

Revision of the Genus *Pandanus* Stickman, Part 34 Four Species from the Philippines

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THE GENUS *Pandanus* has been much investigated by the botanists resident in the Philippines, but a few novelties have come to light. The author's studies of this large and intricate genus have been supported by grants from the National Science Foundation.

Section *Acrostigma*

Pandanus Copelandii Merr., P. I. Bur. Govt. Lab., Publ. 17:7, 1904, (as *Copelandi*), emended by Merrill to *Copelandii*, Enum. Philipp. Pl. 1:15, 1923; Martelli, Philipp. Jour. Sci. 3 C:71, 1908; Webbia 4(2):t. 31, figs. 5-7, 1914.

P. muricatus Elmer, Leaf. Philipp. Bot. 1: 76, 1906, non Thouars (1808).

(In 1904 Merrill published this as *P. Copelandi*, but in 1908 Martelli altered it to *P. Copelandii*, and Merrill so accepted it in 1923. As this is a permissible emendation, and one made by the original author, it is here accepted.) (sect. *Acrostigma*)

Figs. 295-296.

NOM. VERN.: "barieu," on Leyte (Visayan language).

DIAGNOSIS OF HOLOTYPE: (Quoted from Merrill's original description, with a few supplementary details observed on the clastotype in Firenze.) Plant erect, unbranched, about 2 m tall; leaves 1-1.5 m long, 5.5-6 cm wide, shining above, glaucous beneath, ligulate, coriaceous, at the point 6 or 7 cm from the apex 3.5 cm wide and from this point tapering abruptly to the acute apex, near the base with 61 parallel secondary veins in each half and on the lower side with tertiary cross veins forming short oblong meshes, the margins and midrib beneath spinously toothed, the teeth pale, coarse

toward the base and 3-4 mm long, but toward the apex the margins and midrib below finely and densely serrate; the marginal teeth antrorse throughout, those on the midrib retrorse below, antrorse above, and to this is added that on the leaf fragment from near the base the margins are with prickles 2.5-3 mm long, 3-6 mm apart, obliquely deltoid, compressed, salient or slightly ascending, yellowish; flowers unknown; rhachis 50 cm long, 1.5 cm thick, triangular; syncarps solitary or racemed, nearly sessile, 7-9 cm long, 5-6 cm in diameter, elliptical or subspherical, red; drupes very numerous, "14 mm. long, 3 or 4 mm. in diameter," becoming 19-22 mm long, 3.5-4 mm in diameter, 2-3 mm thick, the body narrowly ellipsoid, the pileus conical or ovoid, 4.5-5 mm high; style 5-6 mm long, subulate, curved upward; endocarp "3" but becoming 7 mm long, bullet-shaped, the walls 0.1 mm thick, stramineous; seed 2.5-3 mm in diameter; basal mesocarp fibrous up the sides, fleshy within.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Shrub 2-4 m tall, forming thickets, or even tree-like and 6.7 m tall; trunk 7.5-13 cm in diameter, ringed with leaf scars, and with blunt spines; branches none or few and short; aerial roots short; leaves copious, 1.08-2.25 m long, (3.3-) 4.2-5.8 (-8.3) cm wide, coriaceous, deeply U-grooved above and 2-pleated, at midsection with (48-) 57-68 (-80) parallel secondary veins in each half, on the lower side toward the base the tertiary cross veins visible, forming short oblong meshes, the blade ascending, recurving above the middle, green and shiny above, below paler and glaucous, ligulate, slightly cuneate, tapering in the outer $\frac{1}{6}$ or $\frac{1}{8}$ to the apex which usually has a slender subulate acumination, rarely is merely acute, the base unarmed, but beginning 4-8.5 cm up the margins with prickles 1-2.5 mm long, 1-6 mm apart, arcuate stout subulate, compressed, ascending, pale; the midrib below beginning at 5-18 cm up with prickles 1-3 mm long, 2-10 mm apart,

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stout arcuate subulate, reflexed, pale; at mid-section the margins with prickles 1.5–3 mm long, 4–11 mm apart, arcuate, compressed subulate, ascending, pale; the nearby midrib below with prickles 0.3–0.8 mm long, 3–5 mm apart, arcuate subulate, strongly ascending, pale; near the apex the margins and midrib below with subulate-serrulations 0.3–0.7 mm long, 1–5 mm apart; on the upper side toward the apex the two pleats with sharp, strong serrulations 0.5–0.9 mm long, 1–9 mm apart; pistillate inflorescence inodorous; peduncle 50–100 cm long, 10–15 mm in diameter, trigonous; rhachis usually with 3–8 crowded, spicate syncarps, each subtended by a 10-cm caducous bract, (rarely "with a solitary syncarp"); syncarps 7–11 ("–15") cm long, 4–6.5 ("–7") cm in diameter, ellipsoid (rarely subglobose), bearing numerous drupes; drupes 19–23 mm long, 3.5–5 mm wide, 2–3 mm thick, 5–6-angled, almost fusiform but the body narrowly ellipsoid; pileus 4.5–6 mm high, from lance-conic to ovoid, angled; style 5 mm long, stout subulate, slightly curved proximally; stigma 3.5–4 mm long, linear, brown, papillose, not extending to the tip; endocarp in lower $\frac{1}{3}$, hard but only 0.1 mm thick, bullet-shaped, stramineous; seed 2.5–3 mm in diameter; basal mesocarp fibrous up the sides, fleshy within.

STAMINATE PLANTS (*Elmer* 8,309 and *Rosebluth* 15,268): Leaf 1.92 (+0.04?) m long, 5.5 cm wide, at midsection with 58 parallel secondary veins in each half, pleats of the upper surface unarmed; staminate inflorescence 80 or more cm long, with conspicuous bracts, all but the lowest wholly herbaceous and yellow; lowest bract 75 cm long, 5 cm wide, the lower half herbaceous and yellow, the upper half green, coriaceous and here the margins and midrib below with rigid subulate prickles, and the pleats serrulate above, the apex stout trigonous subulate; middle bract 30 cm long, 3.5 cm wide, ligulate, mostly unarmed, abruptly contracted to a 17-mm subulate, serrulate apex;

spikes 4 or more, 7–9.5 cm long, 10–12 mm in diameter, dense; free filament tips 0.2 mm long; base of connective broadly lanceolate; anthers 4.3–4.5 mm long, linear, bearing a subulate prolongation of the connective 0.3–0.5 mm long.

HOLOTYPE: "No. 140, Copeland, Gimagon River, Negros, January 5, 1904; growing in forests at an elevation of about 100 m," (specimen once in PNH, but now destroyed). Clastotype seen (FI)! Martelli had altered the data to: Gunagon River, Panay (FI)! In any case, *P. muricatus* Elmer (1906) is a later homonym of *P. muricatus* Thouars (1808) for a species of Madagascar.

SPECIMENS EXAMINED: Philippines,

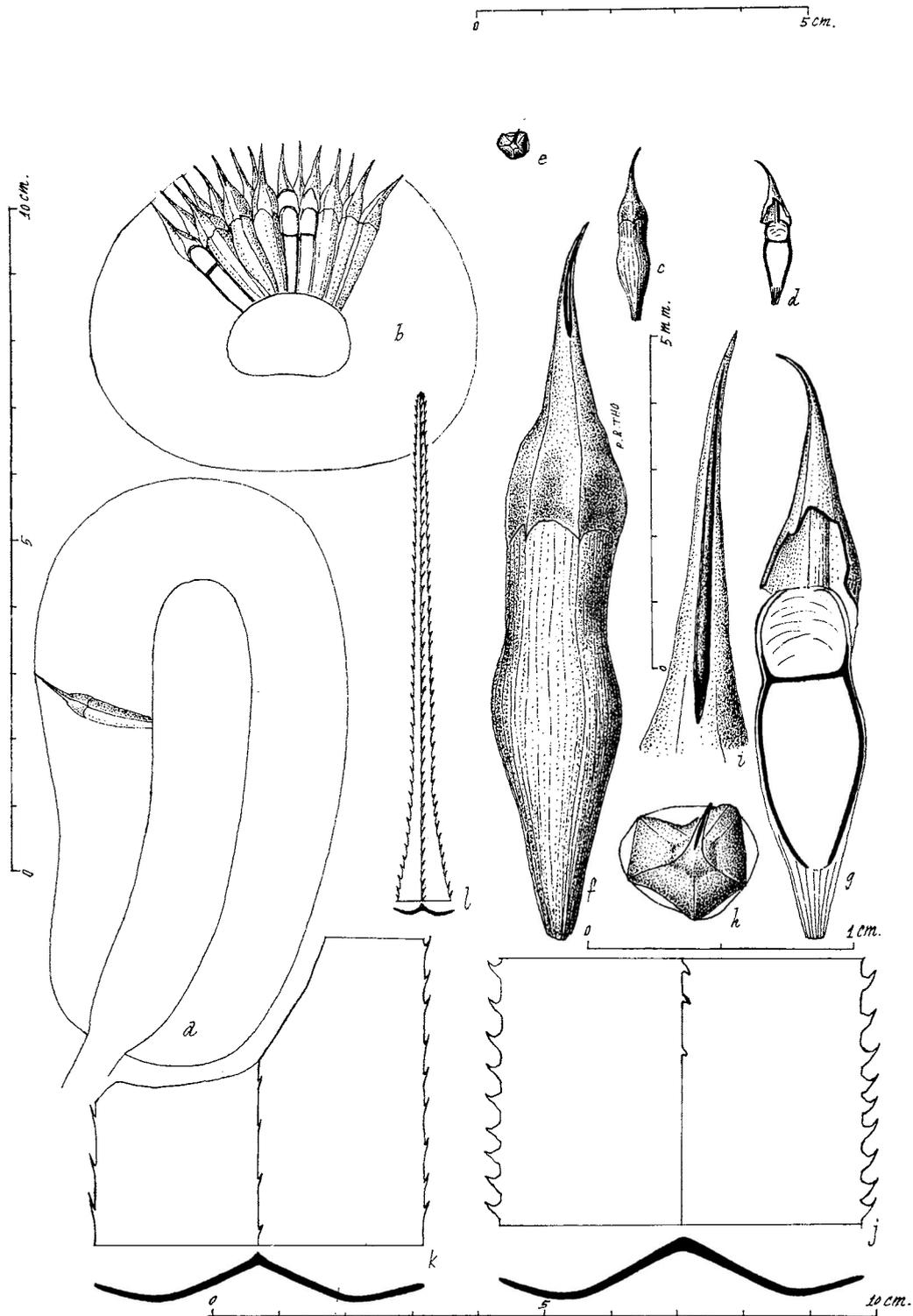
Luzon: Cagayan Prov., *H. M. Curran* 17,091, and 17,814 (FI); Pangasinan Prov., *Curran & M. L. Merritt* 8,361 (US); Mt. Magnas, Apayao Subprov., forested ridge, 550 m alt., June 7, 1953, *G. E. Edaña* 19,766 (L); Lucuban, *A. D. E. Elmer* 7,805 (BO, FI, G), and 8,309 (FI), and 9,081 (FI, US); Irosin, Mt. Bulusan, Sorsogon Prov., April 1916, *Elmer* 15,267 (FI, G, K, L, MO, P, U, UC, US); Savland, *E. Fénix* 984 (FI, G, US); Apayo Subprov., May 1917, *Fénix* 28,159 (US); Mt. San Isidro, Labrador, Pangasinan Prov., Nov. 1917, *Fénix* 29,879 (P); Cagayan Prov., *W. Klemme* 11,288 (FI); Limutan, *A. Lober* 1,571 (K, FI); Dupax, *R. C. McGregor* 11,227 (FI, L, P); Laguna Prov., *McGregor* 23,186 (US); Cagayan Prov., *M. Ramos* 14,539 (FI); and 16,632 (FI, K, L, P, US); Sorsogon Prov., 1915, *Ramos* 23,476 (US); Paracale, Camarines Prov., Nov.–Dec. 1918, *Ramos & Edaña* 33,760 (L); Kinagumar, *Rosebluth* 15,268 (FI); Sablan, Benguet, Nov. 18, 1904, *R. S. Williams*, 1,549 (K, US).

Polillo I.: Oct.–Nov. 1908, *R. C. McGregor* 10,472 (L); Aug. 1909, *C. B. Robinson* 6,892 (P).

Catanduanes I.: *Ramos* 30,362 (US).

Batan I.: Albay, Aug. 23, 1908, *C. B. Robinson* 6,223 (L).

FIG. 295. *Pandanus Copelandii* Merr., from clastotype. *a*, Syncarp, longitudinal section, $\times 1$; *b*, syncarp, cross section, $\times 1$; *c*, drupe, lateral view, $\times 1$; *d*, drupe, longitudinal median section, $\times 1$; *e*, drupe, apical view, $\times 1$; *f*, drupe, lateral view, $\times 4$; *g*, drupe, longitudinal median section, $\times 4$; *h*, drupe, apical view, $\times 4$; *i*, style and stigma, lateral view, $\times 10$; *j*, leaf base, lower side, $\times 1$; *k*, leaf middle, lower side, $\times 1$; *l*, leaf apex, lower side, $\times 1$.



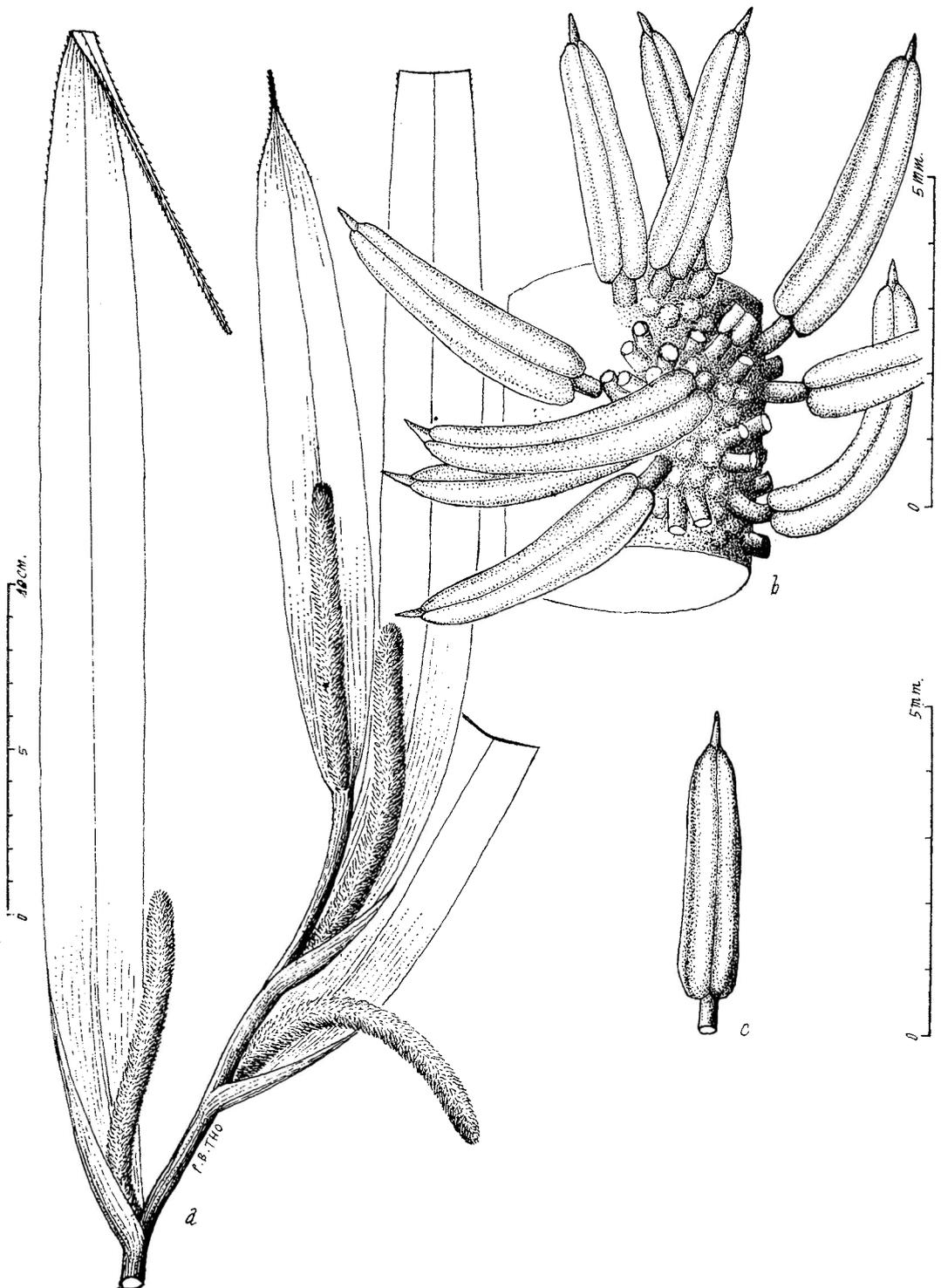


FIG. 296. *Pandanus Copelandii* Merr., from Elmer 8,309. *a*, Staminate inflorescence, $\times \frac{1}{2}$; *b*, spike axis and stamens, $\times 10$; *c*, stamen, lateral view, $\times 10$.

Mindoro: Mount Yagaw, S. E., May 5, 1958, *H. C. Conklin* 37,950 (L); Naujan, Nov.–Dec. 1925, *Ramos* 46,452 (L, UC).

Samar: Borongan, *E. D. Merrill* 5,215 (FI, L, P, US).

Panay: Hamanay, Capiz Prov., Oct. 14, 1925, *Edaño* 46,103 (MO).

Leyte: Palo, *Elmer* 7,201, type number of *P. muricatus* Elmer (BO, E, FI, G, K).

Bucas Grande I.: *Ramos & J. Pascasio* 35,121 (US).

Mindanao: Surigao, *F. H. Bolster* 203 (UC, FI, US); Camp Keithly, *M. S. Clemens* 679 (FI); Todaya, *Elmer* 11,901 (E, FI, G, K, L, MO); Tanculan, *Fénix* 26,155 (FI, G, US); Surigao, *E. A. Mearns* (US); Tuñgao So., San Mateo Bo., Butuan, Agusan, May 30–June 26, 1961, *R. D. Mendoza* 42,221 (L); Mati, Davao Prov., Mar.–April 1927, *Ramos & Edaño* 49,053 (UC), and 49,323 (UC).

Palawan: bosque del Puerto Princesa, Dec. 1905, *Bermejos* 232 (FI).

DISCUSSION: *P. Copelandii* was first published by Merrill, with a description but without any illustration. Later, Martelli published illustrations of the drupes (*Webbia* 4(2):t. 31, figs. 5–7, 1914), but he chose to make these only from the immature drupes in his clastotype. The new figures here presented are made from the mature drupes forming part of the same specimen.

P. Copelandii is one of the few species in the genus with a considerable geographic range, occurring from Luzon south to Mindanao, but the localities are all within the Philippines.

In the original description by Merrill of the Negros specimen it was stated that the peduncle was 50 cm long and that the syncarps were elliptical or subspherical. Later, when Elmer found plants on Leyte, he noted that the peduncles were 1 m long and that the syncarps were cylindrical with rounded ends. Upon this basis he described his collection as *P. muricatus* Elmer. It can be seen that the suborbicular syncarps are rare and exceptional. The usual ones are narrowly ellipsoid or cylindrical with rounded ends, there being no significant difference. Also the length of the peduncle is variable and of no significance. Merrill described his leaves as with an acute, not acuminate, apex. The sheet bearing a leaf which he lent to Martelli had the

apex broken and gone, and no other isotype or clastotype has been found in any of the principal herbaria. Hence that character on the type specimen cannot be verified. Ordinarily the leaves are with a short or long acumination. Martelli discussed the problem (*Philipp. Jour. Sci.* 3 C: 71–72, 1908) and concluded that the leaf tips were variable and that *P. muricatus* must be reduced to synonymy, and with this conclusion the writer concurs.

The leaves of this species contain strong fibers, and hence are used by the Philippine natives for the making of bags, baskets, and mats.

The termination of the epithet *Copelandii* deserves discussion. It was published originally as *P. Copelandi*; that is, the epithet was the genitive case of a Latin noun. In the 1961 edition of the International Code, Art. 73, Note 3 requires for such epithets the use of the termination -ii, thus requiring that all such personal specific epithets must be adjectival. This is also covered by Rec. 73C, and similar advice as to how to form new names is under Rec. 73 A to H. Of all these only Rec. 73C is now singled out and repeated as a law. This is contrary to long practice and to the Prin. V, which states that all names "are treated as Latin," and follow the rules of Latin grammar. Grammatically an epithet can be the genitive of a noun or a noun in apposition, just as well as an adjective. This arbitrary rule, on the -ii, was introduced in the rules in the 1930 edition, apparently on the advice of a Latin professor. He required that epithets be only adjectives. This view may reflect excellent Latin, but it showed ignorance of long established botanical nomenclature. Despite all this, Art. 73, Note 3 requires the use of the -ii. Nevertheless, it is inconsistent with Rec. 23A which states that epithets may be nouns in the genitive, and it is in direct conflict with Art. 23, paragraph 2, which states, "The epithet of a species may be taken from any source whatever, and may even be composed arbitrarily." Under this article Merrill had every right to publish the epithet *P. Copelandi*. The epithet was not ungrammatical and it was not published in error. Martelli in 1908 had no right to "correct" the ending to -ii, since the spelling with one -i was not an orthographic error. Art. 73, paragraph 1, clearly covers this. But later, in 1923, Merrill himself changed the

name to *P. Copelandii*. This emendation we must accept, since the original author has the right at a later time to correct names or epithets that he himself had previously published.

Pandanus cubicus sp. nov. (sect. *Dauphinensia*)

Fig. 297

DIAGNOSIS HOLOTYPE: Radices truncus ramuli incogniti, foliis 1.58–1.65 (+0.1–0.2?) m longis 4.5–4.9 cm latis ad basim et in medio coriaceis supra viridibus infra pallidioribus et glaucis U-sulcatis 2-plicatis in sectione mediali cum 58 nervis parallelis secundariis in quoque dimidio nervis tertiis nullis lamina gladiata e basi in apice gracili diminuenti (apex deest) basi inermi brunnei-tincti, ex 6 cm marginibus cum aculeis 2.5–3 mm longis 5–8 mm separatis arcuatis crassiter subulatis basi crassa adscendentibus apicibus brunneis, midnervo infra ex 4.5 cm cum aculeis 1–1.5 mm longis 10–14 mm separatis subulatis arcuatis reflexis pallidis, in sectione mediali marginibus cum aculeis 2.5–3 mm longis 5–16 mm separatis arcuatis lancei-subulatis compressis adscendentibus apicibus brunneis, midnervo infra cum aculeis 0.8 mm longis 3–5 mm separatis valde arcuatis subulatis, syncarpio 17 cm longo 11 cm diametro ovoideo trilaterato, phalangibus 4.3–4.6 cm longis 3.1–3.8 cm latis 2.8–3.8 cm crassis paene cubicis sed ad basem subcuneatis 4-angulosis suturis laterilibus nullis lateribus inferis planis parte $\frac{1}{5}$ supera libera et marginibus rotundatis apice truncato laevi sublucido et cum concavitate 2–2.3 cm lato quadrati cum margine elevato et in vel extra eo cum 8–9 stigmatibus 0.7–1 mm longis late ellipsoideis nigris papillosis prostratis plerumque centrifugalibus sed paucis diversis, endocarpio supramediati 26–28 mm longo osseoso pallide brunneo et extra pallidiori et supra seminum quoquam elevato lateribus lateralibus 4–5 mm crassis intra laevibus obscure brunneis lucidis, seminibus 15 mm longis anguste ellipsoideis, mesocarpio apicali 1-cavernoso cum fibris et paretibus firmis brunneis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Roots, trunk, and branches unknown; leaves 1.58–1.65 (+0.1–0.2?) m long, 4.5–4.9 cm wide near the base and at the middle, coriaceous, above green, be-

low pale green and glaucous, U-sulcate, 2-pleated, at midsection with 58 parallel secondary veins in each half, no visible tertiary veins, blade sword-shaped, gradually tapering from the base toward the slender apex (this lost in ours), the base unarmed, brownish; beginning at 6 cm up the margins with prickles 2.5–3 mm long, 5–8 mm apart, arcuate, stout subulate from a broad base, ascending, brown tipped; beginning at 4–5 cm up the midrib below with prickles 1–1.5 mm long, 10–14 mm apart, arcuate subulate, reflexed, pale; at midsection the margins with prickles 2.5–3 mm long, 5–16 mm apart, arcuate lance subulate, compressed, ascending, brown-tipped; the midrib below with prickles 0.8 mm long, 3–5 mm apart, strongly arcuate subulate, ascending; the leaf apex lost; infructescence with a solitary syncarp; peduncle 26 cm long, 22 mm in diameter, 3-sided, clothed with numerous leafy bracts; syncarp 17 cm long, 11 cm in diameter, ovoid, bearing about 28 phalanges; phalanges 4.3–4.6 cm long, 3.1–3.8 cm wide, 2.8–3.8 cm thick, nearly cubical but somewhat cuneate toward the base, 4-angled, no lateral sutures; the lower sides nearly flat, upper $\frac{1}{5}$ free, of this exposed part the edges rounded, then the rest broad truncate, smooth, a little shiny, and $\frac{3}{4}$ of the top occupied by a slight depression 2–2.3 cm wide, square, bounded by an elevated rim, on or just outside of which are the 8–9 stigmas, these 0.7–1 mm long, broad elliptic, black papillose, flush, mostly centrifugal, but a few otherwise directed; endocarp slightly suprmedian, 26–28 mm long, bony, light brown, and paler without, with ellipsoid elevations above each seed, the lateral walls 4–5 mm thick, within smooth, dark brown, shining; seeds 15 mm long, narrowly ellipsoid; apical mesocarp one broad cavern with strong longitudinal fibers and firm brown cross partitions; basal mesocarp fibrous and fleshy.

HOLOTYPE: Philippines, Luzon, Mt. Marayep, Zambales Prov., Dec. 1924, *M. Ramos & G. Edano* 44,786 (K). Isotypes (UC, US)!

DISCUSSION: *P. cubicus* is a member of the section *Dauphinensia*, as is its closest relative, *P. camarinensis* Merr. also of Luzon, a species with the phalanges 2.5–3.4 cm wide, subcuneate prismatic, the apex mostly truncate, rarely sub-

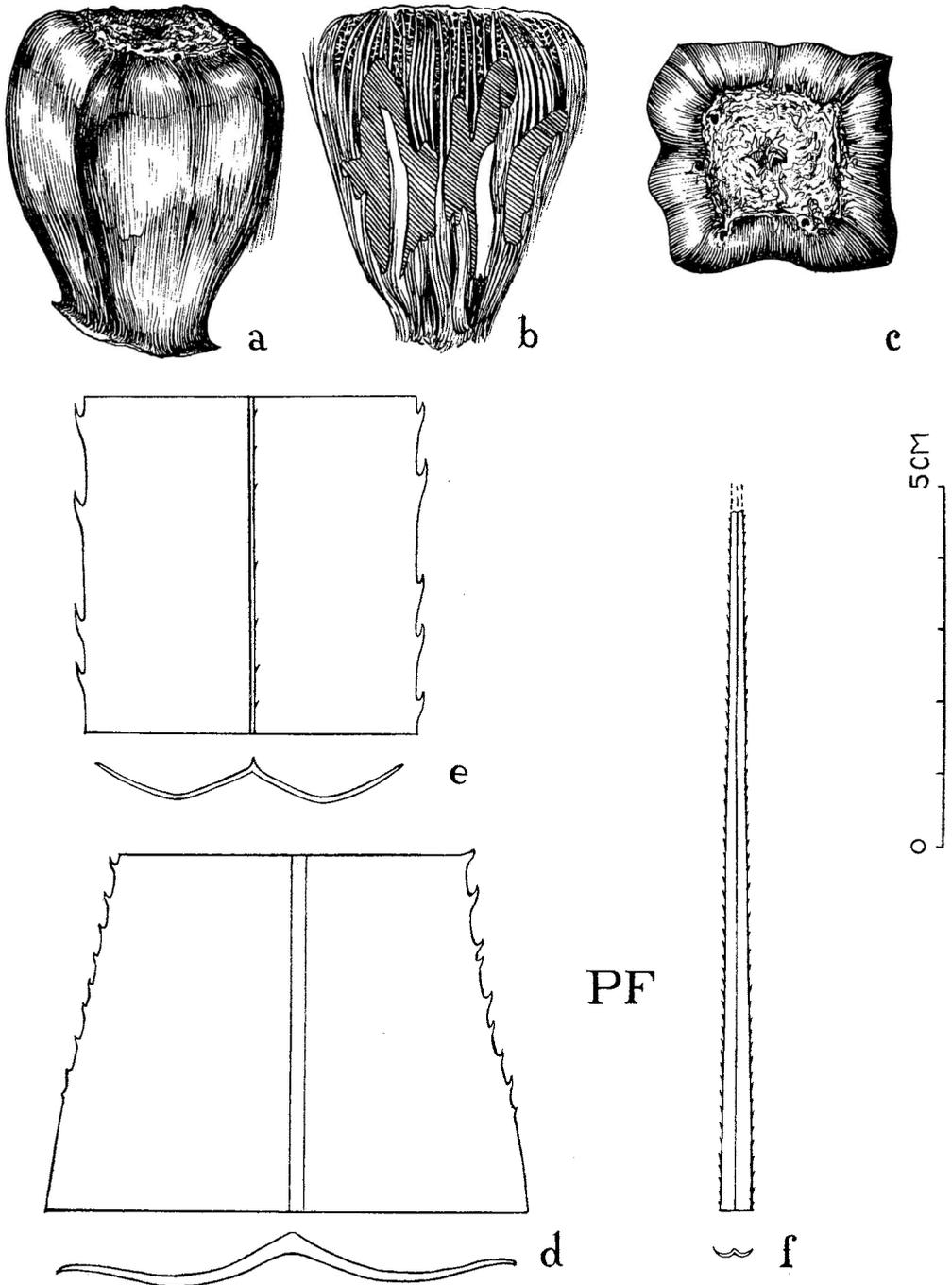


FIG. 297. *Pandanus cubicus* St. John, from holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, leaf base, lower side, $\times 1$; *e*, leaf middle, lower side, $\times 1$; *f*, leaf apex, lower side, $\times 1$.

convex; endocarp 20–22 mm long, blackish, the lateral walls 2.5–3 mm thick; leaf margins beginning at 10 cm from the base with prickles 1–2 mm long, 1.5–5 mm apart, pale; at midsection with 63 parallel secondary veins in each half. *P. cubicus* has the phalanges 3.1–3.3 cm wide, nearly cubical, the apex truncate and with an apical concavity 20–23 mm wide; endocarp 26–28 mm long, light brown, the lateral walls 4–5 mm thick; leaf margins beginning at 6–7 cm from the base with prickles 2.5–3 mm long, 5–8 mm apart, brown tipped; at midsection with 58 parallel secondary veins in each half.

The new epithet is the Latin *cubicus*, cubical, and is given with reference to the nearly cubical shape of the phalanges.

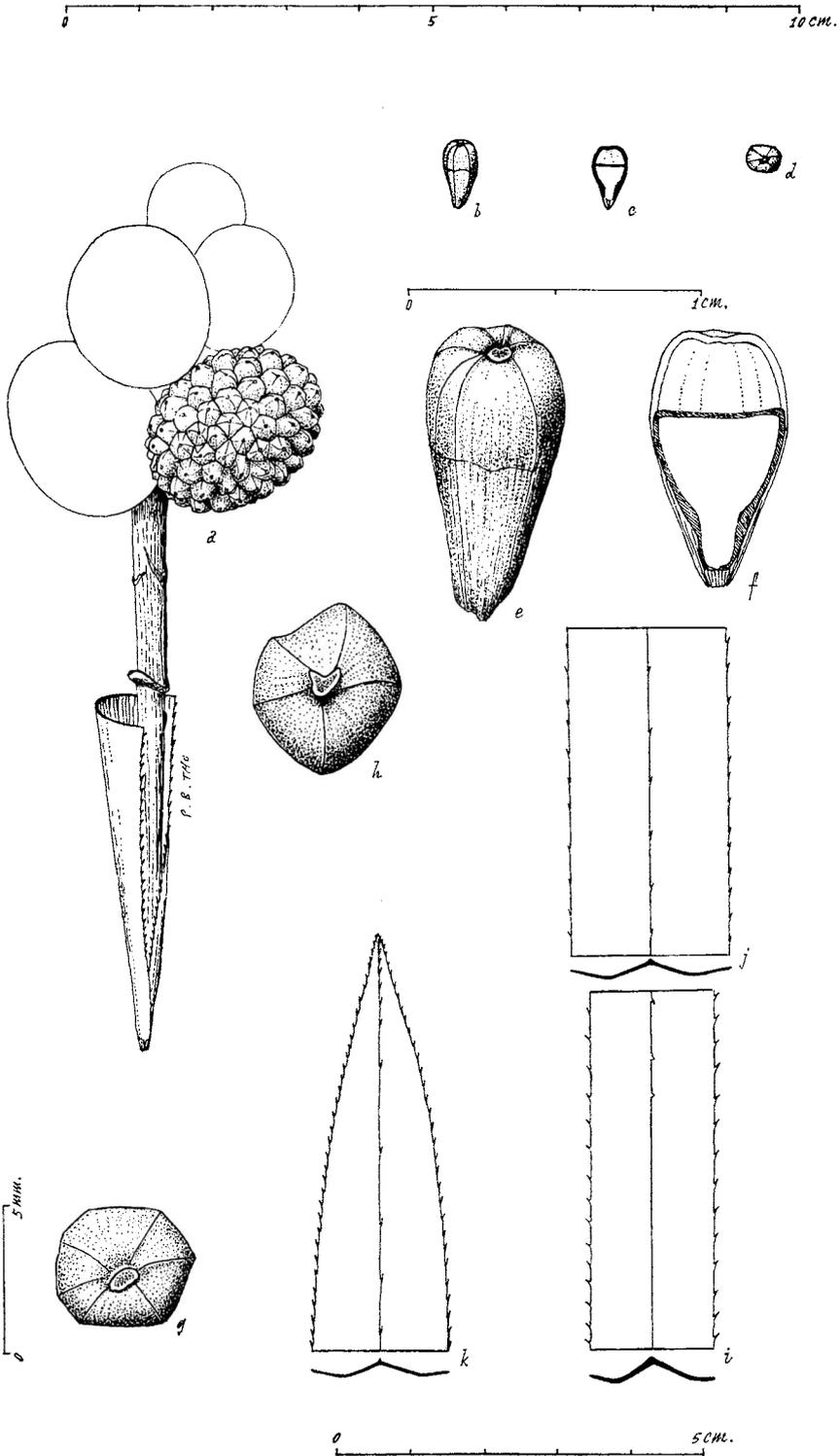
Pandanus retusus sp. nov. (sect. *Microstigma*)
Fig. 298

DIAGNOSIS HOLOTYPE: Videtur frutex, ramulis 1 cm diametro, foliis 67–75 cm longis proxima basem 18–19 mm latis in medio 20–22 mm latis subtiliter subcoriaceis supra viridibus infra pallidioribus supra midnervum U-sulcatis 2-plicatis in sectione mediali cum 20–21 nervis parallelis secundariis in quoque dimidio nervis tertiis in omnibus partibus gracilibus perpendicularibus vel obliquis et reticulis anguste oblongis formantibus lamina ligulata acuta basi amplexicauli inermi alba vel subviridi ex 2 cm marginibus cum aculeis 0.5–1.3 mm longis 0.5–1.5 mm separatis arcuati-subulatis minime recurvatis apicibus brunneis, midnervo infra per 10 cm inermi, in sectione mediali marginibus cum aculeis 0.5–1 mm longis 2–5 mm separatis arcuati-subulatis adscendentibus apicibus brunneis, midnervo proximo infra cum aculeis 7–12 mm separatis simulantibus sed gracilioribus, in apice subulato marginibus cum subulati-serrulis 0.5–0.8 mm longis 1–3 mm separatis apicibus brunneis, midnervo infra cum aculeis 0.4–1 mm longis 5–9 mm separatis subulatis adscendentibus apicibus brunneis, infructescentia spicata cum 6 syncarpiis, pedunculo 8 cm longo 4–5 mm diametro 3-laterato cum bracteis foliosis paucis, bracteis spicae evanescentibus et in fructu

solum fibris persistentibus 1.5–2 cm longis, syncarpiis inferis et lateralibus 22–25 mm longis 19–21 mm diametro ovoideis vel subglobosis 74–78 drupis ferrentibus, syncarpio subterminali minori et eo terminali globoso 14 mm diametro et cum 30 drupis, drupis 8.5–9.5 mm longis 3–5 mm latis, 2.5–3.5 mm crassis cuneatibovoides 5–6-angulosis parte $\frac{2}{5}$ supera libera ovoidea retusa sublaevi striata exlucida, stigmatate 0.6–1.2 mm lato 0.2–0.4 mm longo transverse elliptico sulcato brunneo papilloso apicali horizontali inserto, endocarpio mediali osseoso viridi-brunneo lateribus lateralibus 0.1 mm crassis intra lucidis laevibus, semine 4 mm longo obovoideo in apice concavo, mesocarpio apicali 2 mm longo subgloboso cum fibris in marginibus et cum membranibus albis delicatis transversis paucis aerenchymatem formantibus, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Apparently a shrub; branchlets 1 cm in diameter; leaves 67–75 cm long, 18–19 mm wide near the base, 20–22 mm wide at the middle, thin subcoriaceous, above green, below paler green, U-furrowed above the midrib, 2-pleated, at midsection with 20–21 parallel secondary veins in each half, the tertiary veins slender, perpendicular or oblique, forming narrow oblong meshes, visible throughout, blade ligulate, acute, the base amplexicaul, unarmed, whitish to greenish, beginning at 2 cm the margins with prickles 0.5–1.3 mm long, 0.5–1.5 mm apart, arcuate subulate, slightly recurved, brownish-tipped; the midrib below unarmed for 10 cm; at midsection the margins with prickles 0.5–1 mm long, 2–5 mm apart, arcuate subulate, ascending, brown tipped; the midrib below with similar but more slender prickles 7–12 mm apart; on the acute apex the margins with subulate-serrulations 0.5–0.8 mm long, 1–3 mm apart, brown tipped; the midrib below with prickles 0.4–1 mm long, 5–9 mm apart, subulate, ascending, brown tipped; infructescence spicate, bearing 6 syncarps; peduncle 8 cm long, 4–5 mm in diameter, 3-sided, bearing a few leafy bracts; bracts of the spike

FIG. 298. *Pandanus retusus* St. John, from holotype. *a*, Infructescence, lateral view, $\times 1$; *b*, drupe, lateral view, $\times 1$; *c*, drupe, longitudinal median section, $\times 1$; *d*, drupe, apical view, $\times 1$; *e*, drupe, lateral view, $\times 4$; *f*, drupe, longitudinal median section, $\times 4$; *g, h*, drupe, apical view, $\times 4$; *i*, leaf base, lower side, $\times 1$; *j*, leaf middle, lower side, $\times 1$; *k*, leaf apex, lower side, $\times 1$.



decaying and in fruit the remains are only the fibers, 1.5–2 mm long; lower and lateral syncarps 22–25 mm long, 19–21 mm in diameter, ovoid to subglobose, bearing 74–78 drupes, the subterminal syncarp smaller, and the terminal one globose, 14 mm in diameter, bearing 30 drupes; drupes 8.5–9.5 mm long, 3–5 mm wide, 2.5–3.5 mm thick, cuneate-obovoid, color unknown, 5–6-angled, upper $\frac{2}{5}$ free, ovoid, retuse, the surface nearly smooth, striate, rather dull; stigma 0.6–1.2 mm wide, 0.2–0.4 mm long, transversely narrowly elliptic, sulcate, brown, papillose, apical, horizontal, countersunk; endocarp median, bony, greenish brown, the lateral walls 0.1 mm thick, within smooth, shining; seed 4 mm long, obovoid, the apex concave; apical mesocarp 2 mm long, subglobose, bounded by the marginal fibers, crossed by a few delicate, white membranes, forming an aerenchyma; basal mesocarp fibrous and fleshy.

HOLOTYPE: Philippines, Luzon, Cagayan Prov., Abulug River, Jan. 1912, *C. M. Weber* 1,568 (G). Isotypes (FI,P)!

DISCUSSION: *P. retusus* is a member of the section *Microstigma*, as is its closest relative *P. Clementis* Merr., of Mindanao, a species having the syncarp 3–4.5 cm long, 2.5–3 cm in diameter; drupe apex narrowly ovoid; endocarp walls 0.2 mm thick, within chestnut brown, the apex bearing a central subulate projection to the stigma; leaves 46–51 cm long, the margin near the base with straight prickles 1–2 mm long and 5–10 mm apart. *P. retusus* has the syncarps 1.4–2.5 cm long, 1.4–2.1 cm in diameter; drupe apex suborbicular, retuse; endocarp walls 0.1 mm thick, within greenish, the apex shallow concave and lacking any central projection; leaves 67–75 cm long, the margin near the base with arcuate prickles 0.5–1.3 mm long and 0.5–1.5 mm apart.

The new epithet is the Latin adjective, *retusus*, retuse, and it is given with reference to the shape of the apex of the drupe.

Pandanus hemisphaericus sp. nov. (sect. *Pandanus*)

Fig. 299

DIAGNOSIS HOLOTYPI: Trunco ramis radicibusque incognitis, foliis 1.02 m longis proxima

basem 4.1 cm latis in medio 3.6 cm latis coriaceis supra viridibus infra pallide viridibus et glaucis in sectione mediali cum 48 nervis parallelis secundariis in quoque dimidio nervis tertiis nullis supra midnervum U-sulcatis lateribus recurvatis lamina gladiformata in medio ultimo in apice trigono subulato gracili diminuenti eo in puncto 10 cm ex apice 1.5–2 mm lato basi amplexicauli inermi ex 3.5 cm marginibus cum aculeis 2–4.5 mm longis 3–10 mm separatis graciliter subulatis compressis adpresse adscendentibus pallidis, ex 4 cm midnervo infra cum aculeis simulantibus sed 2–3 mm longis 6–12 mm separatis, in sectione mediali marginibus cum aculeis 2.5–3 mm longis 7–11 mm separatis graciliter arcuati-subulatis adscendentibus brunnescentibus, midnervo infra cum aculeis simulantibus sed 1.5–1.7 mm longis 9–11 mm separatis pallidis, in sectione apicali marginibus et midnervo infra cum subulati-serrulis 0.2–0.4 mm longis 5–15 mm separatis brunneis, syncarpio invisio, phalangibus 5–5.2 cm longis 3.5–3.9 cm latis 3–3.4 cm crassis latiter obovoideis 5–6-angulosis lateribus subcurvatis laevibus lucidis suturis lateralibus nullis parte $\frac{1}{2}$ – $\frac{3}{5}$ supera libera apice suborbiculari sinibus apicalibus centralibus 2–3 mm profundis in centro rectis in apicibus curvatis latiter V-formatis, carpellis 10–13 apicibus centralibus depresso obtusis illis marginalibus cum depressione distali illis $\frac{2}{3}$ –1-plo tam grandibus quam marginalibus, stigmatibus 1.5–3.5 mm latis latiter reniformibus obliquis eis marginalibus elevatis extracurvatis obscure brunneis papillosis sulcatis, sinibus proximalibus latis $\frac{1}{3}$ – $\frac{1}{2}$ ad fondam extentis, endocarpio mediali 2.3 cm longo osseoso partibus centralibus obscure mahogani-coloratis apice obtuso lateribus lateralibus 5–6 mm crassis intra laevibus lucidis, seminibus 13–15 mm longis obliquiter ellipsoideis, mesocarpio in apice cuiusque carpellae cavernam cum fibris paucis et membranis albis delicatis formanti, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Stature, roots, trunk, and branches not recorded; leaves 1.02 m long, 4.1 cm wide near the base, 3.6 cm wide at the middle, coriaceous, green above, pale green and glaucous below, at midsection with 48 parallel secondary veins in each half, no tertiary veins, U-sulcate over the midrib, the sides down

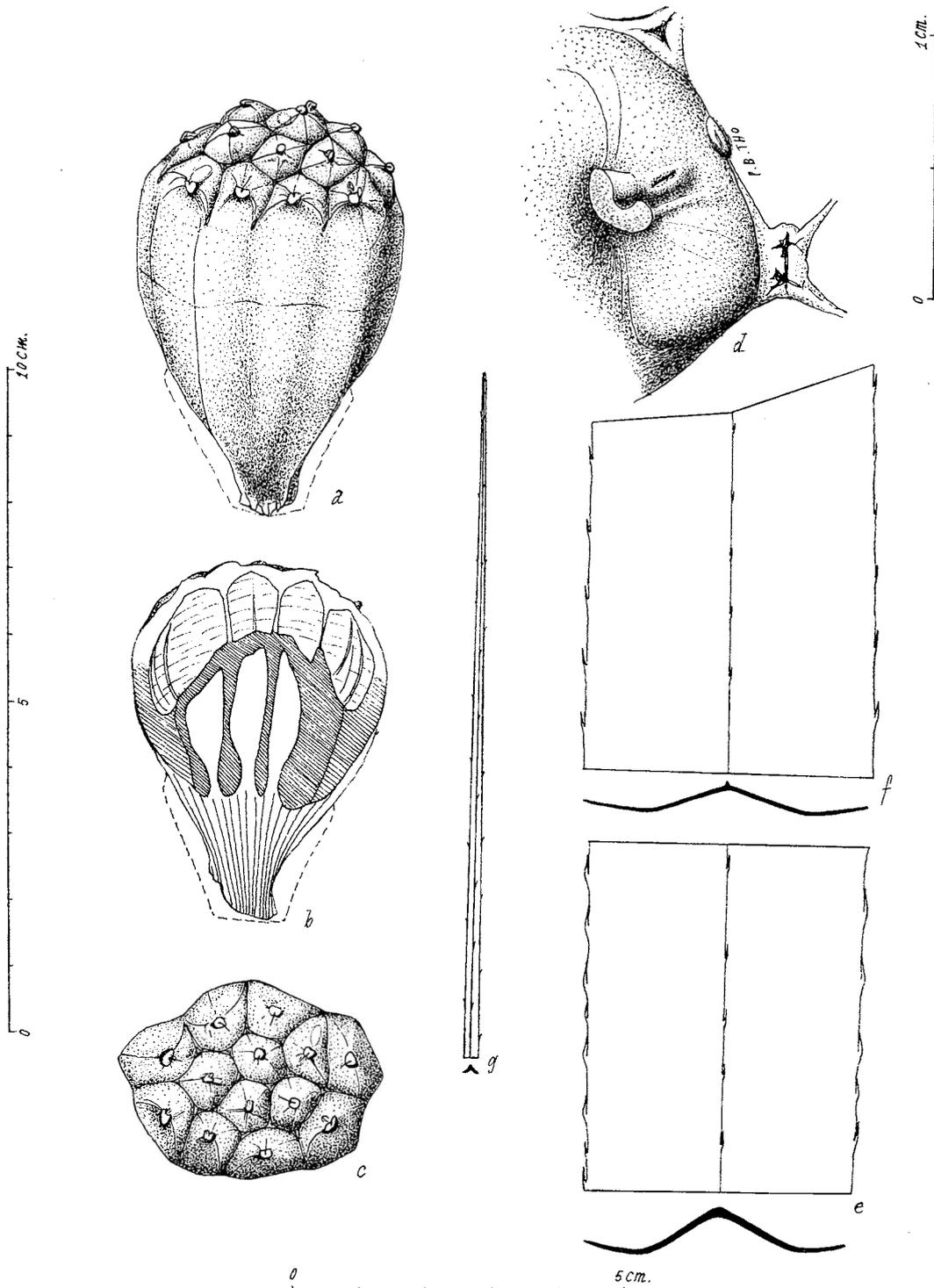


FIG. 299. *Pandanus hemisphaericus* St. John, from holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

curved but not pleated, blade sword-like, in the outer half tapering to the slender trigonous subulate apex, this at the point 10 cm down 1.5–2 mm wide, the base amplexicaul, unarmed; beginning from 3.5 cm up the margins with prickles 2–4.5 mm long, 3–10 mm apart, slender subulate, flat appressed ascending, pale; beginning at 4 cm up the midrib below with similar prickles but 2–3 mm long, 6–12 mm apart; at midsection the margins with prickles 2.5–3 mm long, 7–11 mm apart, arcuate, slender, subulate, ascending, brownish; the midrib below with similar prickles 1.5–1.7 mm long, 9–11 mm apart; on the subulate apex the margins and midrib below with subulate-serrulations 0.2–0.4 mm long, 5–15 mm apart, brown; phalanges 5–5.2 cm long, 3.5–3.9 cm wide, 3–3.4 cm thick, broadly obovoid, 5–6-angled, the sides gently curving, shining, smooth, lateral sutures none, upper $\frac{1}{2}$ – $\frac{3}{5}$ free, the apex semiorbicular, apical central sinuses 1–3 mm deep, the center straight, the ends curving, very wide V-shaped; carpels 10–14, the apices of the central ones low obtuse, of the marginal ones with a shallow depression distal of the stigma, the inner apices from as large as to $\frac{2}{3}$ as large as the marginal ones; stigmas 1.5–3.5 mm wide, broadly reniform, oblique, the marginal ones prominent and outcurved, dark brown, papillose, sulcate; proximal sinus wide, running $\frac{1}{3}$ – $\frac{1}{2}$ way to valley bottom; endocarp median, 2.3 cm long, bony, the central parts all dark mahogany-colored, the apex obtuse, the lateral margins equally bony but whitish, lateral walls 5–6 mm thick, the inner surfaces smooth, shining; seeds 13–15 mm long, obliquely ellipsoid; mesocarp forming in the apex of each carpel a cavern traversed by a few fibers and with many white delicate membranes; basal mesocarp fibrous and fleshy.

EXPANDED DESCRIPTION: Trees 5 m tall, branching low or high; trunk 7–15 cm in diameter, bark yellowish to grayish, smoothish but

with blunt conic spines; leaves 0.9–1.8 m long, 3.8–5 cm wide near the base, 2.8–3.8 cm wide at the middle, at midsection with 41–48 parallel secondary veins in each half; peduncle 30 cm long, 25 mm thick, with 3–4 leafy bracts; syncarp solitary, 20–30 cm long, 15–20 cm in diameter, ellipsoid; phalanges 4.6–5.2 cm long, 3–3.9 cm wide, 2.4–3.4 cm thick, the lower $\frac{2}{5}$ – $\frac{1}{2}$ fleshy enlarged, yellowish, the upper free part reddish; carpels 10–14; central apical sinuses 1–3 mm deep; fresh stigmas yellowish brown.

HOLOTYPE: Philippines, Palawan Island, Taytay, May 1913, *E. D. Merrill 1,312* (G). Isotypes (FI, L, MO).

SPECIMENS EXAMINED: Philippines, Palawan, 1911, *A. D. E. Elmer 12,709* (BM, FI, G, NY); Negros, Dumaguete (Cuernos Mts.), Negros Oriental Prov., June 1908, *Elmer 10,447* (E, FI, G, K, MO, Z).

DISCUSSION: *P. hemisphaericus* is a member of the section *Pandanus*, as is its closest relative, *P. tectorius* Soland. ex Warb. var. *borneensis* Martelli, of North Borneo, a plant with the phalanges 5.3–5.8 cm long, 2.9–3.5 cm wide, pyriform, the apex low convex; carpels 6–7, the outer ones $1\frac{1}{2}$ –2 times the larger; stigmas elliptic; leaf apex 10 cm down 10 mm wide, the midrib below beginning 7–10 cm up with prickles 3–3.5 mm long, 17–32 mm apart, heavy subulate, arcuate, reflexed. *P. hemisphaericus* has the phalanges 5–5.2 cm long, 3.5–3.9 cm wide, broadly obovoid, the apex hemispheric; carpels 10–13, the outer ones equal to or $\frac{1}{3}$ larger than the inner; stigmas broadly reniform; leaf apex 10 cm down 2 mm wide, midrib beginning 4 cm up with prickles 2–3 mm long, 6–12 mm apart, slender subulate, flat appressed ascending.

The new epithet is the Latinized Greek adjective meaning hemispheric.