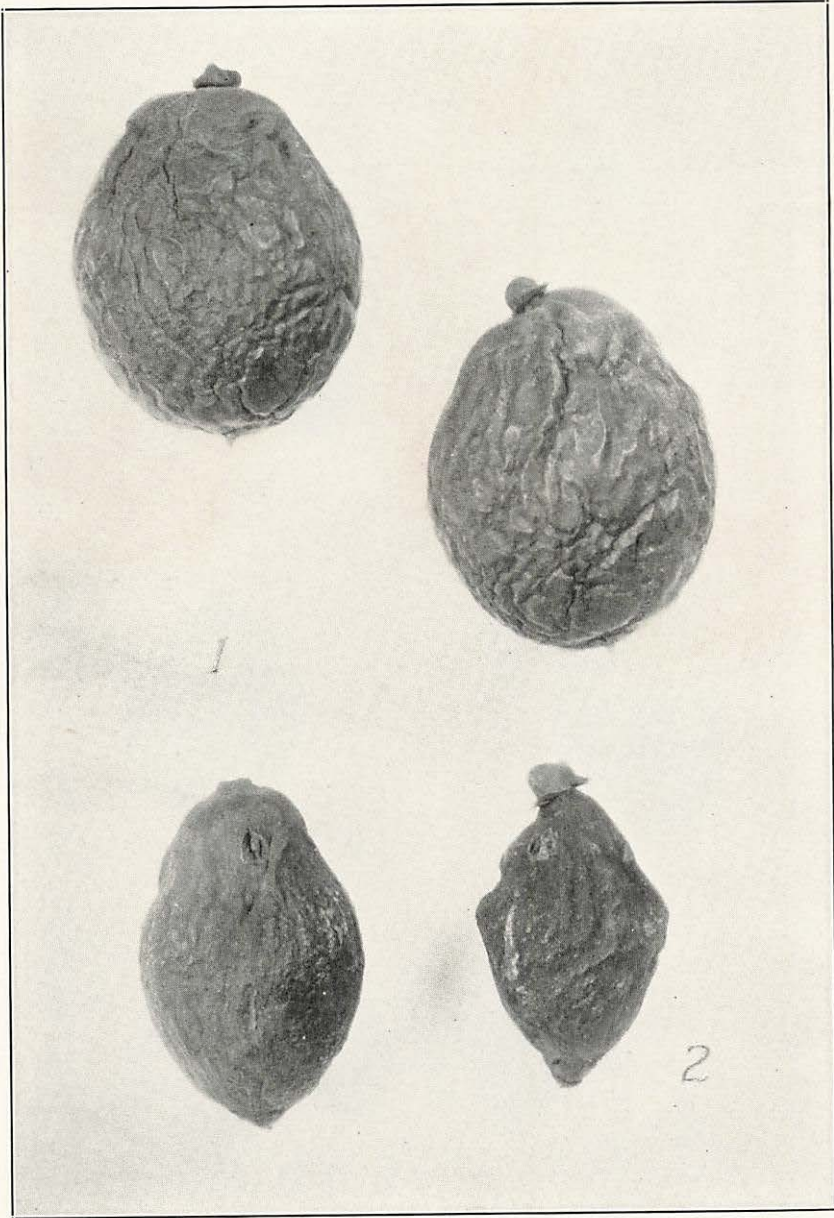


PLATE XIV.—Fruits of *Pritchardia* (natural size): 1, *Pritchardia donata* Caum; 2, *Pritchardia kamapuana* Caum. The specimens of *Pritchardia kamapuana* pictured are somewhat smaller than is typical, as the fruits were green when collected and have shrunk somewhat in drying.

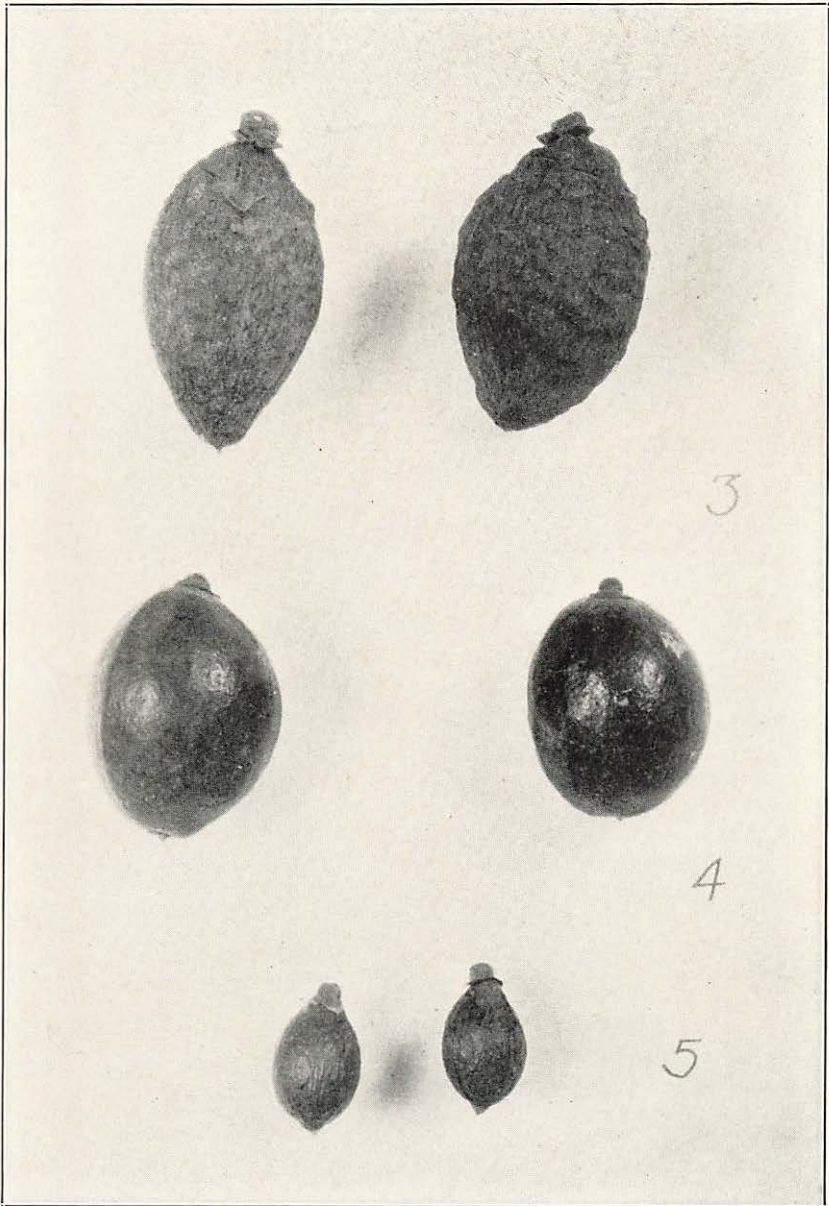


PLATE XV.—Fruits of *Pritchardia* (natural size): 3, *Pritchardia macdanielsi* Caum; 4, *Pritchardia elliptica* Rock and Caum; 5, *Pritchardia kahukuensis* Caum.