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New Hawaiian Lobeliaceae
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The Lobeliaceae (or tribe L.obelioideae) is a prominent and interesting part of the Hawaiian flora. It contains numerous endemic shrubs and trees, many of them with large and strikingly handsome flowers. It was carefully monographed by J. F. Rock [B. P. Bishop Mus., Mem. 7(2): 1-394, 1919]. Subsequent collecting in the wet mountain forests has revealed more endemics, some of which are here described.

Clermontia epiphytica St. John, spec. nov. (pl. 1).

Frutex 5 m. altus, foliis glabris, petiolis 4-6 cm. longis, laminis linear-oblancoelatis sparse crenato-serratis 6-14 cm. longis 16-30 mm. latis, cymis 2-3-floriferis, pedunculis 10-15 mm. longis subglabris, pedicellis 15-20 mm. longis glabris, floribus albis vel viridi-albis curvatis 3.3-4 cm. longis, lobis 2-3 mm. latis, lobis calycis corollaeque aequantibus, columnis filamentorum glabris albidis 3.3 cm. longis, antheris subviridibus 1 cm. longis, inferis penicillatis, baccis viridibus vel brunneis subglobosis truncatis 10-costatis, seminibus albis ellipsoideis 0.5-0.8 mm. longis.

Shrub 5 m. tall, 8 cm. in diameter, epiphytic on *Metrosideros collina*; bark on old stems gray or brown, with deep longitudinal fissures; bark of young stems green, smooth; leaf scars shield shaped or suborbicular, white, 2.5-3 mm. wide; leaves glabrous; petioles 4-6 cm. long; blades linear-oblancoelate, 6-14 cm. long, 16-30 mm. wide, remotely crenate-serrate, entire for the lower quarter, above dark glossy green, beneath pale glossy green; cyme 2-3-flowered; peduncles 10-15 mm. long, nearly glabrous; pedicels 15-20 mm. long, often arcuate, glabrous; perianth white or greenish white, 6 mm. in diameter, erect, gently curved, strongly reflexed 1/3 of their length, the dorsal sepal reflexed to one side, the others and all the petals reflexed to the opposite side; perianth segments linear, acute, 3.3-4 cm. long, 2-3 mm. wide; calyx lobes as long as the corolla, deciduous; staminal column glabrous, greenish white, 3.3 cm. long; anthers greenish, 1 cm. long, the lower two penicillate; berry 9-11 mm. in diameter, greenish to brownish, depressed globose, truncate, with 10 green ribs, dehiscing at the summit of the ovary; seeds white, ellipsoid, 0.5-0.8 mm. long.

¹ This is the seventh of a series of papers designed to present descriptions, revisions, and records of Hawaiian plants. The preceding papers have been published as B. P. Bishop Mus., Occ. Papers 10(4), 1933; 10(12), 1934; 11(14), 1935; 12(8), 1936; 14(8), 1938; 15(1), 1939.

Oahu: Waikakalaua Gulch, Waipio, Koolau Mountains, epiphytic on *Metrosideros*, near stream, alt. 1,200 ft., April 6, 1930, *H. St. John 10468*; same locality, Sept. 14, 1930, *H. St. John and E. Hosaka 10566* (type in Bishop Mus.).

The closest relative is *Clermontia micrantha* (Hbd.) Rock of west Maui and Lanai, but its leaves are linear-oblongate, light green with pinkish veins; the petioles 2-3.5 cm. long; the peduncles 2-5-flowered, 5 mm. long; the pedicels 5-12 mm. long; the calyx greenish pink; the corolla 2-2.7 cm. long, pinkish purple; the staminal column and anthers pruinose-bluish; and the berry orange, 15 mm. in diameter. As diagnostic differences, the new *C. epiphytica* has the leaves linear-oblongate, dark green above, with green veins; the petioles 4-6 cm. long; the peduncles 2-3-flowered, 10-15 mm. long; the pedicels 15-20 mm. long; the calyx greenish white; the corolla 3.3-4 cm. long, white or greenish white; the staminal column greenish white; the anthers greenish; and the berry greenish to brownish, 9-11 mm. in diameter. It is a member of the section *Clermontiae Genuinae*.

The specific name is taken in allusion to the epiphytic habit of the species.

Cyanea truncata Rock var. ***Juddii*** (Forbes) St. John, comb. nov. (pl. 2).

Cyanea Juddii Forbes, B. P. Bishop Mus., Occ. Papers 6(3) : 68, pl. p. 69, 1916.

Stems 1-1.8 meters tall, unbranched, erect, stout, glabrous, muricate, the part below the leaves green and 2.5-3 cm. in diameter; leaf scars pale or green, 20-27 mm. wide; leaves numerous in a terminal tuft, arched ascending with spreading tips; petioles 8-25 cm. long, 15 mm. in diameter at base, flattened on the upper side, stout, muricate, and minutely hispidulous, green or reddish tinged; blades 35-60 cm. long, 14-28 cm. wide, membranous, oblongate or obovate, acute, subcordate at base, glabrous and dark shining green above, pale green and puberulent beneath, the main lateral veins nearly straight but curved up at the tip and recurved to connect with the next vein, the margins slightly sinuate, white callous denticulate by the ends of the veins, slightly revolute; racemes several, axillary, with 200-400 flowers; peduncles hispid-muricate, commencing to flower at a length of 3 cm. but becoming 30 cm. long, 7-10 mm. in diameter, bracts 9-20 mm. long, foliaceous, oblong to oblong-spatulate, hispid-ciliate and sparsely hispidulous; pedicels 1-2 cm. long, ascending hispid-muricate, bearing near the middle two oblong, lanceolate, or spatulate bracts 5-6 mm. long; hypanthium in anthesis 5 mm. long, turbinate, green, sparsely hispidulous-muricate; calyx lobes 7-12 mm. long, 3-6 mm. broad, oblong or somewhat broadened towards the tip, thick, ascending hispidulous ciliate, elsewhere subglabrous, green and persistent on the fruit, the lower lobe distinctly larger than the others; corolla 32-42 mm. long, 7-9 mm. wide and of nearly constant width, falcate, only slightly flattened, magenta, with a few scattered small hairs.

the lobes white-tipped, split down less than 1 cm.; staminal column free, glabrous, white, 35 mm. long; anthers blackish purple, 5 mm. long, the upper glabrous, the lower penicillate; style 4 cm. long, magenta, stigma 2-lobed; summit of the ovary glabrous, magenta; fruit globose, orange, 8-10 mm. long; seeds yellowish, obovoid, 0.7 mm. long.

Oahu: Waiahole, Feb. 6, 1912, *C. N. Forbes 1744.O* (type in Bishop Mus.); Waiahole, July 1917, *H. L. Lyon 12830*; Waiahole, Dec. 1919, *J. F. Rock 17329*; Waikane-Schofield Trail, Waikane, in native banana grove by stream, alt. 800 ft., May 10, 1931, *H. St. John 11001*; same locality, April 17, 1932, *E. P. Hume 539*.

The description given here is an expanded one based upon added material and including the fruiting stage. Forbes' type collection contained only one short flowering peduncle, one petiole, and one fragment of a leaf.

Cyanea truncata is known only from Punaluu. The variety *Juddii*, as shown by the several collections, comes from Waiahole and Waikane. These are also on the windward slope of the Koolau Range, but are in an airline about six miles distant and are separated by one or two intervening valleys from the valley of Punaluu.

Rock, in his monograph (B. P. Bishop Mus., Mem. 7(2): 193, 1919), reduced *C. Juddii* Forbes to the synonymy of *C. truncata* Rock. Now that more ample material is available, the Waiahole plant is seen to differ in several characters. It is deemed worthy of varietal rank.

In the species *C. truncata* Rock, the plants are 3-4 dm. high; the peduncles in flower up to 7 cm. long; the calyx lobes 4-5 mm. long; and the corolla 5-7 mm. wide. In variety *Juddii* the plants are 1-1.8 meters high; the peduncles becoming as much as 30 cm. long; the calyx lobes 7-12 mm. long; and the corolla 7-9 mm. wide.

***Lobelia niihauensis* St. John var. *Forbesii* St. John, var. nov. (pl. 3).**

A specie differt in calycis lanatis.

Calyx lanate; flowers rose purple.

Kauai: Nonou Mountains, Oct. 16-17, 1916, *C. N. Forbes 607.K* (type in Bishop Mus.).

Though coming from Kauai, instead of from Niihau, this plant has all the specific characters of *Lobelia niihauensis*. It seems correctly placed as a variety of that species. It is named in honor of the collector.

***Lobelia niihauensis* St. John var. *meridiana* St. John, var. nov. (pl. 4).**

A specie differt in foliis 9-18.5 mm. latis sinuato-crenatis ad apicem maximis crenatis etiam ad basim, calycibus valde puberulentis, bracteis 5-10 cm. longis, corollis 22-25 mm. longis, filamentis 13-16 mm. longis.

A prostrate or drooping shrub, differing from the species in having its leaves 9-18.5 mm. wide, sinuate crenate beyond the middle and, on the larger leaves, crenate nearly to the base; the calyx tube densely puberulent; the bracts 5-10 mm. long; the corolla 22-25 mm. long; and the filament tube only 13-16 mm. long. In contrast, *L. niihauensis*, an endemic of Niihau, has the leaves 9-14 mm. wide, entire or occasionally minutely undulate towards the tip; the calyx tube glabrous or with a few lines of hairs; the bracts 3-5 mm. long; the corolla 25-28 mm. long, and the filament-tube 20-23 mm. long.

Oahu: Uluhulu Gulch, Kaena, rock ledge, Nov. 3, 1929, *H. St. John 9996* (type in Bishop Mus.). Dr. Vladimir Krajina probably has specimens of this plant from the same locality, as he was a companion on this collecting trip.

At first sight this plant closely simulates *L. niihauensis* which is known only from the low arid island of Niihau. The differences are in size and toothing of the leaf, pubescence of calyx tube, and the size of the flower. None of these characters seems important enough to be of specific value. Hence, the plant is here described as a new variety.

There is another variety which inhabits Kauai that is also described as new in this paper. So now, the species and its varieties are known from Niihau, Kauai, and Oahu, the three northern islands of the main group of Hawaiian islands.

The type locality is near the northwest end of the island of Oahu. From the shore there is a gradual ascent across a dry open slope and alluvial cones to the foot of the Waianae Mountains which drop off here into a steep precipice. This meets the gentler lower slopes at about the 400-foot contour line. So steep is the precipice that it is not possible to climb far. We ascended Uluhulu Gulch for a short distance, then skirted the headland to the west. Here, at about 500 feet elevation, were a number of bushes of *Lobelia*, rooted on nearly inaccessible ledges with their contorted branches prostrate or hanging down the face of the precipice.

The varietal name is coined from the Latin adjective, *meridianus* (southern).

Lobelia tortuosa Heller var. ***intermedia*** St. John, var. nov. (pl. 5).

Foliis glabris, pedicellis glabris, calycibus sparse ciliatis, floribus glabris.

Leaves glabrous; axis of raceme and pedicels glabrous; calyx tube glabrous, the lobes sparsely hispidulous; and the corolla glabrous.

Kauai: Kalalau Trail, July 19, 1909, *C. N. Forbes and C. H. Dole 70.K.* (Type in Bishop Mus.).

While preparing to describe as new *Lobelia niihaucensis*, certain atypic specimens were found in the cover of the related *L. tortuosa*. The collection from the Nonou Mountains, Kauai, *Forbes 607.K* was quickly and definitely placed as a pubescent variety of *L. niihaucensis*. The other collection, *Forbes and Dole 70.K*, from the Kalalau Trail, Kauai, two excellent sheets, was very puzzling. In general habit and appearance, it was like *L. tortuosa*, and it had the narrowly lanceolate, long-acuminate leaves of that species. As in *L. niihaucensis*, the leaves are glabrous; the calyx tube glabrous, the lobes sparingly hispidulous; and the corolla glabrous. From both species it differed in having the axis of the raceme and the pedicels glabrous. This might be made the basis of a new species, but it too closely resembles *L. tortuosa* and grows on the same island, though on the opposite side on the precipitous windward cliffs of the Napali Coast. Its leaf form and structure diverge from those of *L. niihaucensis*. It might be a hybrid between these two species. Since it possesses some characters not seen in either alleged parent and since its native region is remote from that of one of these possible parents, it seems wiser not to call it a hybrid. It is in many ways intermediate between the two species, but its closest affinity seems to be with *L. tortuosa*, an endemic species of the same island. Hence, it is here described as a variety of that species.

The varietal name is taken from the Latin adjective *intermedius* (that which is between).

Rollandia bidentata St. John, spec. nov. (pl. 6).

Frutex 4 dm. altus, caule muricato, petiolis 5-7 cm. longis muricatis, laminis 21-28 cm. longis 8-11 cm. latis lanceolatis elliptico-oblancoatisve breve acuminatis basim rotundatis inaequalibus, superne glabris et sparse papillosis inferne hispidulis marginibus bidentatis denticulatisque, racemis axillaribus 3-8-floriferis, floribus 6 cm. longis atro-purpureo-lineatis tinctisque, antheris superioribus minute papillosis.

Erect plant with a single simple green stem, 4 dm. or more in height, 15 mm. in diameter, dark or purplish muricate, prickly throughout, white hispidulous above, below glabrate; leaves remote and divergent; petioles 5-7 cm. long, about 5 mm. in diameter, slightly flattened above, purplish tinged, appressed white hispidulous, with dark, broad based, spine-tipped murications; leaf blades 21-28 cm. long, 8-11 cm. wide, lanceolate or more commonly elliptic-oblancoate, short acuminate, rounded at base but the two halves very unequal at base; upper leaf surface dark green, glabrous except for prominent scattered conical-based, mucronate papillae, few or none towards the base but numerous beyond the

middle; the midrib prominent, it and the lateral veins dark muricate, all the ribs and veins white hispidulous; lower leaf surface pale green, depressed below each papilla of the upper surface; the leaf margins coarsely doubly dentate and callous denticulate by the protruding tips of the major veinlets; racemes several, axillary, divergent or subascending, purplish tinged, appressed white hispidulous, 3-8-flowered near the tips, remotely bracted below; peduncles 3-5.5 cm. long, 3-5 mm. in diameter, the bracts oblong-deltoid, 2-5 mm. long; pedicels 12-20 mm. long, bibracteolate 1/3 from the base or below, the bracteolae oblong, 1-2 mm. long; hypanthium narrowly oblong conical, 9-12 mm. long, with 10 hispidulous, purplish ribs; calyx lobes unequal, broadly cordate, obtuse, overlapping at base, 6-8 mm. long; corolla strongly falcate, strongly laterally compressed, 8 mm. broad at the middle, 6 cm. long, white near the middle, with magenta-purple stripes and blackish purple tips, the lobes hispidulous along their mid-ribs; staminal column adnate less than 1/3 its length, short white hispidulous below, white hispidulous towards the apex; anther sacs magenta-purple, white margined, densely retrorsely hispid with rose-purple hairs at base, white appressed hispidulous along the connectives and sparsely so on the lines of dehiscence; tips of lower anthers abundantly penicillate; tips of upper anthers yellowish and merely papillose; fruit unknown.

Oahu: Puu Kanehoa, Waianae Mountains, Honouliuli, wooded ridge, alt. 2,600 ft., March 22, 1931, *H. St. John 11038* (type in Bishop Mus.).

From the small size of this plant and from the fact that it is flowering for the first time, one might suspect it to be a mere juvenile state of some well-known species. However, it is mature enough to have produced several mature racemes, yet the leaves remain true to type. There is no hint of a transition from a juvenile to a mature foliage. It, thus, shows every evidence of maturity and none of a juvenile condition. Even without the leaf characters, it is abundantly distinct in inflorescence and flower characters from the known species of *Rollandia*.

Except for *R. parvifolia* from Kauai, all the rest of the genus, ten species and five varieties, occur only on the island of Oahu. Of the Oahu species, all but one are restricted to the extensive rain-forests of the Koolau Range. *R. kaalae* is known only from the original collection by Wawra on Mount Kaala, the highest peak of the Waianae Mountains. It is of no little interest to add two new species to this genus, in view of their occurrence in the Waianae Mountains. They grew near each other at the upper limit of the narrow band of rain forest lining the eastward or windward slope from the middle slopes to the divide.

The most similar known species is *R. calycina* (Cham.) G. Don which has leaves acute, unevenly crenulate or dentate, tomentose be-

low; the pedicels 2.5-3 cm. long, bibracteolate at the middle; the corolla up to 8 cm. long, dark purplish red with blackish stripes; the staminal column adnate less than $\frac{1}{2}$ its length, slightly pubescent; the anthers hairy along the base and sutures, all penicillate at apex. In contrast, *R. bidentata* has the leaves short acuminate, coarsely doubly dentate and callous denticulate, hispidulous on the veins below, the upper leaf surface perhaps not so papillose hispid; the pedicels 12-20 mm. long, bibracteolate $\frac{1}{3}$ from the base or below; the corolla 6 cm. long, white with magenta-purple stripes and blackish purple tips; the staminal column adnate less than $\frac{1}{3}$ its length, abundantly hispidulous; and the upper anthers not penicillate, all anthers hispidulous at base and along the connectives and margins.

The specific name is from the Latin, *bi-* (twice), *dens, dentis* (tooth).

***Rollandia waianaensis* St. John, spec. nov. (pl. 7).**

Frutex 1-2 m. altus, petiolis 5-7 cm. longis, laminis 33-49 cm. longis 7-11 cm. latis oblanceolatis cuneatis superne glabris inferne albo-hispidulis marginibus undulatis crenatisque, racemis axillaribus multifloris, corollis 5-6 cm. longis purpureo-lineatis tinctisque, antheris superioribus ad apices glabris.

Stout plant with a single simple stem, 1-3 m. tall, 2.5-4 cm. in diameter, short hispidulous at tip, becoming smooth and green; leaf scars rounded shield-shaped, 12-14 mm. wide; leaves numerous at the summit of the stem, mostly arched ascending; petioles stout, flattened above, 8-12 mm. in diameter, 3-9 cm. long, brownish, hispidulous, occasionally with a few scattered papillae; blades 33-61 cm. long, 7-14.5 cm. wide, oblanceolate, cuneate at base, dark green and shining above, glabrous above, the lower surface pale green, the midrib, lateral veins, and the secondary veins raised and prominent, densely white hispidulous on the veins beneath, the margins undulate and crisped, minutely crenate with white cartilaginous thickened veinlet tips; racemes numerous, axillary; peduncle 4-9 mm. thick, ascending, puberulent, purple, bracted below, 10-25- or more-flowered; bracts purplish, lanceolate or spatulate, 2-7 mm. long; pedicels 10-20 mm. long, 2-3 mm. in diameter, purplish to green, white puberulent, bibracteolate below the middle, the bracteoles oval or elliptic, glabrate at least on the back, 2-3 mm. long; calyx green or blackish purple or magenta, sparsely white puberulent; hypanthium obovoid-obconic, becoming green, 8-10 mm. long; calyx teeth 3-7 mm. long, rounded oblong, broader than long, often cordate-eared and overlapping at base, obtuse or emarginate; corolla 5-7 cm. long, dark purple but white striped below, or purple at tip and white below, or only purple striped, 9-12 mm. broad at the middle, sparsely puberulent towards the tip, staminal column purple, adnate to the corolla for half its length, white pilose, especially so above the point of adnation, anthers 8-14 mm. long, purplish black, densely retrorsely white hispidulous at base, white hispidulous with ascending hairs along each connective and line of dehiscence, lower anthers strongly white penicillate at tip, upper anthers glabrous at tip; fruit unknown.

Oahu: Puu Kanehoa, Waianae Mts., Honouliuli, wooded ridge, alt. 2,600 ft., March 22, 1931, *Edward Y. Hosaka 373* (type in Bishop Mus.); Kaala, Waianaeuka, in moist woods, alt. 2,950 ft., side ridge, April 3, 1931, *E. P. Hume 149*; east ridge to Kaala, Waianaeuka, steep ridge, dwarfed woods, alt. 3,200 ft., April 24, 1932, *E. P. Hume 523*; Puu Kaala, Waianaeuka, moist woods, alt. 3,000 ft., side of east ridge, May 17, 1931, *H. St. John 11093*; Puu Kaala, Waianaeuka, lower woods, alt. 2,000 ft., May 17, 1931, *H. St. John 11094*; Puu Kaala, Waianaeuka, Waianae Mts., near crest of moist, wooded east ridge, alt. 2,500 ft., 8 ft. erect shrub, May 8, 1932, *H. St. John 11634*.

Not uncommon in the upper forest on the eastern slope, just below the divide of the Waianae Mountains. The nearest congener is *R. lanceolata* Gaud. var. *grandifolia* DC. which has the nerves of the lower leaf surface and the petioles with short spiny protuberances; the raceme bracts broad and strongly cuspidate at apex; the hypanthium shining and glabrous; the calyx teeth 1.5 mm. long, triangular, mucronulate; the corolla deep purple, glabrous; the staminal column reddish, hirsute with purplish hairs; and the anthers whitish pubescent throughout, the upper tufted or ciliate at apex. On the other hand, in the new *R. waianaeensis* the nerves of the lower leaf surface and the petioles are without spiny protuberances; the raceme bracts oblong, obtuse; the hypanthium puberulent; the calyx teeth 3-5 mm. long, rounded-oblong, obtuse; the corolla dark purple, but white striped below, sparsely puberulent especially towards the tip; the staminal column white pilose; and the anther blackish purple, white hispidulous at base and on each suture and connective, the upper glabrous at tip.

The specific name is coined from the name of the mountain range, Waianae; with the Latin place ending, *-ensis*. The Hawaiian place name is treated as an indeclinable foreign noun and the suffix is added directly to it. Some authors in compounding such names have treated the Hawaiian place names as Latin nouns and removed one or more of the final vowels, in the attempt to reach the word root. Thus plants from Maui have been called *Maviensis* and those from Kauai, *Kauaensis*. I feel that this method is unnecessary and confusing. Hawaiian and other Polynesian names often have many successive vowels, and have no word root comparable to the Latin. Some Hawaiian place names are all vowels, as Aiea or Auau. If one or more final vowels are cut off, these names are unrecognizable. I recommend that Polynesian place names be treated as indeclinable foreign nouns, and that they be used unchanged in compounding botanical names.



PLATE 1.—*Clermontia epiphytica* (type).

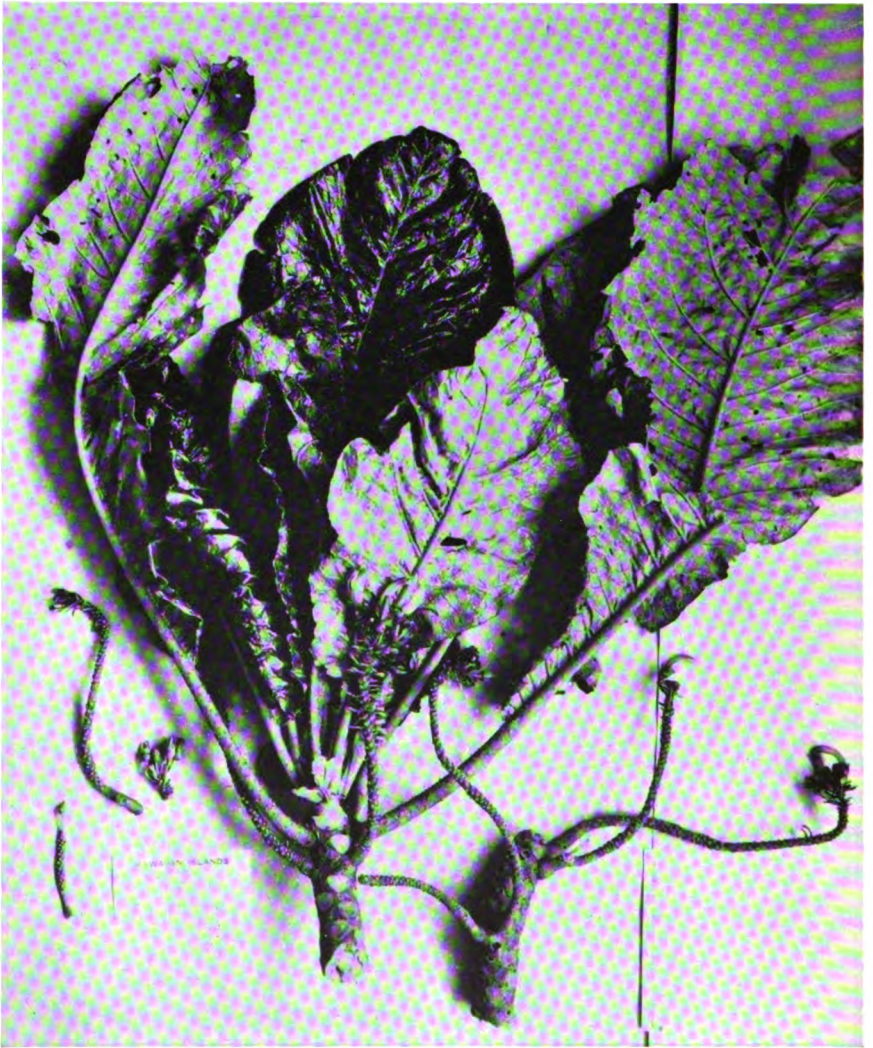


PLATE 2—*Cyanea truncata* var. *Juddii* (St. John 11091).

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PLATE 3.—*Lobelia nīhauensis* var. *Forbesii* (type).



PLATE 4.—*Lobelia nīhauensis* var. *meridiana* (type).



PLATE 5.—*Lobelia tortuosa* var. *intermedia* (type).

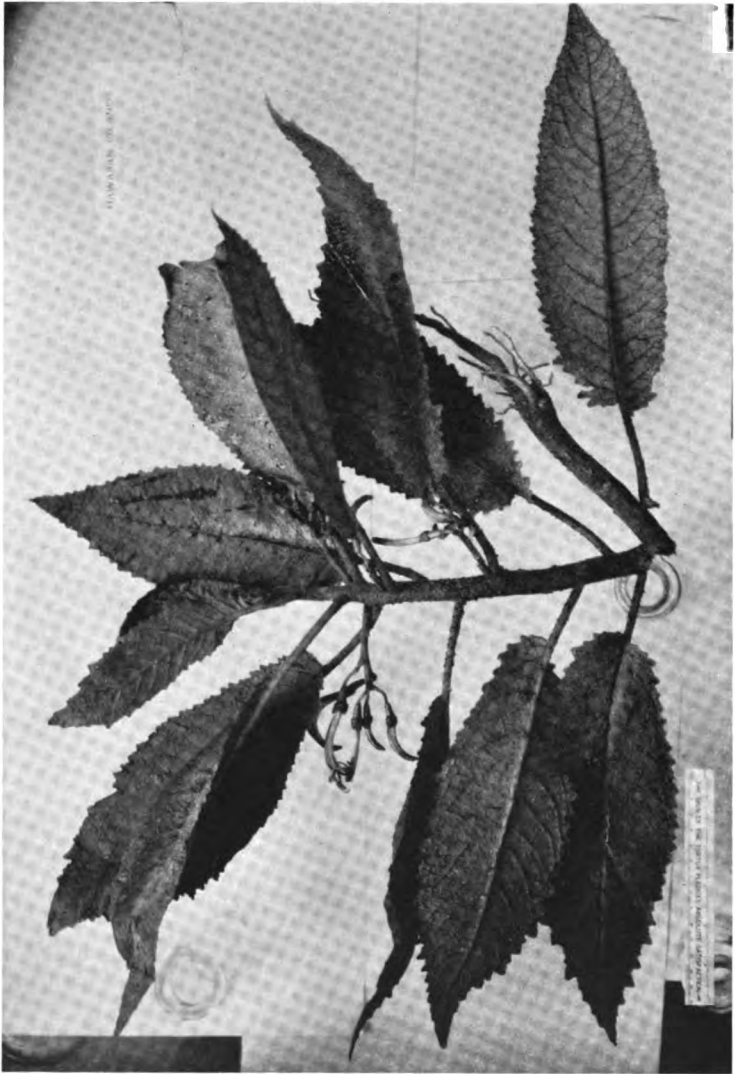


PLATE 6.—*Rollandia bidentata* (type).



PLATE 7.—*Rollandia waianaensis* (type).