

Revision of the Genus *Pandanus* Stickman, Part 12 Queensland *Pandanus*

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IN 1958, under a grant from the National Science Foundation, the writer made an expedition in search of *Pandanus* in New Guinea and in Queensland, Australia. Most of the following novelties were collected on that trip, in company with Dr. Stanley T. Blake of the Botanic Museum, Brisbane.

SECTION *Pandanus*

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

Figs. 107B, 109a

DIAGNOSIS HOLOTYPY: Arbor 7 m alta 2 dm diametro, radicibus futurosus nullis, cortice cum radicillis adpresse adscendentibus, foliis 1.60–1.62 m longis 6.5–7 cm latis coriaceis in sectione mediali cum 63–65 nervis secundariis in quaque latere, gladiformibus ex base in apice subulato diminuentibus eo in puncto 10 cm ex apice 2 mm lato in sectione M-formatis basi amplexicauli inermi sed ex 22–25 cm marginibus cum aculeis 2.8–3.5 mm longis 8–14 mm distantibus graciliter subulatis adscendentibus apice brunneo, midnervo infra per partem 4/5 inferiorem inermi, in sectione mediali margine uno cum aculeis 1.8–2 mm longis 6–19 mm distantibus adpresse adscendentibus, margine alter inermi, proxima apicem marginibus inermibus sed midnervo infra cum serris 0.2 mm longis 5–8 mm distantibus, phalangibus 5–5.6 cm longis 4.7–6.1 cm latis 3.9–5.1 cm crassis luteoaurantiacis late ellipsoideis basi truncata apice depresso convexo, parte 1/2 supera libera, suturis lateralibus profundis et V-formatis, lateribus dense papillois et 7–9-angulatis et carpella quaque cum 3–8 angulis secundariis, suturis lateralibus evidentis angustis, sinibus apicalibus centralibus 7–12 mm profundis V-formatis, carpellis 9–14 apicibus centralibus pyramidalibus et

multiangulatis, apicibus marginalibus pyramidalibus compressis et angulatis, in apice cum regione concava cartilaginea lucida et sub margine hoc stigmatate 1.5–2.5 mm longo suborbiculari ad oblato cordato obscure brunneo sulcato obliquo, sinibus proximalibus 1/2–3/4 ad fundam extentis, endocarpio submediali 2.5–3 cm longo solido osseoso brunneo lateribus 4–5 mm crassis, seminibus 15 mm longis 3 mm diametro ellipsoideo, mesocarpio apicali 8–20 mm longo cavernoso cum fibris membranisque, mesocarpio basali fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 7 m tall, 2 dm in diameter; no prop roots; bark with appressed ascending rootlets; leaves 1.60–1.62 m long, 6.5–7 cm wide, coriaceous, at midsection with 63–65 secondary veins on each side, sword-like, tapering from the base to the subulate tip which about 10 cm down is 2 mm wide, 1-ribbed, but in section flattened M-shaped, the base amplexicaul and unarmed but beginning 22–25 cm from the base the margins with slender subulate prickles 2.8–3.5 mm long, 8–14 mm apart, ascending, brown tipped; the midrib below unarmed for lower 4/5 part; at the midsection one margin with prickles 1.8–2 mm long, 6–19 mm apart, closely appressed ascending, the other margin unarmed; near the apex the margins unarmed but the midrib below with serrae 0.2 mm long, 5–8 mm apart; phalanges 5–5.6 cm long, 4.7–6.1 cm wide, 3.9–5.1 cm thick, yellow-orange, broadly ellipsoid with a broad truncate base and a broad, low convex apex, upper 1/2 free, lateral sutures deep and V-shaped, the sides closely minutely papillose, with 7–9 principal angles and on each carpel with 3–8 secondary ridges and valleys; lateral sutures pronounced, narrow; apical central sinuses 7–12 mm deep, V-shaped; carpels 9–14, the apices of the central ones pyramidal but with numerous longitudinal ridges and valleys and mortised with the neighboring ones, the

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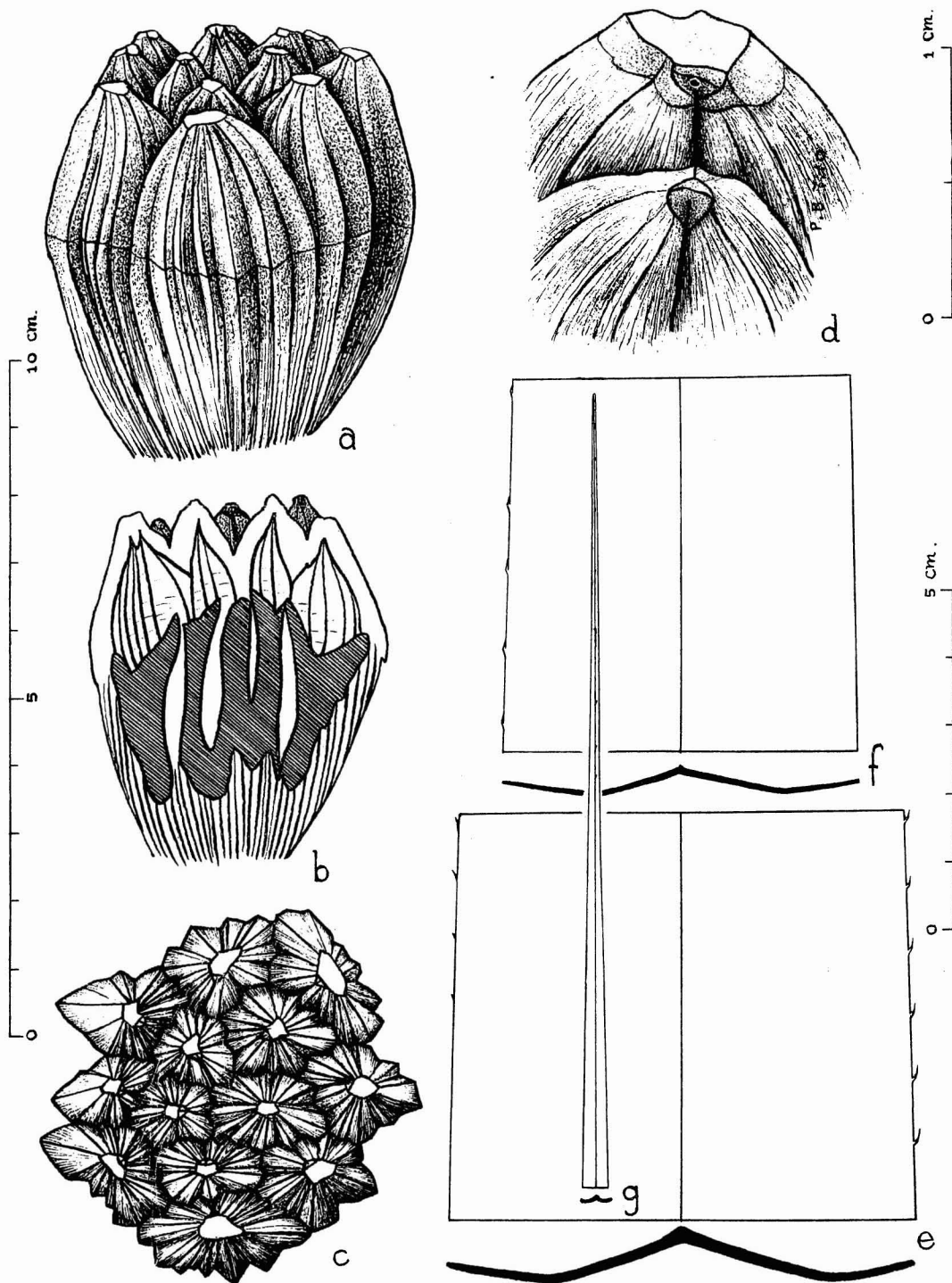


FIG. 107B. *Pandanus angulatus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apices and stigmas, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

marginal ones pyramidal but flattened distally, similarly ridged, the apex with a cartilaginous, shiny concavity, under the proximal edge of which is the centripetal, steeply oblique stigma 1.5–2.5 mm long, suborbicular to oblate cordate, dark brown, creased; proximal crease in a narrow valley, running $\frac{1}{2}$ – $\frac{3}{4}$ way to the mortised valley bottom; endocarp inframedian, 2.5–3 cm long, massive, bony, brown, the lateral walls 4–5 mm thick; seeds 15 mm long, 3 mm in diameter, ellipsoid; apical mesocarp cavernous in each carpel, 8–20 mm long, with numerous strong, longitudinal fibers and white medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, 10 miles s.s.e. of Cooktown, towards Archer Point savanna, 20 ft. alt., Feb. 1, 1958, *H. St. John* 26,242 (BISH).

DISCUSSION: *P. angulatus* is a member of the section *Pandanus*, and finds there its closest relative, *P. Solms-Laubachii* F. Muell. of Queensland, which has the phalanges 5–7 cm long, 2.5–4 cm wide, and the carpel apices semiorbicular-conic. In contrast, *P. angulatus* has the phalanges 5–5.6 cm long, 4.7–6.1 cm wide, and the carpel apices pyramidal and deeply many sulcate.

The new epithet is the Latin adjective meaning angled, in reference to the angled sides of the phalange and carpels.

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

Figs. 108, 109b–d

DIAGNOSIS HOLOTYPE: Arbor 13 m alta 2 dm diametro sparse furcata in corona laxa, cortice cum radicillis multis adscendente adpressis ramosis eis 3–4 cm longis et cum *Bryophytis* et *Pteridophytis* epiphyticis, radicibus futurosus nullis, foliis 1.84–2.27 m longis 7.5–8 cm latis coriaceis in sectione mediali cum 68–72 nervis secundariis in quoque latere, in sectione oblate M-formati gladiiformati ex basi in apice subulato diminuentibus eo in puncto 10 cm ex apice 3 mm lato basi amplexicauli et inermi sed ex 25–28 cm marginibus cum aculeis 1.5–2.5 mm longis 4–11 mm distantibus valide subulatis adscendentibus basibus pallidis apicibus rubro-brunneis, midnervo infra inermi excepta in apice, in regione mediali marginibus inermibus,

circa apicem marginibus cum serrulis 0.1 mm longis 2–10 mm distantibus, midnervo infra cum serrulis simulantibus pluribus remotis, syncarpio invisio, phalangibus 5.6–6.1 cm longis 4.7–5.9 cm latis 4.1–5.4 cm crassis rotundato-obovoideis 5–6-subangulatis in sicco brunneo sed obscure rubro-tincto lateribus subconvexis sed cum dorsis longitudinalibus multis et papillosis rugosisque exlucidis parte $\frac{1}{3}$ supera libera, apice depresso convexo, suturis lateralibus angustis sed prominentibus, sinibus centralibus apicalibus 5–8 mm profundis late V-formati, carpellis 7–10 plerumque 8 apicibus semiorbiculari-pyramidalibus angulosi et cum dorsis secundariis supra punctatis et exlucidis infra rugosis et sublucidis lateribus distalibus cum 2–8 angulis et interobserratis, in apice cum concavitate horizontali et ab eo cum projectioni proximali et infra eam stigmati 1.5–3 mm longo ovali vel suborbiculari nigri valde obliqui vel perpendiculari sulcato centripetali eis marginalibus plerumque truncatis, sinibus proximalibus prominentibus et cum labiis protrusis $\frac{1}{4}$ – $\frac{1}{2}$ ad fundam extentis, endocarpio in parte $\frac{2}{5}$ infera osseoso solido brunneo marginibus lateralibus 8–10 mm crassis, seminibus 20–22 mm longis 2 mm diametro sublinearibus, mesocarpio apicali cavernoso cum fibris validis multis et membranis medullosis aliquis et pilis, mesocarpio basali pauci sed fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 13 m tall, 2 dm in diameter, sparsely forked to form an open crown; bark with abundant appressed ascending branching rootlets 3–4 cm long, bearing moss and ferns as epiphytes; prop roots none; leaves 1.84–2.27 m long, 7.5–8 cm wide, coriaceous, at midsection with 68–72 secondary veins on each side, in section low M-shaped, swordlike, tapering from base to the subulate apex which 10 cm down is 3 mm wide, the base amplexicaul and unarmed, but beginning at 25–28 cm the margins with prickles 1.5–2.5 mm long, 4–11 mm apart, arcuate, stout subulate, ascending, pale below, the tips red-brown; midrib below unarmed except at very tip; at midsection the margins unarmed; near the tip the margins with serrulations 0.1 mm long, 2–10 mm apart, and the midrib below with several, remote similar serrulations; syncarp not seen; phalanges 5.6–6.1 cm long, 4.7–5.9 cm wide, 4.1–5.4 cm thick,

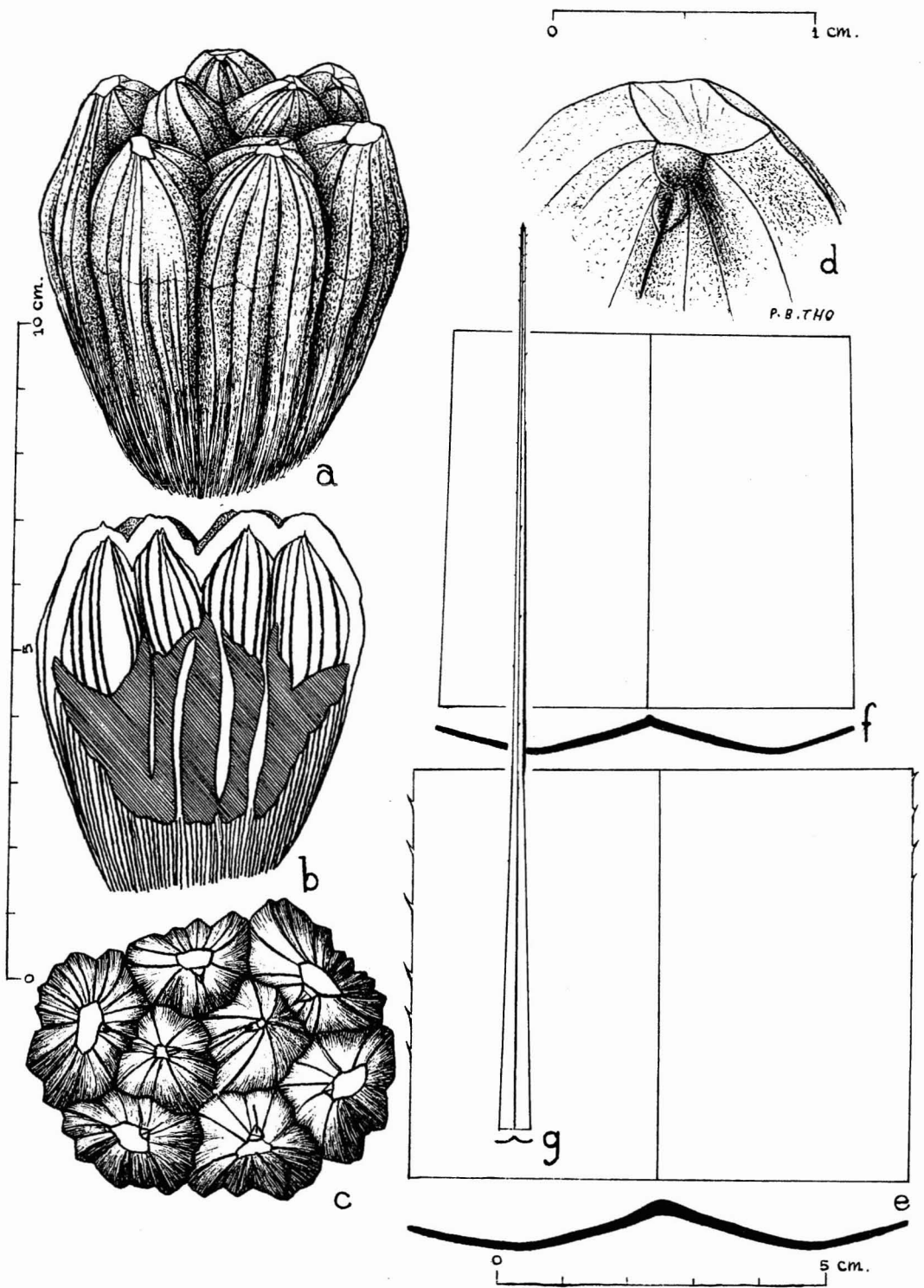


FIG. 108. *Pandarus australiensis* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex and stigma, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

rounded obovoid, with 5–7 obscure angles, when dried brown but with traces of dark red, the sides gently convex but with many longitudinal ridges, the surface papillose and wrinkled, rather dull, upper $\frac{1}{3}$ free, the apex low convex; lateral sutures well marked but narrow; central apical sinuses 5–8 mm deep, broad V-shaped; carpels 7–10, usually 8, the apices semiorbicular-pyramidal, angled and ridged on all sides, above the surface punctate and dull, below wrinkled and a little shiny, the distal sides of each with 2–8 angles and valleys, mortised with the neighbors, on the apex a prominent horizontal concavity leading to a visor over the stigma which is 1.5–3 mm long, oval to suborbicular, black, steeply oblique to perpendicular, creased, centripetal, the marginal ones mostly truncate; proximal sinus prominent and with protruding lips, running $\frac{1}{4}$ – $\frac{1}{2}$ way to valley bottom; endocarp centering in lower $\frac{2}{5}$, bony, massive, brown, the lateral margins 8–10 mm thick; seeds 20–22 mm long, 2 mm in diameter, almost linear; apical mesocarp cavernous, with numerous strong fibers and some medullary membranes and hairs; basal mesocarp of small extent, fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, 10 miles s.s.e. of Cooktown, towards Archer Point, rainforest in gully, 100 ft. alt., Feb. 1, 1958, *H. St. John* 26,243 (BISH).

DISCUSSION: *P. australiensis* is a member of the section *Pandanus*. Its closest relative, *P. Whitei* Martelli of Queensland has the phalanges 7–7.3 cm long, 6–6.5 cm wide, the surface not punctate or rough, central apical sinuses 3–5 mm deep, the carpel apices obscurely pentagonal, rounded pyramidal; and the stigmas apical. On the other hand, *P. australiensis* has the phalanges 5.6–6.1 cm long, 4.7–5.9 cm wide, the surface papillose and wrinkled, the central apical sinuses 5–8 mm deep, the carpel apices sharply angled, semiorbicular-pyramidal, with the apex concave; and the stigma on the distal face.

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

Fig. 110

DIAGNOSIS HOLOTYPI: Arbor 6 m alta 18 cm diametro, cortice sparse muricatulī, radicibus

fulturosīs 1 m longis 4 cm diametro sparse muricatulī, foliīs 1.45–1.5 m longis 8–8.5 cm latis coriaceis supra viridibus infra pallidis in sectione depresso M-formatis in apice subulato longe diminuentibus eo in puncto 10 cm ex apice 3.5 mm lato, basi inermi sed ex 6 cm marginibus cum aculeis 2–2.5 mm longis 3–20 mm distantibus pallidis subulatis adscendentibus, midnervo infra inermi ex basi et ultra mediam, in sectione mediali marginibus cum aculeis 1.5–2 mm longis 3–8 mm distantibus simulantibus adpressis vel in regionibus aliquis nullis, proxima apicem marginibus et midnervo infra cum serrulis 0.2–0.3 mm longis 2–6 mm distantibus, pedunculo 34 cm longo trigono bracteoso, syncarpio terminali solitario 20 cm longo 15 cm diametro ellipsoideo obtuse trigono cum 79 phalangibus eis 5.1–5.5 cm longis 3.2–4.6 cm latis 2.2–3.5 cm crassis (sed in geminis 5.5 cm latis) obovoideis subcompressis basi cuneata 5–6 angulosis lateribus subulatis subcurvatis parte $\frac{1}{2}$ supera libera apice oblato-convexo, suturis lateralibus nullis, sinibus centralibus apicalibus 1.5–3 mm profundis, carpellis 9–12 apicibus oblato-pyramidalibus ad pyramidalibus eis marginalibus minime majoribus valleculis latis vel angustis et V-formatis, stigmatibus 1–1.5 mm longis ovalibus ad obovatis sulcatis obliquis centripetalibus pallide brunneis, suturis proximalibus profundis et $\frac{1}{2}$ ad fundam extentis, endocarpio mediali 2 cm longo osseoso obscure brunneo lateribus 3–4 mm crassis, seminibus 11–13 mm longis 4–5 mm diametro ellipsoideis vel obliquiter ellipsoideis, mesocarpio supero in carpella quaque cavernam rotundatam cum fibrīs paucis et membranīs albis medullois formato, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 6 m tall, 18 cm in diameter; bark sparingly muriculate; prop roots 1 m long, 4 cm in diameter, sparingly muriculate; leaves 1.45–1.5 m long, 8–8.5 cm wide, coriaceous, green above, pale beneath, in section perceptibly M-shaped, long tapering to the subulate apex, the tip 10 cm down 3.5 mm wide, the base unarmed for 6 cm, then the margins with prickles 2–2.5 mm long, 3–20 mm apart, pale, subulate, ascending; the midrib below unarmed near the base and essentially so to beyond the middle; at the midsection the mar-



FIG. 109. *a*, *Pandanus angulatus* St. John, holotype, habit. *b*, *P. australiensis* St. John, holotype, branches and crown; *c*, trunk with epiphytes, and portrait of S. T. Blake; *d*, trunk covered by appressed ascending, adventitious rootlets.

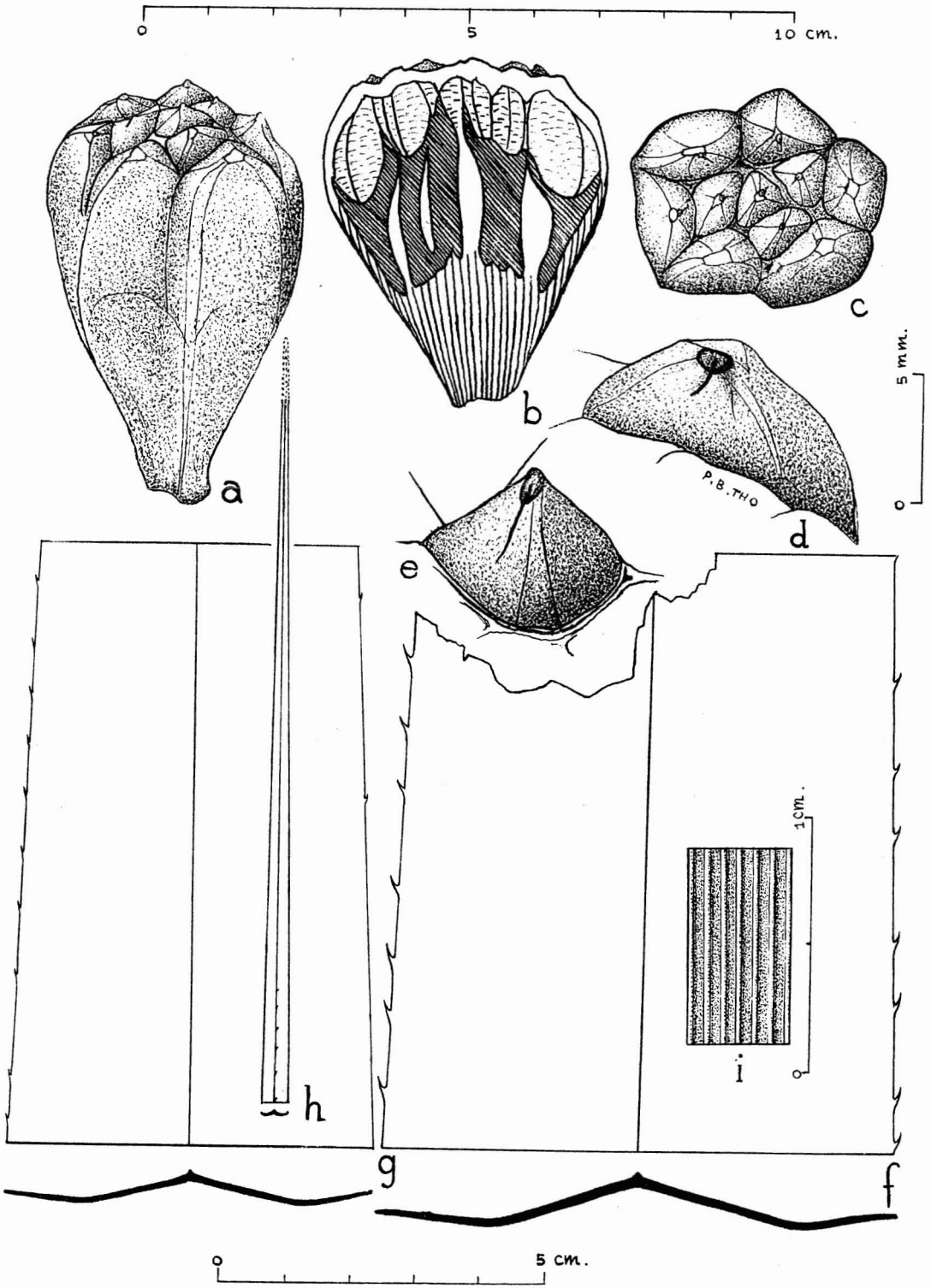


FIG. 110. *Pandanus Blakei* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, marginal carpel apex and stigma, oblique view, $\times 4$; *e*, narrower central carpel apex, and stigma, oblique view, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$; *i*, secondary veins at midsection, lower side, $\times 4$.

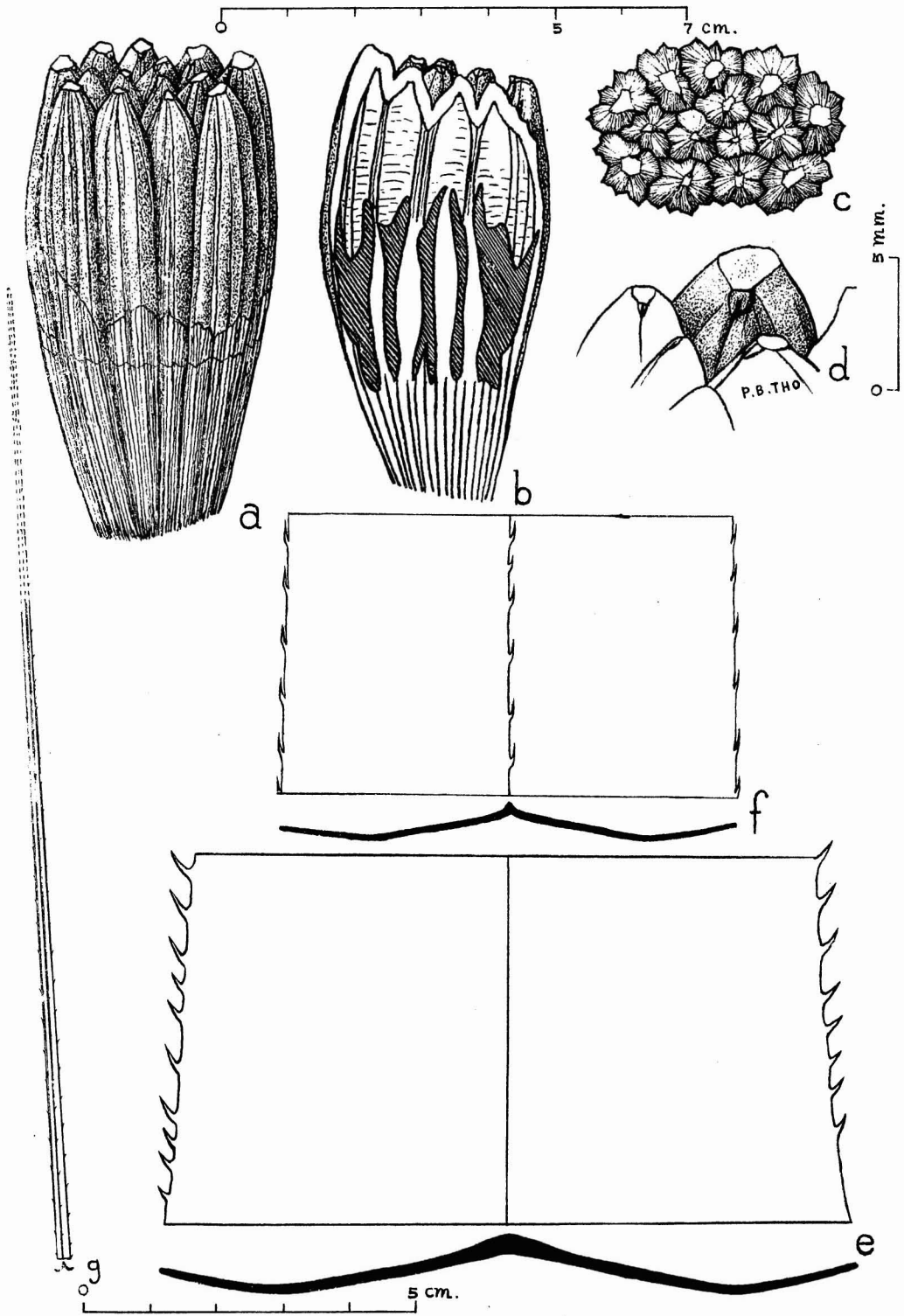


FIG. 111. *Pandanus citraceus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apices and stigmas, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

gins with prickles 1.5–2 mm long, 3–8 mm apart, similar, appressed or for some distance wanting; near the tip the margins and midrib below with serrations 0.2–0.3 mm long, 2–6 mm apart; peduncle 34 cm long, trigonous, leafy bracted; syncarp terminal, solitary, 20 cm long, 15 cm in diameter, ellipsoid, 3-sided, bearing 79 phalanges, these 5.1–5.5 cm long, 3.2–4.6 cm wide, 2.2–3.5 cm thick, (in a double 5.5 cm wide), obovoid, somewhat compressed, the base cuneate, 5–6-angled, the sides smooth, somewhat shining, gently curved, upper $\frac{1}{2}$ free, apex low convex, lateral sutures none, apical central sinuses 1.5–3 mm deep; carpels 9–12, their apices from low pyramidal to pyramidal, the marginal ones a little the larger, the valleys broad or narrow V-shaped; stigmas 1–1.5 mm long, oval to obovate, sulcate, oblique, centripetal, light brown; proximal crease deep, running $\frac{1}{2}$ way to valley bottom; endocarp median, 2 cm long, bony, dark brown, the lateral margins 3–4 mm thick; seeds 11–13 mm long, 4–5 mm in diameter, ellipsoid or obliquely so; apical mesocarp forming in each carpel a rounded cavern with a few longitudinal fibers and filled with white, medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, Yule Point, 27 miles n. of Cairns, top of sea beach with *Scaevola frutescens*, *Clerodendron inerme*, *Vitex trifolia* var. *ovalifolia*, *Ipomoea pes-caprae* ssp. *brasiliensis*, Feb. 5, 1958, *H. St. John* 26,260 (BISH).

DISCUSSION: *P. Blakei* is a member of the section *Pandanus*. Its closest relative is *P. somersetensis* St. John, of Queensland, which has the phalanges 4–5.1 cm wide, upper $\frac{1}{4}$ free, the apical central sinuses 0.5–1 mm deep; carpels 7–9, the apices of the marginal almost flat, but of the central perceptibly depressed conic; stigmas 1.5–3 mm long; leaves 6.8–7.2 cm wide, and at midsection unarmed, the leaf tip 10 cm down 7 mm wide. In contrast, *P. Blakei* has the phalanges 3.2–4.6 cm wide, upper $\frac{1}{2}$ free, the apical central sinuses 1.5–3 mm deep; carpels 9–12, their apices from low pyramidal to pyramidal; stigmas 1–1.5 mm long; leaves 8.3–8.5 cm wide, and at midsection the margins armed with prickles 1.5–2 mm long, and the leaf tip 10 cm down 3.5 mm wide.

This species is named in honor of Dr. Stanley T. Blake, of the Brisbane Botanic Gardens.

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

Figs. 111, 139Aa–c

DIAGNOSIS HOLOTYPE: Arbor 10–15 m alta 25–28 cm diametro, cortice cum radicillis multis adpresse adscendentibus, radicibus futurosus nullis, foliis 2.3–2.85 m longis 7–8 cm latis coriaceis in sectione mediali cum 67–70 nervis secundariis in quoque latere, gladiformibus ex basi in apice subulato circa 30 cm longo diminuentibus eo in puncto 10 cm ex apice 2 mm lato, basi amplexicauli et inermi sed 12–26 cm ex basi marginibus cum aculeis 3–5 mm longis 6–12 mm distantibus subulatis arcuatis adscendentibus dimidio externo mahogani-brunneo, midnervo infra plerumque inermi, regioni mediali marginibus cum aculeis 3–3.5 mm longis 5–8 mm distantibus, simulantibus, midnervo infra acute salienti et cum aculeis 2.5–3 mm longis adscendentibus simulantibus, proxima apicem marginibus et midnervo infra cum aculeis 0.5–0.7 mm longis 2–6 mm distantibus subulatis adscendentibus, folio juvenali 2.7 m longo 10 cm lato et spinosiori marginalibus basalibus cum spinis 4–5.5 mm longis 4–11 mm distantibus subrectis crasse subulatis, midnervo infra ex 30 cm cum aculeis 3–4 mm longis 6–16 mm distantibus subulatis obscure mahogani-brunneis inferioribus reflexis alteris adscendentibus; inflorescentia foeminea terminali cernua foliosa, syncarpio solitario 23 cm longo 17 cm lato late ovoideo, phalangibus 6–7 cm longis 2.8–4.1 cm latis 2.2–3 cm crassis cuneatis vel oblanceo-cuneatis 5–6-angulatis in sicco rubro-brunneis, lateribus subcurvatis sed cum dorsis multis papillosis sublucidis et cutim Citri simulantibus, parte $\frac{3}{5}$ supera libera apice truncato simulante sed in verite vadose concava, suturis lateralibus angustis in dimidia supera notatis, sinibus centralibus apicalibus 6–9 mm profundis anguste V-formatis, carpellis 9–16 (in geminis 19) apicibus anguste pyramidalibus eis centralibus symmetricalibus sed marginalibus distaliter compressis et cum apice concavo parvo inflexo, lateribus cum dorsis et valleculis pluribus, stigmatibus 1.5–2 mm longis ellipticis subnigris papillosis sulcatis valde obliquis ad verticalibus

centripetalibus, sinibus proximalibus $\frac{2}{3}$ distantia ad fundam extentis, endocarpio minime submediali 25–30 mm longo osseoso obscure mahogany-colorato paginis interioribus lucidis lateribus 3–4 mm crassis, seminibus 17–22 mm longis 3–4 mm diametro ellipsoideis, mesocarpio supero in carpella quaque cavernam cum in lateribus fibris et in centro membranis medullosis transversis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 10–15 m tall, 25–28 cm in diameter; bark with many appressed ascending rootlets; prop roots none; leaves 2.3–2.85 m long, 7–8 cm wide, coriaceous, at midsection with 67–70 secondary veins on each side, swordlike, tapering from base to the subulate apex about 30 cm long, and about 10 cm down 2 mm wide, the base amplexicaul and unarmed but beginning 12–26 cm up the margins with prickles 3–5 mm long, 6–12 mm apart, subulate, arcuate, ascending, the outer half mahogany brown; the nearby midrib below mostly unarmed; at midsection the margins with prickles 3–3.5 mm long, 5–8 mm apart, similar; the midrib sharply salient below and with similar ascending prickles 2.5–3 mm long; near the apex the margins and midrib below with subulate ascending prickles 0.5–0.7 mm long, 2–6 mm apart; the leaf of a juvenile sprout is 2.7 m long, 10 cm wide, and in general with more spiny margins, those near the base being 4–5.5 mm long, 4–11 mm apart, nearly straight, stout subulate; and the midrib below beginning 30 cm from the base has prickles 3–4 mm long, 6–16 mm apart, subulate, wholly dark mahogany brown, the lower ones reflexed, the others ascending; pistillate inflorescence terminal, nodding, leafy bracted; syncarp solitary, 23 cm long, 17 cm wide, broadly ovoid; phalanges 6–7 cm long, 2.8–4.1 cm wide, 2.2–3 cm thick, cuneate or oblance-cuneate, 5–6-angled, when dried reddish brown, the sides gently curving but with many longitudinal ridges, papillose, almost shiny, resembling *Citrus* skin, upper $\frac{3}{5}$ free, apex appearing truncate but actually usually shallowly concave, lateral sutures narrow, distinct at least in upper free part, central apical sinuses 6–9 mm deep, narrow V-shaped; carpels 9–16 (in a double 19), the apices narrowly pyramidal, the central ones symmetric, the lat-

eral ones laterally compressed and with a small, oblique, concave apex slanting inward, the sides ridged and mortised with adjacent ones, the outer side of each with 3–9 secondary sharp ridges and valleys; stigmas 1.5–2 mm long, elliptic, blackish, papillose, creased, sharply oblique to vertical, centripetal; proximal sinus running $\frac{2}{3}$ to all the way to the valley bottom; endocarp slightly submedian, 25–30 mm long, bony, dark mahogany colored, the inner surfaces shining, the lateral margins 3–4 mm thick; seeds 17–22 mm long, 3–4 mm in diameter, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern with on the sides longitudinal fibers and within transverse medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, $\frac{1}{2}$ mile w. of Trinity Beach, n. of Cairns, by small creek in *Eucalyptus* forest with *Melaleuca viridiflora*, *Dillenia alata*, *Eucalyptus alba*, 15 ft. alt., grove of *Pandanus*, Feb. 6, 1958, H. St. John 26,265 (BISH).

DISCUSSION: *P. citraceus* is a member of the section *Pandanus*. Its closest relative is *P. mossmanicus* St. John. For a statement of the characteristic differences, see the treatment of that species.

The new epithet is from the generic name *Citrus*, plus the Latin adjectival ending *-aceus*, meaning citrus-like, in reference to the surface of the phalanges which is rugose, half shiny, appearing glandular, like the skin of an orange fruit.

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

Fig. 112

DIAGNOSIS HOLOTYPI: Arbor 7 m alta 2 dm diametro, cortice cum radicillis adpresse adscendentibus dense oblecto, radicibus fulurosus nullis, foliis 1.6–1.79 m longis 6–7.5 cm latis coriaceis in sectione mediali cum 59–61 nervis secundariis in quoque latere, in sectione depresso M-formatis ex basi in apice subulato diminuentibus eo gracilibus sed in parte perdito, basi amplexicauli et inermi sed ex 15–40 cm marginibus cum aculeis 2.5–4 mm longis 7–13 mm distantibus gracilibus subulatis brunneis adpresse adscendentibus, midnervo toto inermi, in sectione mediali et ad apicem marginibus iner-

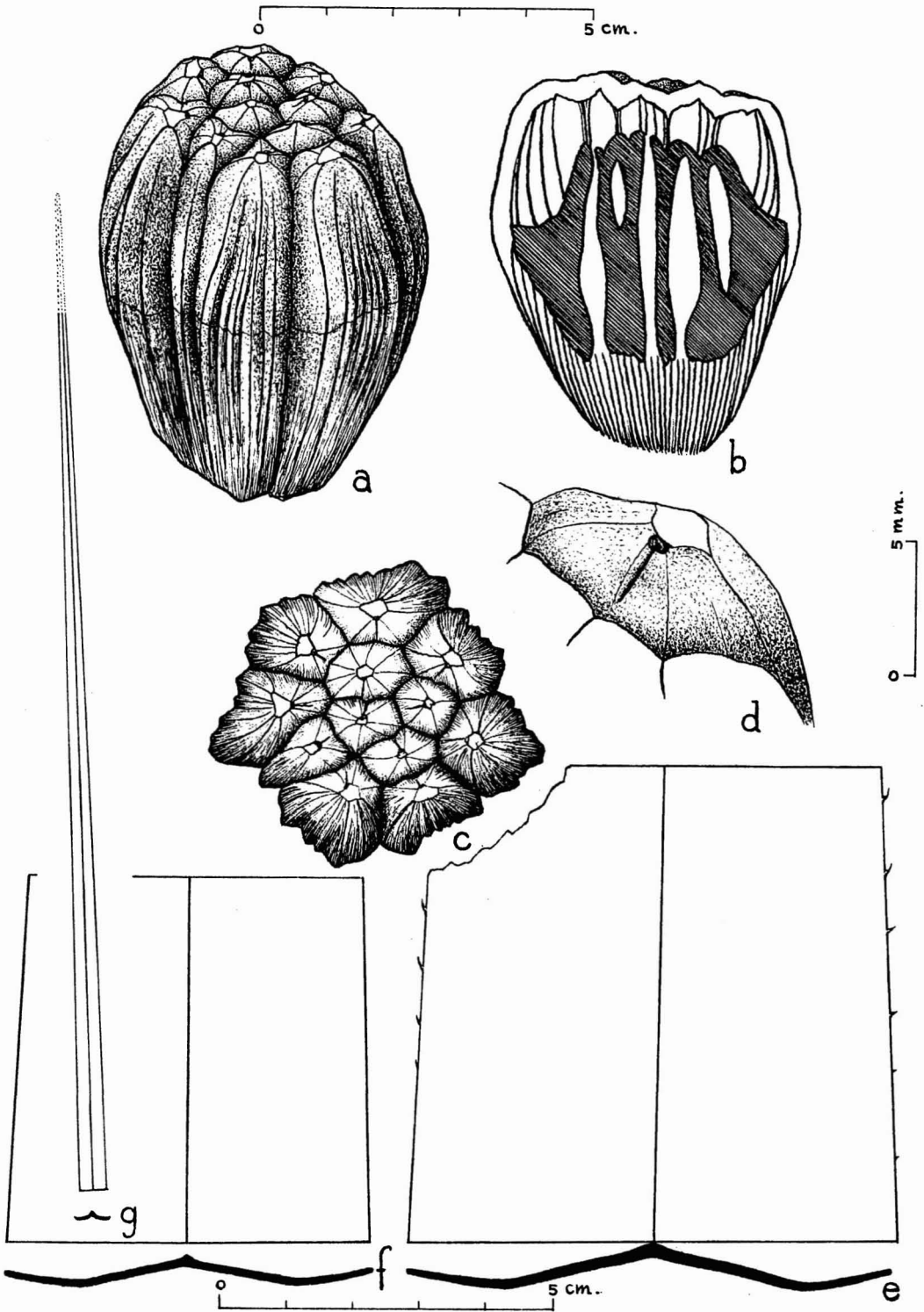


FIG. 112. *Pandanus endeavourensis* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

mibus, phalangibus 5–5.8 cm longis 4.1–4.8 cm latis 3.7–4.5 cm crassis late obovoideis 5–6-angulatis in sicco brunneis lateribus punctatis et subscabris exlucidis sensim convexis sed cum angulis multis, parte $\frac{1}{2}$ supera libera, apice oblato convexo vel enim truncato, suturis lateralibus distinctis, sinibus apicalibus centralibus 2–4 mm profundis curvatis vel sinuosis, carpellis 11–14 plerumque 12 apicibus subaequalibus oblato-pyramidalibus et cum concavitate horizontali, stigmatibus 1–1.5 mm longis ovatis vel reniformibus brunneis sulcatis obliquis centripetalibus, sinibus proximalibus $\frac{1}{2}$ – $\frac{2}{3}$ ad fundam extentis, endocarpio minime supramedioli 3.5 cm longo solido osseoso mahogani-brunneo intra lucido lateribus 8–9 mm crassis, seminibus 20 mm longis 4–5 mm diametro ellipsoideis, mesocarpio in apice carpella quaque cavernam cum fibris et medulla formanti, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 7 m tall, 2 dm in diameter; bark densely covered with appressed ascending rootlets; prop roots none; leaves 1.6–1.79 m long, 6–7.5 cm wide, coriaceous, at midsection with 59–61 secondary veins on each side, depressed M-shaped in section, sword-shaped, tapering from the base to the subulate apex which is slender but the tip not preserved, the base amplexicaul and unarmed, but the margins beginning 15–40 cm up with prickles 2.5–4 mm long, 7–13 mm apart, slender subulate, brown, appressed ascending; midrib unarmed throughout; at the midsection and from there to the tip the margins unarmed; inflorescence and syncarp not seen; phalanges 5–5.8 cm long, 4.1–4.8 cm wide, 3.7–4.5 cm thick, broadly obovoid, 5–6-angled, when dried brown, the sides punctate and slightly roughened, dull, gently convex but with many angles, upper $\frac{1}{2}$ free, the apex very low convex or even truncate; lateral sutures distinct; central apical sinuses 2–4 mm deep, wide, curved or sinuous; carpels 11–14, mostly 12, the apices subequal, much depressed pyramidal, the actual apex with a mostly horizontal concavity, the distal sides with 4–8 sharp angles and valleys, running almost to the apex and thus mortised with the adjacent ones; stigmas 1–1.5 mm long, ovate to reniform, brown, creased, oblique, centripetal; proximal sinus in a valley, running $\frac{1}{2}$ – $\frac{2}{3}$ way to the

bottom; endocarp slightly suprmedian, 3.5 cm long, massive, bony, mahogany-brown, the seed cavities shining, the lateral walls 8–9 mm thick; seeds 20 mm long, 4–5 mm in diameter, ellipsoid; upper mesocarp forming in each carpel apex a cavity with stout fibers and pith; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, by airstrip, 5 miles w.n.w. of Cooktown, savanna, 10 ft. alt., Feb. 1, 1958, *H. St. John* 26,251 (BISH).

DISCUSSION: *P. endeavourensis* is a member of the section *Pandanus*. Its closest relative is *P. orbicularis* St. John, of Queensland, which has the leaves 1.15–1.3 m long, 5.5–5.6 cm wide, the marginal prickles near the base 1.3–1.8 mm long; phalange 5.4–6.5 cm wide, subglobose, the sides almost smooth, a little shiny, the apex rounded; central apical sinuses 5–8 mm deep; and the carpels 7–12. In contrast, *P. endeavourensis* has the leaves 1.6–1.79 m long, 6–7.5 cm wide, the marginal prickles near the base 2.5–4 mm long; phalange 4.1–4.8 cm wide, broadly obovoid, the sides punctate and roughened, dull, the apex very low convex or even truncate; central apical sinuses 2–4 mm deep; and the carpels 11–14.

The species is named for the type locality, which is within a few miles of the Endeavour River, a name reminiscent of the ship commanded by Captain James Cook on his first world voyage. After stoving in its hull on the Great Barrier Reef, he managed to make the shore and beach his craft, H.M.S. "Endeavour," in the bay watered by the river that he named after the ship.

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

Fig. 113

DIAGNOSIS HOLOTYPE: Arbor 9 m alta 20 cm diametro, cortice cum radicillis adpresse adscendentibus, radicibus fulturosis nullis, foliis 2.1 m longis 7.6–8.4 cm latis coriaceis in sectione mediali cum 62–65 nervis secundariis in quaque latere, in sectione depresso M-formati gladiiformati ex basi in apice subulato diminuentibus sed apice non conservato, basi amplexicauli et inermi sed ex 24–41 cm marginibus cum aculeis 1.5–3 mm longis 6–25 mm distantibus, midnervo toto inermi, ex medio ad apicem margini-

bus inermibus, inflorescentia et syncarpio invisa, phalangibus 5.1–5.5 cm longis 3.1–4.8 cm latis 3.5–4.5 cm crassis late obovoideis 5–6-angulosus in sicco brunneo lateribus gradatim curvatis laevibus et lucidis in partibus expositis, apice subconvexo parte $\frac{1}{2}$ supera libera suturis lateralibus angustis sed evidentis plerumque ad basim, sinibus apicalibus centralibus 7–10 mm profundis V-formatis exinterobseratis, carpellis 8–11, plerumque 9 apicibus centralibus ovoideo-pyramidalibus eis marginalibus semiorbiculari-pyramidalibus in latere distali compresso et cum 3–7 angulis et valleculis solum in parte mediali et cum apice subdivergenti, stigmatibus 2–3 mm longis ellipsoideis apicalibus sulcatis brunneis obliquis centripetalibus, sinibus proximalibus $\frac{1}{2}$ – $\frac{2}{3}$ ad fondam extentis, endocarpio submediali solido osseoso mahogani-brunneo intra lucido lateribus lateralibus 6–7 mm crassis, mesocarpio super in apice carpellae quoque cavernoso et cum fibris et membranis medullo-sis, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 9 m tall, 20 cm in diameter; bark with appressed ascending rootlets; prop roots none; leaves 2.1 m long, 7.6–8.4 cm wide, coriaceous, at midsection with 62–65 secondary veins on each side, in section low M-shaped, sword-shaped, tapering from the base to the subulate apex, but the actual tip not preserved, base amplexicaul and unarmed, but the margins beginning at 29–41 cm with prickles 1.5–3 mm long, 6–25 mm apart, the midrib unarmed throughout; from the middle to the tip the margins unarmed; inflorescence and syncarp not seen; phalanges 5.1–5.5 cm long, 3.1–4.8 cm wide, 3.5–4.5 cm thick, broadly obovoid, 5–6-angled, when dried brown, the sides gently sloping, smooth and shiny almost throughout the exposed part, the apex moderately convex, upper $\frac{1}{2}$ free, lateral sutures narrow but distinct all or nearly all the way; central apical sinuses 7–10 mm deep, V-shaped, not mortised; carpels 8–11, mostly 9, the apices of the central ones ovoid-pyramidal, of the marginal ones semiorbicular-pyramidal, the distal side compressed and with 3–7 perceptible angles and valleys just in the median part, and the apex somewhat diverging; stigmas 2–3 mm long, apical, ellipsoid, creased, brown, oblique and

centripetal; proximal sinus prominent, running $\frac{1}{2}$ – $\frac{2}{3}$ way to valley bottom; endocarp submedian, massive, bony, mahogany-brown, in inner surfaces shining, the lateral walls 6–7 mm thick; upper mesocarp forming in the apex of each carpel a cavern with many fibers and with medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, by airstrip, 5 miles w.n.w. of Cooktown, savanna, 10 ft. alt., Feb. 1, 1958, *H. St. John* 26,250 (BISH).

DISCUSSION: *P. exarmatus* is a member of the section *Pandanus*. Its closest relative is *P. australiensis* St. John, of Queensland, which has the phalanges 5.6–6.1 cm long, 4.7–5.9 cm wide, the sides with many longitudinal ridges running to the tip, the upper $\frac{1}{3}$ free; central apical sinuses 5–8 mm deep, mortised; apices of the central carpels semiorbicular-pyramidal, the outer ones erect, and all bearing an apical concavity. *P. exarmatus* has the phalanges 5.1–5.5 cm long, 3.1–4.8 cm wide, the sides with longitudinal ridges only near the middle, upper $\frac{1}{2}$ free; central apical sinuses 7–10 mm deep, straight or curving; apices of the central carpels ovoid-pyramidal, the outer ones somewhat divergent, all acute or obtuse.

The new epithet is the Latin word *exarmatus*, unarmed, chosen because of the nearly spineless leaves.

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

Fig. 114

DIAGNOSIS HOLOTYPI: Arbor 7 m alta 15 cm diametro, cortice cum papillis adscendentibus, foliis 1.5–1.65 m longis 5–5.3 cm latis in sectione depresso sinuose M-formatis in sectione mediali cum 50 nervis secundariis in quoque latere, gladiformatis ex basi in apice subulato diminuentibus eo circa 10 cm ex puncto 4 mm lato basi amplexicauli et inermi sed ex 28–34 cm marginibus cum aculeis 2–2.5 mm longis 11–21 mm distantibus graciliter subulatis adscendentibus adpressis brunneis in margine uno per 1 dm productis, in altero per 2 dm productis, midnervo toto inermi, marginibus ex sec-

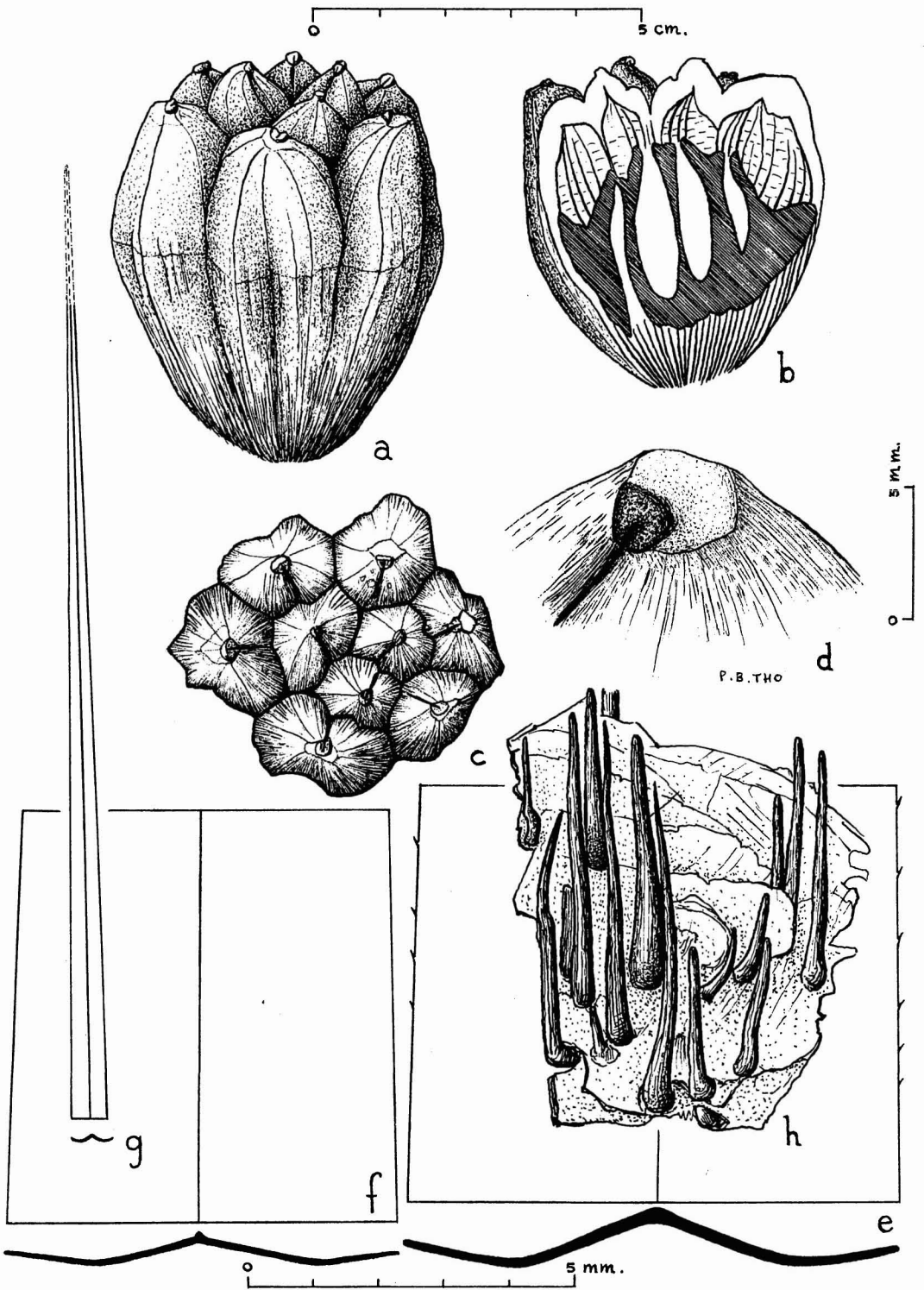


FIG. 113. *Pandanus exarmatus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex and stigma, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$; *h*, bark with appressed ascending adventitious rootlets, $\times 1$.

tione mediali ad apicem inermibus, phalangibus 4.5–5 cm longis 5.8–7.4 cm latis 4.2–5.3 cm crassis late turbinatis subcompressis basi lata et truncata in sicco brunneis 4–6-angulosis apice alto-convexo lateribus subrugosis et cum rimosis longitudinalibus brunneis pluribus parte $\frac{1}{2}$ supera libera, suturis lateralibus angustis in dimidia supera distinctis, sinibus centralibus apicalibus 1–2 mm profundis latis subcurvatis vel rectis, carpellis 8–11 (in geminis 16 et phalangio 8 cm lato) apicibus carpellarum centralium oblato-pyramidalibus cum concavitate apicali parvo, eis marginalium cum apicibus tantum projectionibus laterum phalangium apicibus subangulatis et cum concavitate majore, stigmatibus 1.5–2 mm longis obdeltoideis vel obovoideis et multis truncatis obscuris sulcatis centripetalibus eis centralibus obliquis et inflexis illis marginalibus plerumque in concavitate sitis et divergentibus, sinibus proximalibus $\frac{3}{4}$ vel tota ad fundam extensis, endocarpio 3 cm longo mediali solido osseoso obscure mahogani-brunneo intra lucido lateribus lateralibus 7–8 mm crassis, seminibus 15–18 mm longis 4–5.5 mm diametro ellipsoideis, mesocarpio supera in apice carpella quaque cavernoso cum fibris fortibus et membranarum pallidis medullosis, mesocarpio basali parvo fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 7 m tall, 15 cm in diameter; bark with ascending papillae; leaves 1.5–1.65 m long, 5–5.3 cm wide, in section low sinuous M-shaped, at midsection with 50 secondary veins on each side, swordlike, tapering from the base to the subulate apex, this about 10 cm down 4 mm wide, the base amplexicaul and unarmed, but beginning at 28–34 cm the margins with prickles 2–2.5 mm long, 11–21 mm apart, slender subulate, ascending, closely appressed, brown, produced for about 1 cm on one side, and 2 dm on the other; midrib unarmed throughout; from the midsection to the tip the margins unarmed; phalanges 4.5–5 cm long, 5.8–7.4 cm wide, 4.2–5.3 cm thick, broad turbinate, a little compressed, the wide base truncate, when dried brown, 4–6-angled, the apex high convex, the sides slightly rough and with several longitudinal, brown cracks, upper $\frac{1}{2}$ free, lateral sutures narrow, distinct in upper half; central apical sinuses 1–2 mm deep, wide, gently curved or straight;

carpels 8–11 (16 in a double and its phalange 8 cm wide), apices of central carpels flattened pyramidal, with a small apical concavity, those of the marginal carpels having the apices merely curved continuations of the sloping sides and not clearly separable from them, the sinuses no deeper, the apex slightly angled and with a larger concavity; stigmas 1.5–2 mm long, obdeltoid to obovoid, many truncate, dark, creased, centripetal, the central ones oblique and canted inwards, the marginal ones mostly in the concavity and canted outwards; proximal sinus running $\frac{3}{4}$ way to all the way to the valley bottom; endocarp 3 cm long, median, massive, bony, dark mahogany brown, the inner surfaces shining, the lateral walls 7–8 mm thick; seeds 15–18 mm long, 4–5.5 mm in diameter, ellipsoid; upper mesocarp forming in each carpel apex a small cavern with heavy fibers and pale medullary membranes; basal mesocarp sparse, fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, Six Mile Creek, 6 miles w. of Cooktown, fringing forest on small creek in *Eucalyptus* forest, 20 ft. alt., Jan. 3, 1958, *H. St. John* 26,239 (BISH).

DISCUSSION: *P. medialisnermis* is a member of the section *Pandanus*. In that section is its closest relative, *P. somersetensis* St. John, of Queensland, which has the bark muriculate; leaves 0.93 m long, 6.8–7.2 cm wide, near the tip the midrib below with ascending prickles 0.3 mm long; phalanges 5–5.5 cm long, 4–5.1 cm wide, narrowly obpyramidal, upper $\frac{1}{4}$ free, apex low convex, lateral sutures mostly none, central apical sinuses 0.5–1 mm deep, almost imperceptible; carpels 7–9, the apices depressed conic; and the endocarp walls 2–3 mm thick. *P. medialisnermis* has the bark with ascending papillae; leaves 1.5–1.6 m long, 5–5.3 cm wide, midrib unarmed throughout; phalanges 4.5–5 cm long, 5.8–7.4 cm wide, broad turbinate, upper $\frac{1}{2}$ free, apex high convex, lateral sutures distinct in upper half, central apical sinuses 1–2 mm deep; carpels 8–11, the apices with a terminal concavity; and the endocarp lateral walls 7–8 mm thick.

The new epithet is from the Latin *medialis*, middle; *inermis*, unarmed, in reference to the unarmed midrib.

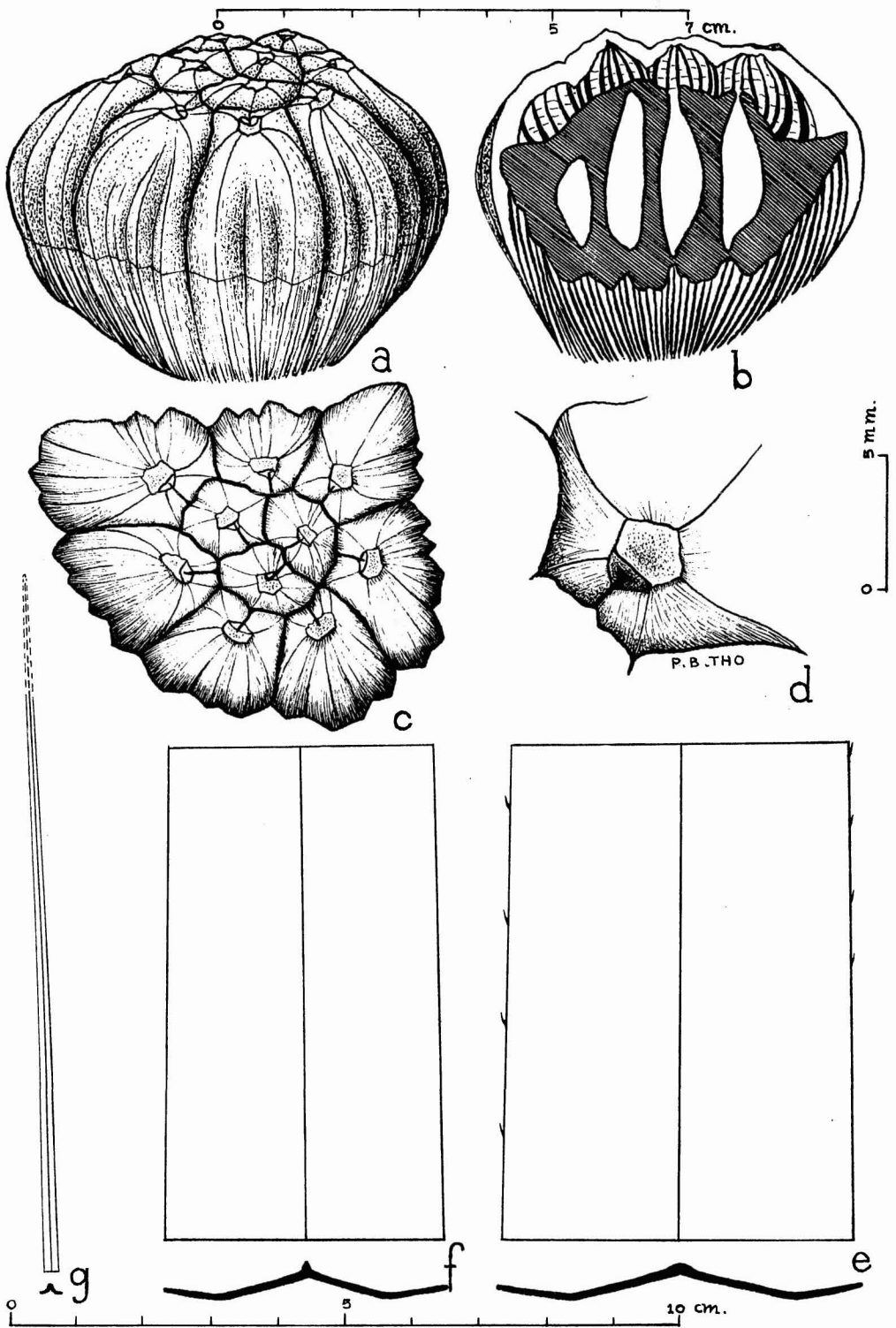


FIG. 114. *Pandanus medialinermis* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex and stigma, apical view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

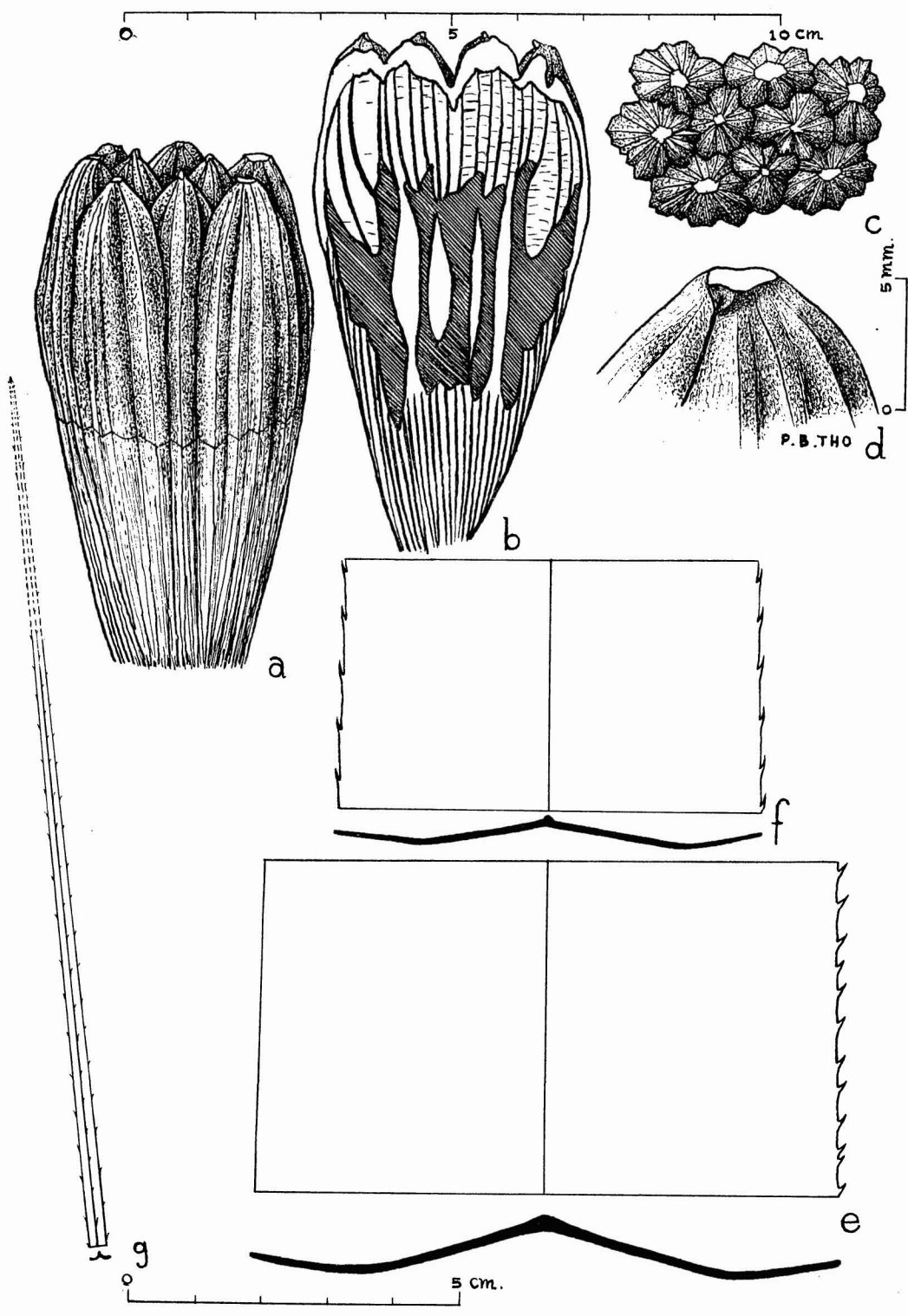


FIG. 115. *Pandanus mossmanicus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

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

Figs. 115, 116a

DIAGNOSIS HOLOTYPI: Arbor 13 m alta 22 cm diametro, trunco per 8–9 m singulo, cortice cum radicillis adpresse adscendentibus dense oblecto, radicibus fulturosis nullis, foliis 2.43–2.50 m longis 9.5–10 cm latis coriaceis in sectione mediali cum 67–74 nervis secundariis in quoque latere, gladiformibus ex basi in apice longo subulato diminuentibus eo in puncto approximato 10 cm ex apice 3–4 mm lato, basi amplexicauli inermi sed ex 20–25 cm marginibus cum aculeis 1.5–3 mm longis 3–11 mm distantibus validis subulatis adscendentibus apice brunneo, midnervo infra inermi in regione basali et mediali, in regione mediali marginibus cum aculeis 2–2.2 mm longis 5–12 mm distantibus crassiter subulatis subadpressis adscendentibus, proxima apicem marginibus cum serris 0.2–0.5 mm longis 2–5 mm distantibus, midnervo infra cum serris simulantibus sed gracilioribus, inflorescentia foeminea terminali cernua foliosa, syncarpio unico globoso, phalangibus 7.3–7.8 cm longis 3.7–4.7 cm latis 2.5–4.2 cm crassis elliptico-obovoideis in basi cuneatis 4–5 angulosis, dimidia supera mahogani-rubra lateribus subcurvatis papillosis et dense plicatis sublucidis et cuti. Citri simulantibus parte $\frac{1}{2}$ supera libera apice truncato vel rare paene convexo-truncato, suturis lateralibus distinctis sed angustis, sinibus centralibus apicalibus 6–12 mm profundis V-formatis, carpellis 7–11 plerumque 8–9 apicibus anguste angulosis marginalibus semiorbiculari-pyramidalibus et pluribus in lateribus distalibus compressis, marginibus exterioribus cum 5–12 dorsis angustis longitudinalibus, lateribus interioribus item cum dorsis valleculisque, apice minime truncato vel concavo, apicibus centralibus plerumque lanceoloideo-pyramidalibus symmetricalibus, stigmatibus 1.5–2 mm longis sulcatis subnigris ovalibus vel marginalibus ceteribus in apice truncatis centripetalibus obliquis vel verticalibus proximalibus, sinibus proximalibus ad fondam extentis, endocarpio minime supramedioli solido osseoso mahogani-colorato 35–38 mm longo summibus interioribus lucidis lateribus lateralibus 6–8 mm crassis, seminibus 13–15 mm longis 4 mm diametro ellipsoideis,

mesocarpio supero in carpella quaque cavernam apicalem cum fibris plerumque marginalibus et cum membranis pallidis medullosis formanti, mesocarpio basali fibroso et carnosio.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Tree 13 m tall, 22 cm in diameter; the trunk unbranched for 8–9 m; bark densely covered with appressed ascending rootlets; prop roots none; leaves 2.43–2.50 m long, 9.5–10 cm wide, coriaceous, at midsection with 67–74 secondary veins on a side, swordlike, tapering from the base to the long subulate apex, this about 10 cm down 3–4 mm wide, the base unarmed, amplexicaul, but beginning 20–25 cm up the margins with prickles 1.5–3 mm long, 3–11 mm apart, stout subulate, ascending, brown tipped; the midrib below unarmed till well beyond the middle; at midsection the margins with prickles 2–2.2 mm long, 5–12 mm apart, stout subulate, subappressed ascending; near the apex the margins with serrae 0.2–0.5 mm long, 2–5 mm apart; the midrib below with similar but more

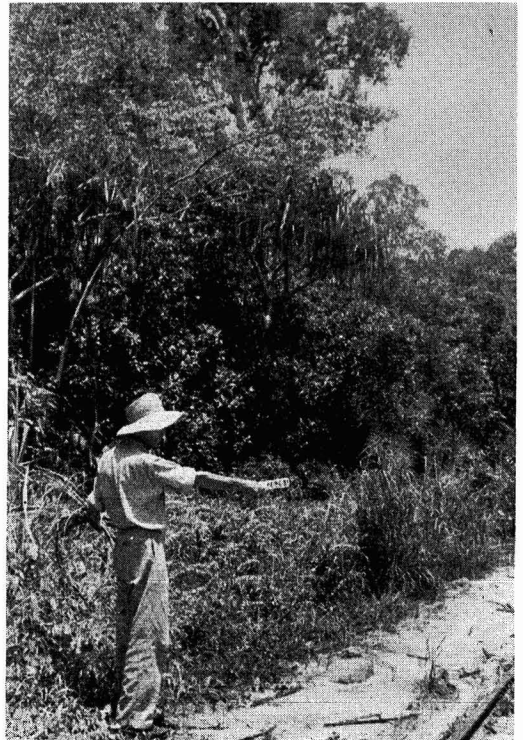


FIG. 116a. *Pandanus mossmanicus* St. John, holotype, habit and habitat, with S. T. Blake.

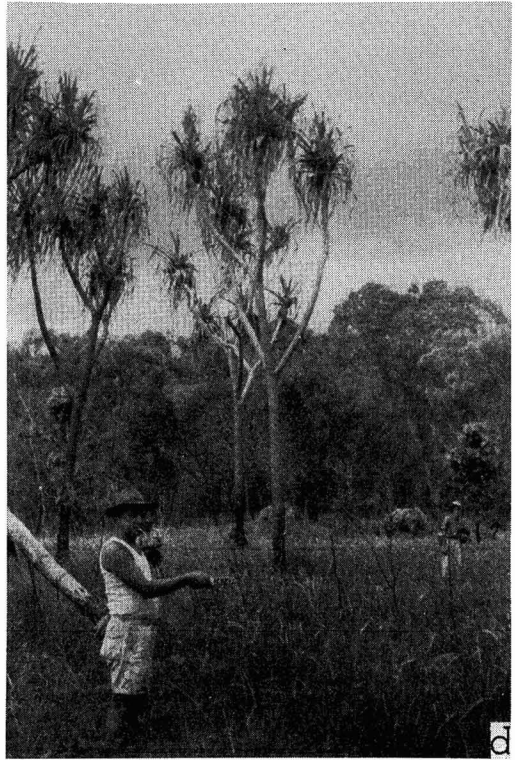


FIG. 116b-d. b, *P. pluriangulatus* St. John, holotype, habit; c, foliage and syncarp. d, *P. punctatus* St. John, holotype, habit.

slender serrae; pistillate inflorescences terminal, nodding, leafy bracted; syncarp single, when half grown green, globose; ripe, fallen phalanges 7.3–7.8 cm long, 3.7–4.7 cm wide, 2.5–4.2 cm thick, elliptic-obovoid, cuneate towards the base, 4–5-angled, upper half deep mahogany-red, the sides gently curved, papillose and closely wrinkled, somewhat shiny, somewhat resembling the skin of a *Citrus* fruit, free in upper $\frac{1}{2}$, the apex truncate, or rarely slightly convex-truncate, lateral sutures distinct but narrow; central apical sinuses 6–12 mm deep, V-shaped below; carpels 7–11, mostly 8–9, their apices sharply angled, the marginal ones semiorbicular-pyramidal and some of them flattened on the distal side, the outer margins with 5–12 sharp, longitudinal ridges, thus mortised with their neighbors, the inner sides also with sharp angles and valleys, and mortised, and at the apex with a small area truncate or shallowly concave, the central carpel apices mostly lanceoloid-pyramidal, symmetric; stigmas 1.5–2 mm long, creased, blackish, oval or some of the marginal ones truncate at summit, centripetal and oblique to vertical on proximal face of tip; proximal sinus running to valley bottom; endocarp slightly suprmedian, massive, bony, mahogany-colored, 35–38 mm long, the inner surfaces shining, the outer lateral walls 6–8 mm thick; seeds 13–15 mm long, 4 mm in diameter, ellipsoid; upper mesocarp forming in apex of each carpel a cavern with the longitudinal fibers mostly marginal and with pale medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, Drovandi Bridge, $3\frac{1}{2}$ miles n. of Mossman, swamp forest with *Dillenia alata*, *Melaleuca*, *Stenochlaena scandens*, 20 ft. alt., common 2nd. story tree, Feb. 5, 1958, *H. St. John* 26,261 (BISH).

SPECIMENS EXAMINED: Queensland, Mourilyan, Nov. 19, 1924, *W. H. Amundsen* (BRI): Daintree River, 1876, *Fitzalan*, bearing an unpublished new specific epithet by von Mueller (MEL).

DISCUSSION: *P. mossmanicus* is a member of the section *Pandanus*. Its closest relative is *P. citraceus* St. John, from Queensland. The latter species has the leaves 7–8 cm wide, near the base the margins with prickles 3–5 mm long,

at midsection the midrib below with ascending prickles 2.5–3 mm long; phalanges 6–7 cm long, 2.8–4.1 cm wide, the apex shallowly concave; carpels 9–16, the apices narrowly pyramidal; and the endocarp 25–30 mm long, the lateral walls 3–4 mm thick. On the other hand, *P. mossmanicus* has the leaves 9.5–10 cm wide, near the base the margins with prickles 1.5–3 mm long, from the base to well beyond the middle the midrib unarmed; phalanges 7.3–7.8 cm long, 3.7–4.7 cm wide, the apex truncate; carpels 7–11, the marginal apices semiorbicular-pyramidal, the central ones mostly lanceoloid-pyramidal; endocarp 35–38 mm long, the lateral walls 6–8 mm thick.

The new epithet is an adjective formed from the name of the type locality.

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

Fig. 117

DIAGNOSIS HOLOTYPI: Arbor 8 m alta 12 cm diametro, cortice verruculoso, radicibus fulturosis 1 m longis 3–4 cm diametro sparse verruculosus, foliis 1.7 m longis 5.7–6.5 cm latis subcoriaceis in sectione mediali cum 57 nervis secundariis in quoque latere, in sectione depresso sinuositer M-formatis gladiformatis ex basi in apice subulato diminuentibus basi amplexicauli inermi sed ex 9–12 cm marginibus cum aculeis 2–3 mm longis 5–14 mm distantibus subulatis adscendentibus apice brunneo, midnervo infra ex 12–15 cm cum aculeis 1.5–2.5 mm longis 8–27 mm distantibus simulantibus sed reflexis, in regione mediali marginibus cum serris subulatis 1–1.3 mm longis 8–15 mm distantibus, midnervo infra cum aculeis 1.3–1.5 mm longis 8–25 mm distantibus adscendentibus subulatis, circa apicem marginibus cum serris 0.2 mm longis 4–6 mm distantibus, midnervo infra cum aculeis 0.6–0.8 mm longis 3–6 mm distantibus subulatis adscendentibus, syncarpio invisio, phalangibus 3.8–4.3 cm longis 2–3 cm latis 1.6–2.6 cm crassis cuneato-obovoideis vel-oblanceoloideis compressis in sicco pallide brunneis 5–6-angulosis lateribus gradatim curvatis vel planatis laevibus lucidis parte $\frac{1}{3}$ supera libera apice convexo, suturis lateralibus in media vel totis partibus liberae, sinibus centralibus apicalibus 2–4 mm profundis parte basali an-

gusto recto vel subcurvato, carpellis 8–15 plerumque 11–12 apicibus subaequalibus oblato-semiorbicularibus marginalibus plerumque asymmetricalibus et latere distali complanato sed paucis majoribus cum concavitate distali subterminali vadoso, stigmatibus 1–1.5 mm longis subcircularibus vel late ellipticis sulcatis apicalibus elevatis obliquis centripetalibus vel paucis marginalibus extra inclinatis, sinibus proximalibus stigmati aequalibus, endocarpio minime supramedioli 18–19 mm longo obscure brunneo osseoso lateribus lateralibus 1 mm crassis, seminibus 10–12 mm longis 3–5 mm diametro obliquiter ellipsoideis, mesocarpio apicali in carpella quaque cavernam cum fibris paucis longitudinalibus et membranis albis medullosis formanti, mesocarpio basali fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 8 m tall, 12 cm in diameter; bark warty; prop roots 1 m long, 3–4 cm in diameter, sparsely warty; leaves 1.7 m long, 5.7–6.5 cm wide, subcoriaceous, at midsection with 57 secondary veins on each side, in section low, sinuous M-shaped, sword-shaped, tapering from the base to the subulate apex, the base amplexicaul and unarmed, but beginning at 9–12 cm the margins with prickles 2–3 mm long, 5–14 mm apart, subulate, ascending, brown-tipped; the midrib below beginning at 12–15 cm up with prickles 1.5–2.5 mm long, 8–27 mm apart, similar but reflexed; at the midsection the margins with prickles 1–1.3 mm long, 8–15 mm apart, subulate serrae; the midrib below with prickles 1.3–1.5 mm long, 8–25 mm apart, ascending, subulate; near the apex the margins with serrae 0.2 mm long, 4–6 mm apart; the midrib below with prickles 0.6–0.8 mm long, 3–6 mm apart, subulate, ascending; syncarp not seen; phalanges 3.8–4.3 cm long, 2–3 cm wide, 1.6–2.6 cm thick, cuneate-obovoid or -oblanceoloid, compressed, when dried pale brown, 5–6-angled, the sides gently curved or plane, smooth, shining, free in upper $\frac{1}{3}$, the apex convex; lateral sutures distinct in half or all of the upper free portion; central apical sinuses 2–4 mm deep, the lower part narrow, straight or gently curved; carpels 8–15, mostly 11–12, the apices subequal, oblate semiorbicular, the marginal ones mostly asymmetric and flattened distally, but a few of

the larger ones with a nearly terminal, distal, shallow concavity; stigmas 1–1.5 mm long, subcircular to broad elliptic, creased, apical, raised, oblique, centripetal or a few of the marginal ones slanted outwards; proximal sinus not longer than the stigma; endocarp slightly supramedioli, 18–19 mm long, dark brown, bony, the lateral walls 1 mm thick; seeds 10–12 mm long, 3–5 mm in diameter, obliquely ellipsoid; upper mesocarp forming in each carpel apex a cavern with a few longitudinal fibers and with white medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, Green Island, off Cairns, in forest at top of beach, with *Scaevola frutescens*, *Thespesia populnea*, *Planchonella obovata*, *Mimusops parviflora*, Feb. 9, 1960, H. St. John 26,267 (BISH).

DISCUSSION: *P. oblatiapicalis* is a member of the section *Pandanus*. Its closest relative is *P. duriocarpus* Martelli, of Palau, a species which has the leaves 7.8 cm wide; phalanges 4.5–4.8 cm long, 2.5–4 cm wide; carpel apices acutely narrow pyramidal; apical central sinuses 5–7 mm deep; and the endocarp in the upper third. *P. oblatiapicalis* has the leaves 5.7–6.5 cm wide; phalanges 3.8–4.3 cm long, 2–3 cm wide; carpel apices oblate-semiorbicular; apical central sinuses 2–4 mm deep; and the endocarp slightly supramedioli.

Pandanus orbicularis sp. nov. (sect. *Pandanus*)
Figs. 118, 139Ad

DIAGNOSIS HOLOTYPI: Arbor 8 m alta 15 cm diametro pauciter ramosa in corona laxa, cortice cum radicillis adpresse adscendentibus, radicibus fulturosis nullis, foliis 1.15–1.3 m longis 5.5–5.6 cm latis coriaceis in sectione mediali cum 50 nervis secundariis in quoque latere, in sectione oblatiter M-formatis gladiformatis ex basi in apice subulato diminuentibus eo 10 cm ex apice 6 mm lato basi amplexicauli et inermi sed ex 10–28 cm marginibus cum aculeis 1.3–1.8 mm longis 5–15 mm distantibus valde subulatis adscendentibus brunneis, midnervo toto inermi, in sectione mediali et ad apicem marginibus inermibus, phalangibus 5.4–6.5 cm longis 5.4–6.5 cm latis 4.3–4.8 cm crassis subglobosis compressis 5–6-angulatis in sicco brunneo et pauciter subrubro lateribus sublaevibus et sublu-

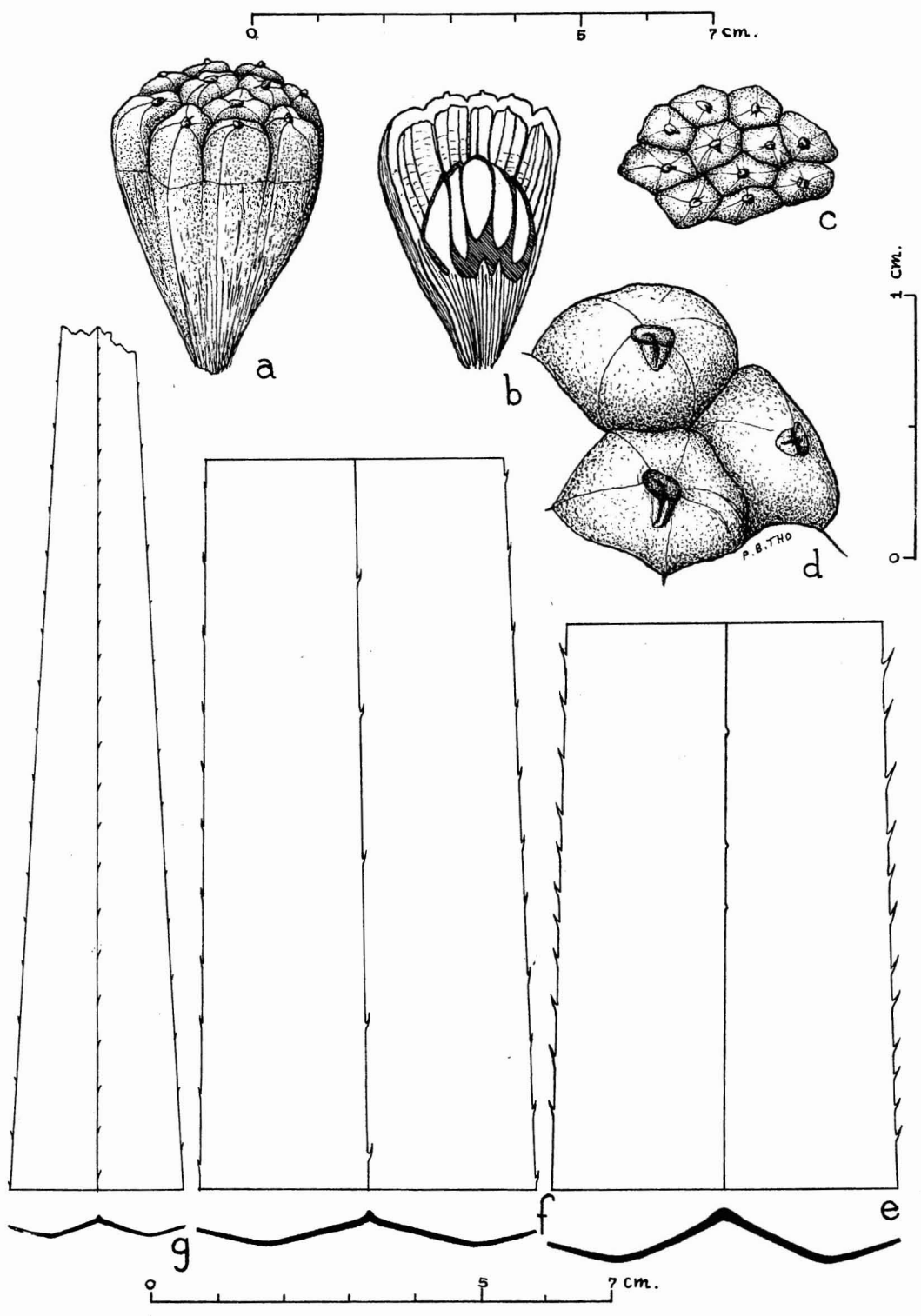


FIG. 117. *Pandanus oblataipicalis* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apices, stigmas, and proximal sinuses, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

cidis subcurvatis sed cum dorsis multis parte $\frac{1}{2}$ supera libera apice rotundato, suturis lateralibus profundis et conspicuis, sinibus centralibus apicalibus 5–8 mm profundis late V-formatis curvatis vel subsinuosis, carpellis 7–12 plerumque 9–10 (sed geminis cum 14 et 8.2 cm latis) apicibus pyramidali-semiorbicularibus subaequalibus angulosis in apice concavitate parva, stigmatibus 2–3 mm longis obdeltoideis vel oblanceolatis sulcatis obliquis centripetalibus, sinibus proximalibus $\frac{2}{3}$ ad fundam extentis, endocarpio 3.4 cm longo solido mediali osseoso mahogani-colorato intra lucido lateribus 9–11 mm crassis, seminibus 20–23 mm longis 5–6 mm diametro ellipsoideo, mesocarpio supero in apice carpellae quaeque cavernam cum fibris longitudinalibus fortibus et membranarum albis medullosis formanti, mesocarpio basali sparso fibroso carnosoque.

DIAGNOSIS OF HOLOTYPE: Tree 8 m tall, 15 cm in diameter, few branched to form an open crown; bark with appressed ascending rootlets; prop roots none; leaves 1.15–1.3 m long, 5.5–5.6 cm wide, coriaceous, at midsection with 50 secondary veins on each side, in section low M-shaped, swordlike, tapering from the base to the subulate tip, this about 10 cm down 6 mm wide, the base amplexicaul and unarmed, but beginning at 10–28 cm the margins with prickles 1.3–1.8 mm long, 5–15 mm apart, stout subulate, ascending, brown; the midrib unarmed throughout; at midsection the margins unarmed and likewise from there to the tip; inflorescence and syncarp not seen; phalanges 5.4–6.5 cm long, 5.4–6.5 cm wide, 4.3–4.8 cm thick, subglobose, compressed, 5–6-angled, when dried brown with a trace of pink, the sides almost smooth, a little shiny, gently sloping but cut by numerous longitudinal ridges, upper $\frac{1}{2}$ free; apex rounded; lateral sutures deep and prominent; central apical sinuses 5–8 mm deep, wide V-shaped, curved or slightly sinuous; carpels 7–12, mostly 9–10 (but in a twin 14 and the phalange 8.2 cm wide), the apices pyramidal semiorbicular, subequal, angled, the actual apex with a small concavity; stigmas 2–3 mm long, obdeltoid to oblanceolate, creased, oblique, centripetal; proximal sinus running $\frac{2}{3}$ way to valley bottom; endocarp 3.4 cm long, massive, median, bony, mahogany-colored, the inner sur-

faces shining, the lateral margins 9–11 mm thick; seeds 20–23 mm long, 5–6 mm in diameter, ellipsoid; upper mesocarp forming in each carpel apex a cavern with strong longitudinal fibers and white medullary membranes; basal mesocarp sparse, fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, south bank of Annan River, 4 miles s.s.w. of Cooktown, savanna with *Eucalyptus alba*, *E. leptophleba*, Feb. 3, 1958, *H. St. John* 26,252 (BISH).

DISCUSSION: *P. orbicularis* is a member of the section *Pandanus*. Its closest relative is *P. Whitei* Martelli, of Queensland, which has the leaves more than 1.5 m long, 8 cm wide; phalanges 7–7.3 cm long, 6–6.5 cm wide; central apical sinuses 3–5 mm deep, zigzag and adjacent carpels strongly mortised. In contrast, *P. orbicularis* has the leaves 1.1–1.3 m long, 5.5–5.6 cm wide; phalanges 5.4–6.5 cm long, 5.4–6.5 cm wide; central apical sinuses 5–8 mm deep, and gently curved or slightly sinuous.

The new epithet is the Latin adjective *orbicularis*, orbicular, given in reference to the nearly orbicular phalanges of this species.

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

Fig. 119

DIAGNOSIS HOLOTYPEI: Arbor 10 m alta 2 dm diametro, trunco cum radicillis adpresse adscendentibus obtecto, radicibus fulurosus nullis, foliis 1.75–1.83 m longis 8 cm latis coriaceis in quoque latere cum 71 nervis secundariis in sectione depresso M-formatis gladiformatis ex basi in apice licet subulato sensim diminuentibus, basi amplexicauli et inermi sed ex 12–14 cm marginibus cum aculeis 3–4 mm longis 5–9 mm distantibus valide arcuate subulatis adscendentibus in apice brunneo, midnervo affini inermi, in sectione mediali marginibus cum subulato-serris 1–1.5 mm longis 3–8 mm distantibus, midnervo infra cum aculeis 1.5–2 mm longis 6–18 mm distantibus graciliter subulatis adpresse adscendentibus, circa apicem marginibus et midnervo infra cum serris 0.2–0.4 mm longis 1.5–3 mm distantibus, phalangibus 4.3–4.8 cm longis 2.3–2.9 cm latis 2.1–2.4 cm crassis late cuneatis parte $\frac{1}{2}$ supera libera apice truncato (vel minime convexo) suturis lateralibus dis-

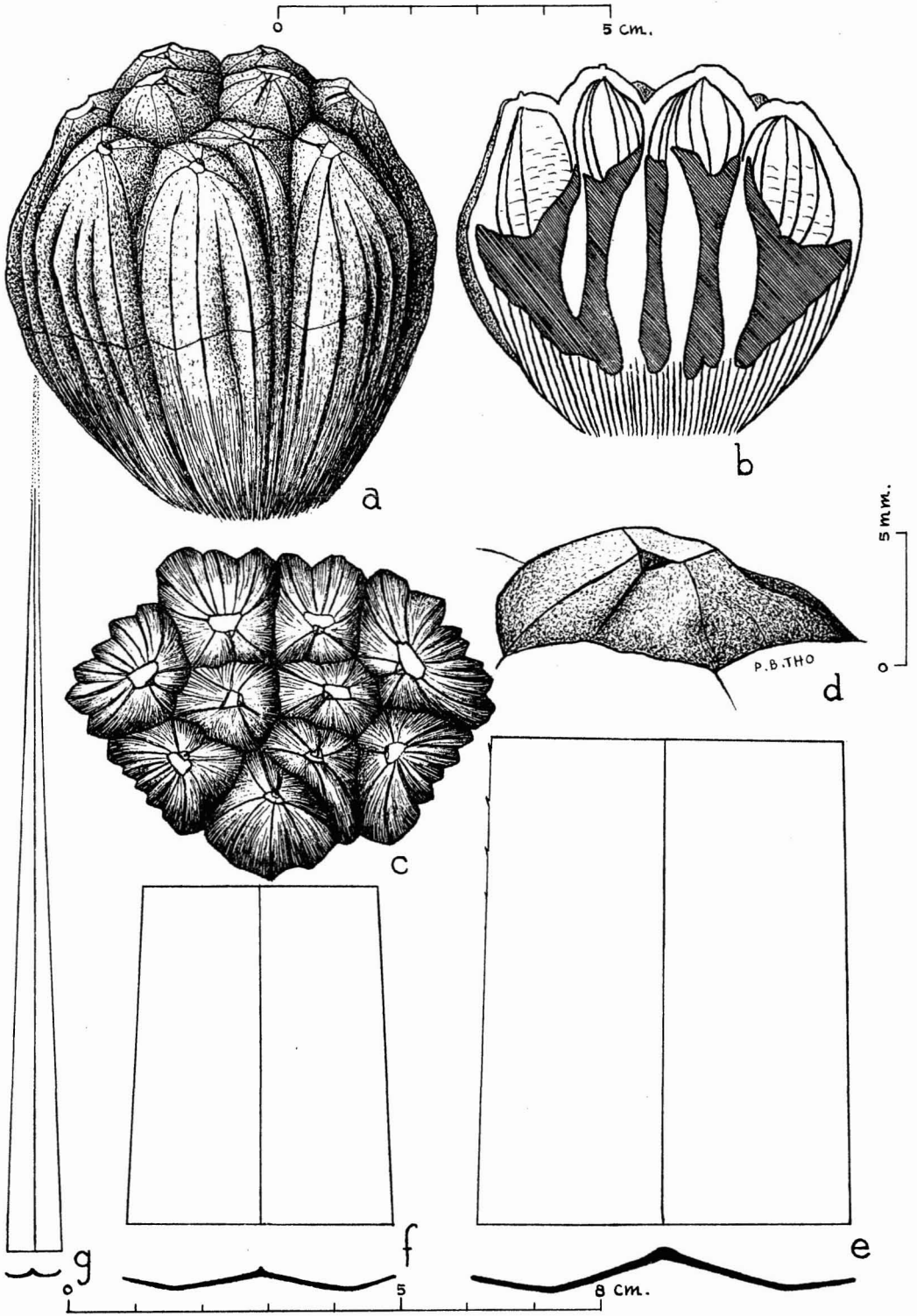


FIG. 118. *Pandanus orbicularis* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex with stigma and proximal sinus, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

tinctis sed angustis, lateribus densiter minute papillosis cum 4–7 angulis majoribus et carpella quaque cum 3–10 dorsis et valleculis secundariis angustis, sinibus centralibus apicalibus 5–12 mm profundis anguste V-formatis, carpellis 5–7 apicibus pyramidalibus eis marginalibus omnibus truncatis, stigmatibus 1.5–2 mm longis distalibus obliquis centripetalibus ovatis vel deltoideis sulcatis nigris, sinibus proximalibus vel in dorso $\frac{1}{2}$ ad fondam vel in vallecula tota ad fondam extentis, endocarpio mediali 3–3.3 cm longo osseoso obscure brunneo lateribus lateralibus 2 mm crassis, seminibus 20–25 mm longis 4 mm diametro fusiformibus, mesocarpio supero in apice carpella quaque cavernoso cum fibris fortibus paucis et membranis albis medullosis multis, mesocarpio basali fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 10 m tall, 2 dm in diameter; trunk covered with appressed ascending rootlets; prop roots none; leaves 1.75–1.83 m long, 8 cm wide, coriaceous, on each side with 71 secondary parallel nerves, in section low M-shaped, sword-shaped, tapering gradually from the base to the apparently subulate apex, the base amplexicaul and unarmed, but beginning 12–14 cm up the margins with prickles 3–4 mm long 5–9 mm apart, stout subulate arcuate ascending, brown-tipped; the nearby midrib unarmed; at midsection the margins with subulate-serrae 1–1.5 mm long, 3–8 mm apart; the midrib below with prickles 1.5–2 mm long, 6–18 mm apart, slender subulate, appressed ascending; near the tip the margins and midrib below with serrae 0.2–0.4 mm long, 1.5–3 mm apart; phalanges 4.3–4.8 cm long, 2.3–2.9 cm wide, 2.1–2.4 cm thick, broad cuneate, upper $\frac{1}{2}$ free, apex truncate (or very low convex), lateral sutures distinct narrow cracks, the sides closely and minutely papillose, with 4–7 principal angles and on each carpel with 3–10 sharp secondary ridges and valleys, apical central sinuses 5–12 mm deep, narrow V-shaped; carpels 5–7, their apices pyramidal, and all the marginal ones with an apical horizontal or slightly oblique truncate plane, then on the distal face is the oblique, centripetal stigma 1.5–2 mm long, ovate to deltoid, creased, black; proximal crease if on a ridge running $\frac{1}{2}$ way, if in a valley running quite to the valley bottom; endocarp median, 3–3.3 cm long, bony, dark

brown, the lateral walls 2 mm thick; seeds 20–25 mm long, 4 mm in diameter, fusiform; apical mesocarp cavernous in each carpel, with a few strong fibers and many white medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, 9 miles w.s.w. of junction of McIvor and Morgan Rivers, fringing forest along swampy creek, with *Dillenia*, *Cassia*, *Planchonella*, 100 ft. alt., Feb. 1, 1958, *H. St. John* 26,249 (BISH).

DISCUSSION: *P. papillosus* is a member of the section *Pandanus*. Its closest relative is *P. ferrimontanus* St. John, of Queensland. The latter has the leaves 5.8 cm wide; phalanges 4.2 cm wide, 3.4–3.5 cm thick, the apex rounded; central apical sinuses 3.5–4.5 mm deep; carpels 8–12, and their apices semiorbicular. *P. papillosus* has leaves 8 cm wide; phalanges 2.3–2.9 cm wide, 2.1–2.4 cm thick, the apex truncate; central apical sinuses 5–12 mm deep; carpels 6–8, and their apices conic.

The new epithet is the Latin adjective *papillosus*, with papillae, in reference to the papillose surface of the phalanges.

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

Figs. 120, 116b, c

DIAGNOSIS HOLOTYPI: Arbor 7 m alta 2 dm diametro, corona vadosa lata pauce ramosa, cortice cum radicillis multis adpresse adscendentibus, radicibus fulturosis nullis, foliis 1.5 m longis 7 cm latis coriaceis in sectione depresso M-formatis in quoque latere cum 63–65 nervis secundariis, gladiformatis in apice subulato diminuentibus basi amplexicauli inermi marginibus et midnervo infra tota inermibus, inflorescentia foeminea 5 dm longa, syncarpio $\frac{2}{3}$ maturo 18 cm longo subglobozo, phalangibus 5.7–6.5 cm longis 4–5 cm latis 3.7–4.3 cm crassis late ellipsoideis 4–6-angulosis in sicco brunneis sed pauce rubris, lateribus subcurvatis papillosis rugosis excludis parte $\frac{1}{2}$ supera libera, apice depresso convexo, suturis lateralibus distinctis sed angustis, sinibus centralibus apicalibus 4–7 mm profundis V-formatis angulosis et interobseratis, carpellis 9–12 apicibus subaequalibus eis centralibus lanceoloideis vel lanceo-ovoideis acute angulosis lateribus cum 3–7 dorsis et valleculis longitudinalibus angustis, apicibus mar-

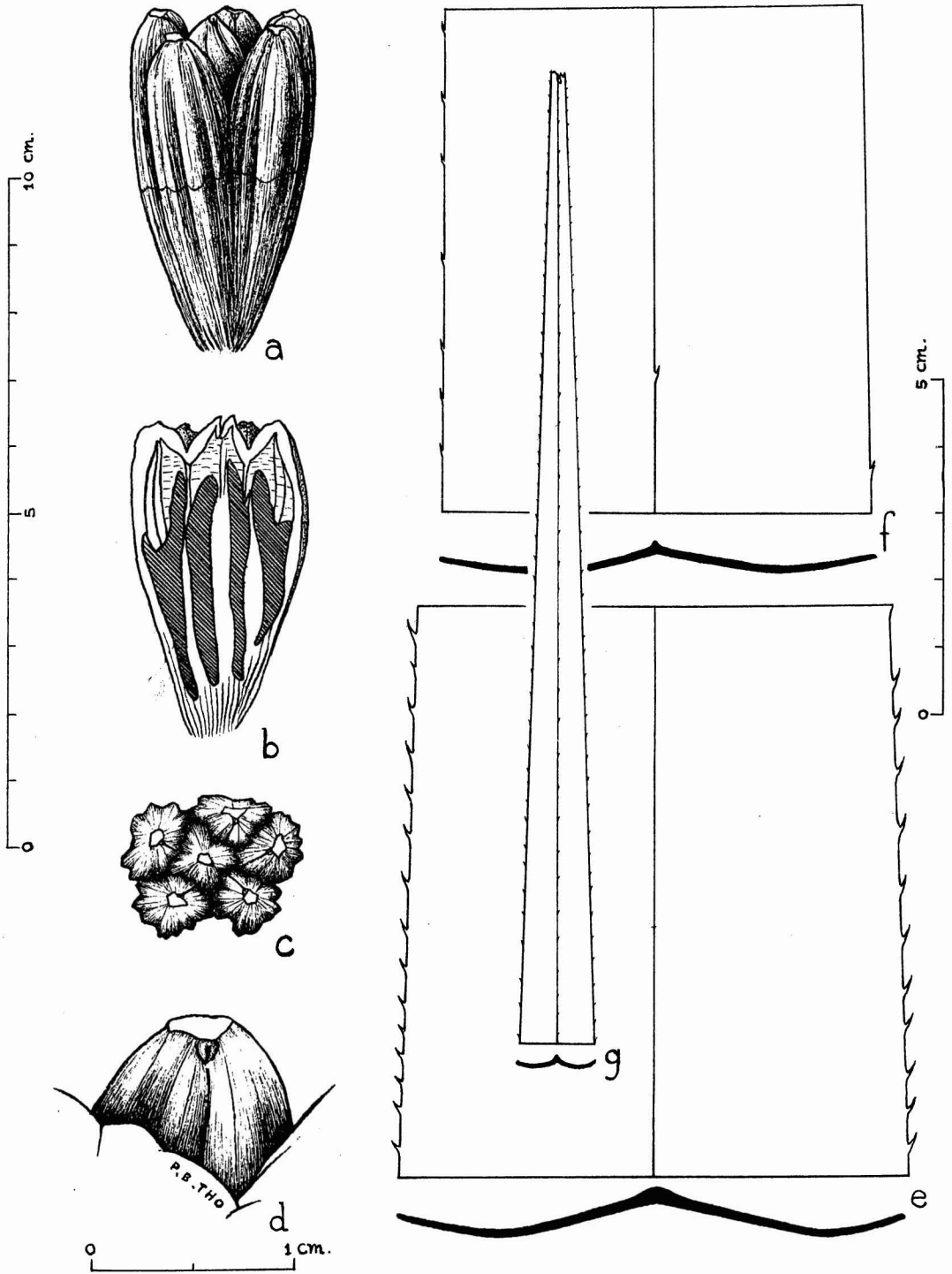


FIG. 119. *Pandanus papillosus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

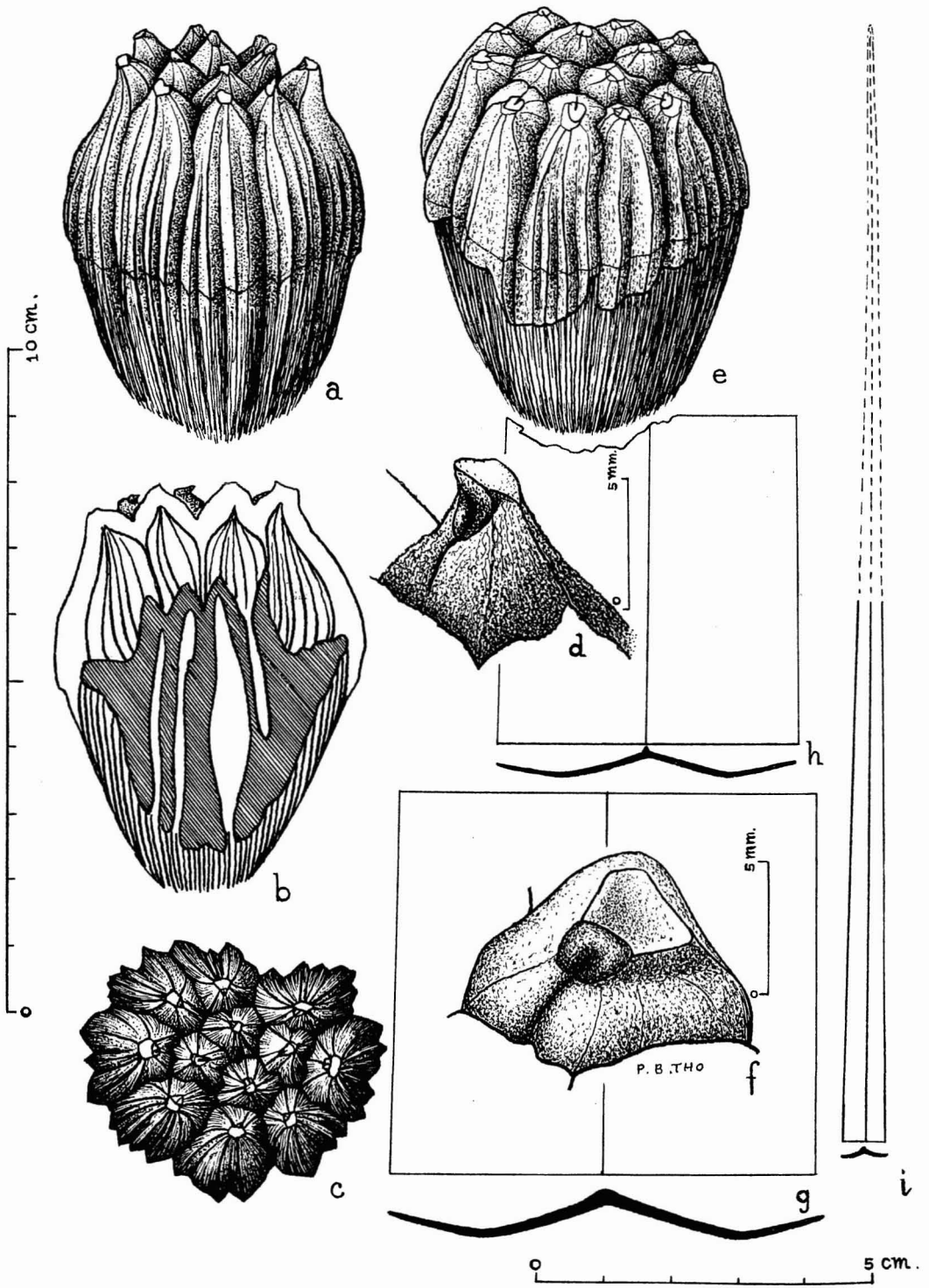


FIG. 120. *Pandanus pluriangulatus* St. John, holotype. *a*, Typical phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, typical phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, $\times 4$; *e*, one of the few broader phalanges, lateral view, $\times 1$; *f*, carpel apex of *e*, $\times 4$; *g*, leaf base, lower side, $\times 1$; *h*, leaf middle, lower side, $\times 1$; *i*, leaf apex, lower side, $\times 1$.

ginalibus lanceo-ovoideis vel semiorbiculari-pyramidalibus et multis a latere compressis et subdivergentibus, enim phalangibus paucis cum apicibus carpellarum oblato-pyramidalibus, stigmatibus 2–3.5 mm longis ellipsoideis sulcatis, eis marginalis plerumque obliquis truncatis centripetalibus apicalibus vel in aliquis marginalibus subapicalibus et distalibus regionis truncatae vel convexae, sinibus proximalibus $\frac{1}{2}$ ad fundam extentis, endocarpio 3.8–4 cm longo solido osseoso mahogani-colorato intra lucido lateribus lateralibus 5–7 mm crassis, seminibus 22 mm longis 5.5 mm diametro ellipsoideo; mesocarpio supero in apice carpellae quoque cavernam cum fibris fortibus et membranis pallidis delicatis medullosis formanti, mesocarpio basali exili fibroso et carnosio.

DIAGNOSIS OF HOLOTYPE: Tree 7 m tall, 2 dm in diameter; crown low and broad, due to the few, widespreading branches; bark with many appressed ascending rootlets; prop roots none; leaves 1.5 m or more long, 7 cm wide, coriaceous, in section low M-shaped, on each side with 63–65 secondary parallel veins, sword-like, tapering to a subulate tip not wholly preserved in our specimen, the base amplexicaul, unarmed, and the leaf margins and midrib unarmed throughout; pistillate inflorescence 5 dm long; a syncarp observed $\frac{2}{3}$ mature 18 cm long, subglobose; phalanges 5.7–6.5 cm long, 4–5 cm wide, 3.7–4.3 cm thick, broad ellipsoid, 4–6-angled, when dried brown, but with traces of red, the sides gently curved, papillose and rough, dull, upper $\frac{1}{2}$ free, apex low convex, lateral sutures distinct but narrow, central apical sinuses 4–7 mm deep, V-shaped, zigzag from the mortised carpels; carpels 9–12, the apices subequal, the central apices lanceoloid or lance-ovoid, sharply angled, the sides with 3–7 sharp longitudinal ridges and valleys, the marginal ones lance-ovoid- to semiorbicular-pyramidal and many of them laterally compressed and slightly divergent, and even a few of the phalanges with the carpel apices oblate pyramidal; stigmas 2–3.5 mm long, ellipsoid, creased, the marginal mostly truncate, oblique, centripetal, apical or on some marginal ones subapical and distal of an apical truncate or convex area; proximal sinus running half or all the way to the valley bottom; endocarp 3.8–4 cm long, massive,

bony, slightly inframedian, mahogany-colored, the inner surfaces shining, the lateral walls 5–7 mm thick; seeds 22 mm long, 5.5 mm in diameter, ellipsoid, upper mesocarp forming in the apex of each carpel a cavern with strong fibers and delicate, pale, medullary membranes; basal mesocarp thin, fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, 9.3 miles n. of Mossman, open forest near sea beach, with *Terminalia*, *Acacia aulaeocarpa*, *Hibiscus tiliaceus*, Feb. 5, 1958, H. St. John 26,262 (BISH).

Also observed by the writer on the same expedition, in open forest near the sea shore, Port Douglas, Queensland.

DISCUSSION: *P. pluriangulatus* is a member of the section *Pandanus*. In that section is its closest relative, *P. angulatus* St. John, of Queensland, which has its leaves with the margins near the base with prickles 2.8–3.5 mm long, 8–14 mm apart, slender subulate; near the tip the midrib below with serrae 0.2 mm long, 5–8 mm apart; phalanges 5–5.6 cm long, 4.7–6.1 cm broad, yellow-orange, lateral sutures deep, apical central sinuses 7–12 mm deep; and the seeds 3 mm in diameter. *P. pluriangulatus* has the leaves unarmed throughout; phalanges 5.7–6.5 cm long, 4–5 cm wide, when dried reddish brown, lateral sutures distinct but narrow, apical central sinuses 4–7 mm deep; and the seeds 5.5 mm in diameter. For comparison with the few phalanges with low, broad carpel apices, the most similar species is *P. endeavourensis* St. John, of Queensland, which has the leaves sparsely prickly; phalanges 5–5.8 cm long, central apical sinuses 2–4 mm deep; and the stigmas 1–1.5 mm long. *P. pluriangulatus* has the leaves wholly unarmed; phalanges 5.7–6.5 cm long, central apical sinuses 4–7 mm deep; and the stigmas 2–3.5 mm long.

The new epithet is from the Latin *pluris*, of many; *angulatus*, angled, in reference to the numerous, prominent, lateral angles of the phalanges.

Pandanus punctatus sp. nov. (sect. *Pandanus*)
Figs. 121, 122, 116d, 123a

DIAGNOSIS HOLOTYPI: Arbor 17 m alta 25 cm diametro, cortice cum radicillis adpresse ad-

scendentibus oblecto, radicibus fulurosus 5–10 dm longis 1–3 cm diametro muricatis, foliis 2.2–2.33 m longis 10–12 cm latis coriaceis in sectio M-formatis in sectione mediali in quoque latere cum 78–82 nervis secundariis ligulatis sensim ex basi in apice longe subulato dimiuentibus eo in puncto 10 cm ex apice 1 mm lato basi amplexicauli inermi sed ex 15–40 cm marginibus inaequaliter cum aculeis 2–3 mm longis 3–15 mm distantibus adscendentibus subulatis arcuatis apice brunneo, midnervo infra per 95–120 cm inermi, in sectione mediali marginibus cum aculeis 2.5–3.5 mm longis 4–8 mm distantibus simulantibus sed adpresse adscendentibus, midnervo infra cum aculeis 1.5–2 mm longis 15–45 mm distantibus simulantibus adpressis, proxima apicem marginibus cum aculeis 0.3–0.7 mm longis 2–4 mm distantibus subulatis adscendentibus vel subadpressis brunneis, midnervo inermi, inflorescentiis foemineis terminalibus, pedunculo 25 cm longo 15 mm crasso subdeltoideo folioso, syncarpio terminali 25 cm longo 20 cm diametro ovoideo, phalangibus 5.8–6.2 cm longis 3.2–4.2 cm latis 2.6–3.1 cm crassis subrubris oblongo-obovoideis lateribus papillosis in sicco rubro-mahogani-coloratis apice pallide subviridibus lateribus 4–6-angulosis et carpella quaque cum 2–6 angulis et valleculis parvis et interobseratis parte $\frac{1}{2}$ supera libera apice valde plano-truncato suturis lateralibus angustis sed ad basim distinctis, sinibus apicalibus centralibus 3–6 mm profundis angustis, carpellis 8–10 apicibus plerumque subtruncatis et eis marginalis valde truncatis et cum concavitate apicali et stigmatibus proximalibus apicibus cum angulis pluribus supra rotundatis infra prominentibus et interobseratis, apicibus centralibus pyramidalibus cum concavitate minoribus vel nullis, stigmatibus 1.5–2 mm latis cordatis vel subcircularibus apice saepe truncato papillosis nigris sulcatis obliquis centripetalibus, sinibus proximalibus $\frac{1}{2}$ ad fundam extentis, endocarpio mahogani-colorato osseoso solido 3.2 cm longo lateribus lateralibus 3–4 mm crassis, seminibus 15 mm longis 4 mm diametro ellipsoideo, mesocarpio apicali in carpella quaque cum caverna cum membranis medullosis, mesocarpio basali fibroso et carnoso.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Tree 13–17 m tall, 20–25 cm in diameter, erect;

bark covered with appressed ascending rootlets; prop roots absent or 5–10 dm long and 1–3 cm in diameter, muricate; leaves 1.7–2.33 m long, 8.5–12 cm wide, sword-shaped, coriaceous, in cross section M-shaped, in middle part with 78–82 secondary parallel veins on each side, gradually tapering to a long subulate apex, this 10 cm from the tip 1 mm wide, the base slightly widened and amplexicaul and unarmed, but beginning 15–40 cm up and at unequal distances the margins with prickles 2–3 mm long, 3–15 mm apart, ascending arcuate subulate, brown-tipped; the midrib below unarmed for 95–120 cm; near the midsection the margins with prickles 2.5–3.5 mm long, 4–8 mm apart, similar but appressed ascending, the midrib below with prickles 1.5–2 mm long, 15–45 mm apart, appressed, similar; near the tip the margins with teeth 0.3–0.7 mm long, 2–4 mm apart, subulate, ascending or subappressed, brown; the nearby midrib unarmed; pistillate inflorescences terminal; peduncle 25–60 cm long, 15 mm thick, slightly 3-sided, leafy bracted; syncarp solitary, terminal, 24–25 cm long 20 cm in diameter, ovoid; the core when dried 14 cm long, 4.5 cm in diameter, deltoid, bearing 117 phalanges 5.3–6.3 cm long, 2.6–4.2 cm wide, 2.3–3.2 cm thick, oblong-obovoid to oblanceolate, compressed, the surface papillose, when ripe the apices greenish yellow, the sides to the middle burnt Sienna, the lower half yellow, the sides when dry reddish-mahogany colored, the apex pale greenish, the sides 3–9-angled and each carpel with 2–6 low angles and shallow valleys and thus mortised with their neighbors, upper $\frac{1}{2}$ free, apex conspicuously flat truncate, or in a few of the largest ones very slightly convex, lateral sutures narrow but distinct to the base, apical central sinuses 2–6 mm deep, narrow; carpels 7–14, mostly 9, the apices rounded conic or mostly subtruncate, and the marginal ones markedly so with a prominent concavity (or plane) on the proximal side of which is the stigma, the apices with several angles ending in rounded shoulders, the angles prominent below and mortised with their neighbors, the central apices with smaller concavities or even none and pyramidal; stigmas 1–2 mm wide, cordate to subcircular to oblate reniform, the apex often truncate, papillose, blackish,

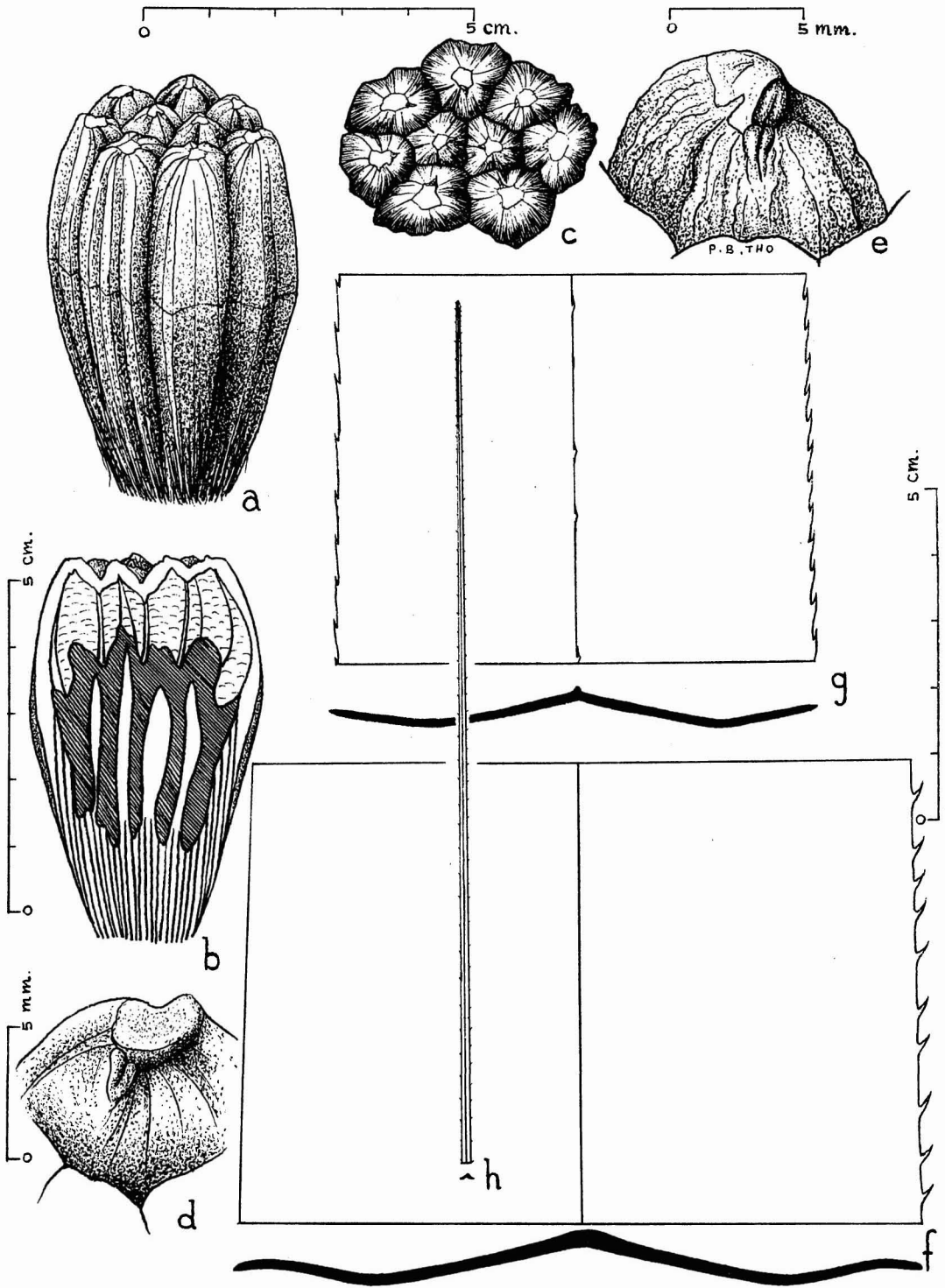


FIG. 121. *Pandanus punctatus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, occasional carpel apex with stigma lateral on the proximal sinus, $\times 4$; *e*, typical carpel apex with stigma and proximal sinus, $\times 4$; *f*, leaf base, lower side, $\times 1$; *g*, leaf middle, lower side, $\times 1$; *h*, leaf apex, lower side, $\times 1$.

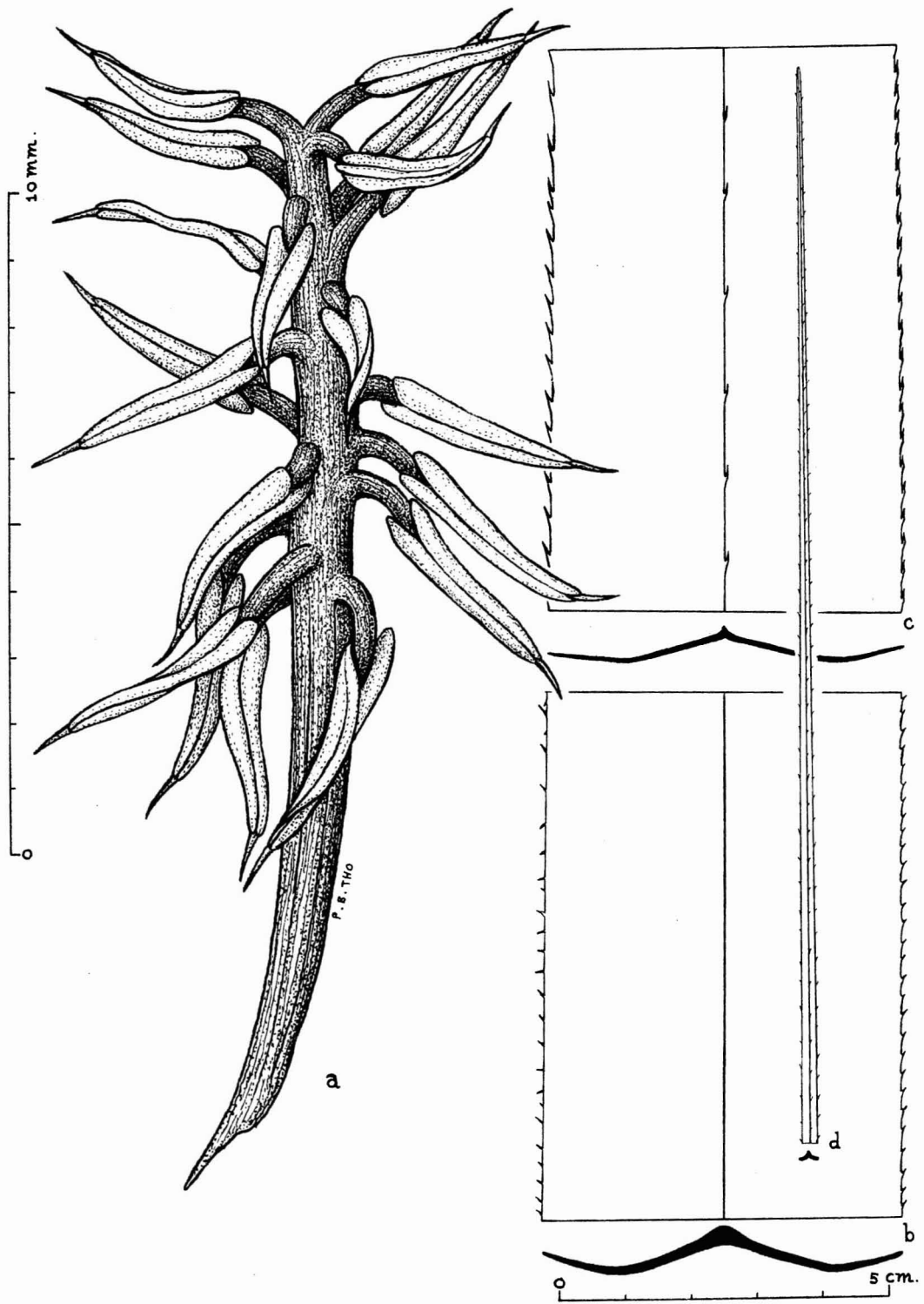


FIG. 122. *Pandanus punctatus* St. John, from *St. John* 26,248. *a*, Staminal column with anthers, $\times 10$; *b*, leaf base, lower side, $\times 1$; *c*, leaf middle, lower side, $\times 1$; *d*, leaf apex, lower side, $\times 1$.

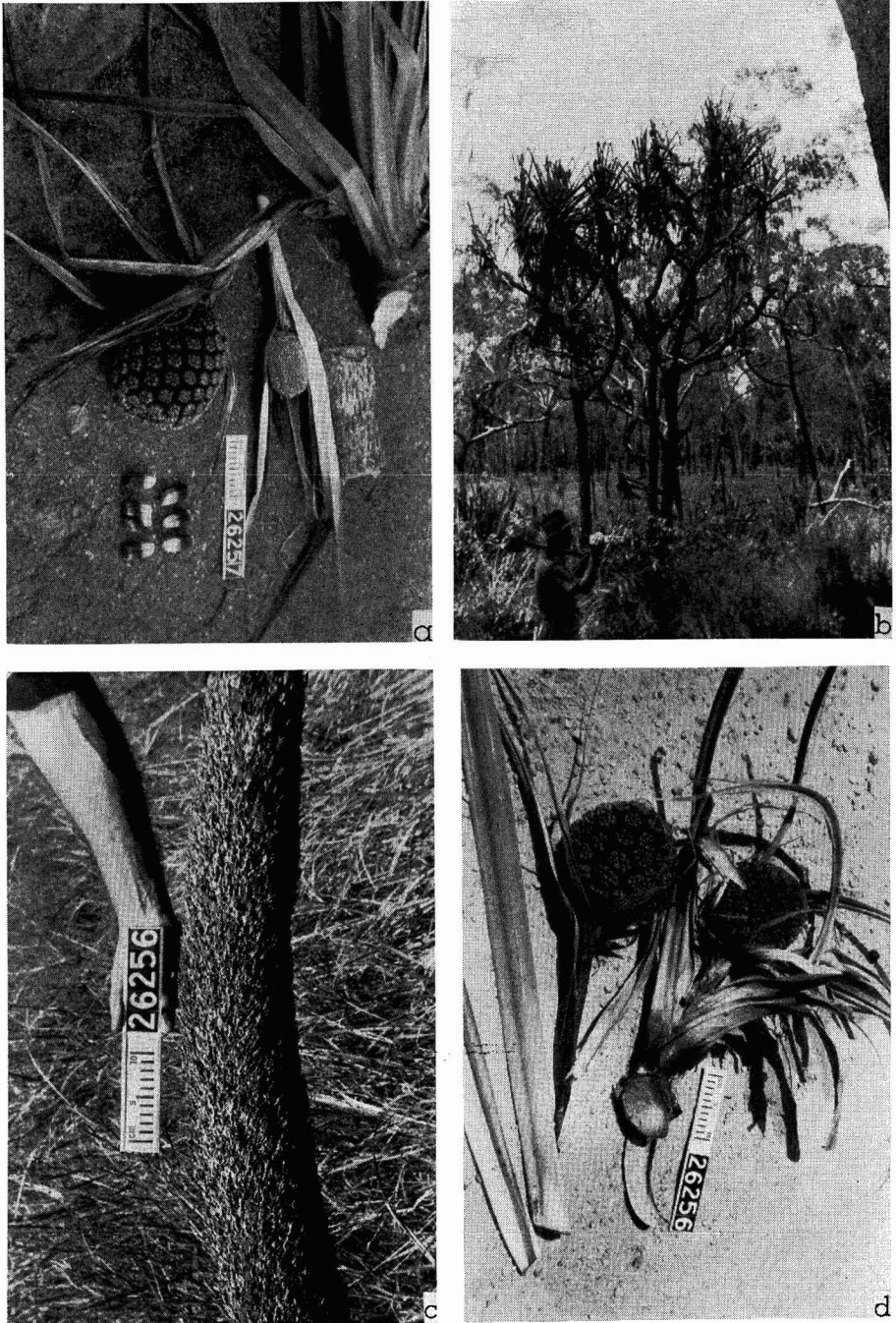


FIG. 123. *a*, *Pandanus punctatus* St. John, holotype, young and mature pistillate inflorescence. *b*, *P. radiferus* St. John, holotype, habitat and habit; *c*, trunk with adventitious ascending rootlets; *d*, young and mature syncarps, with foliage.

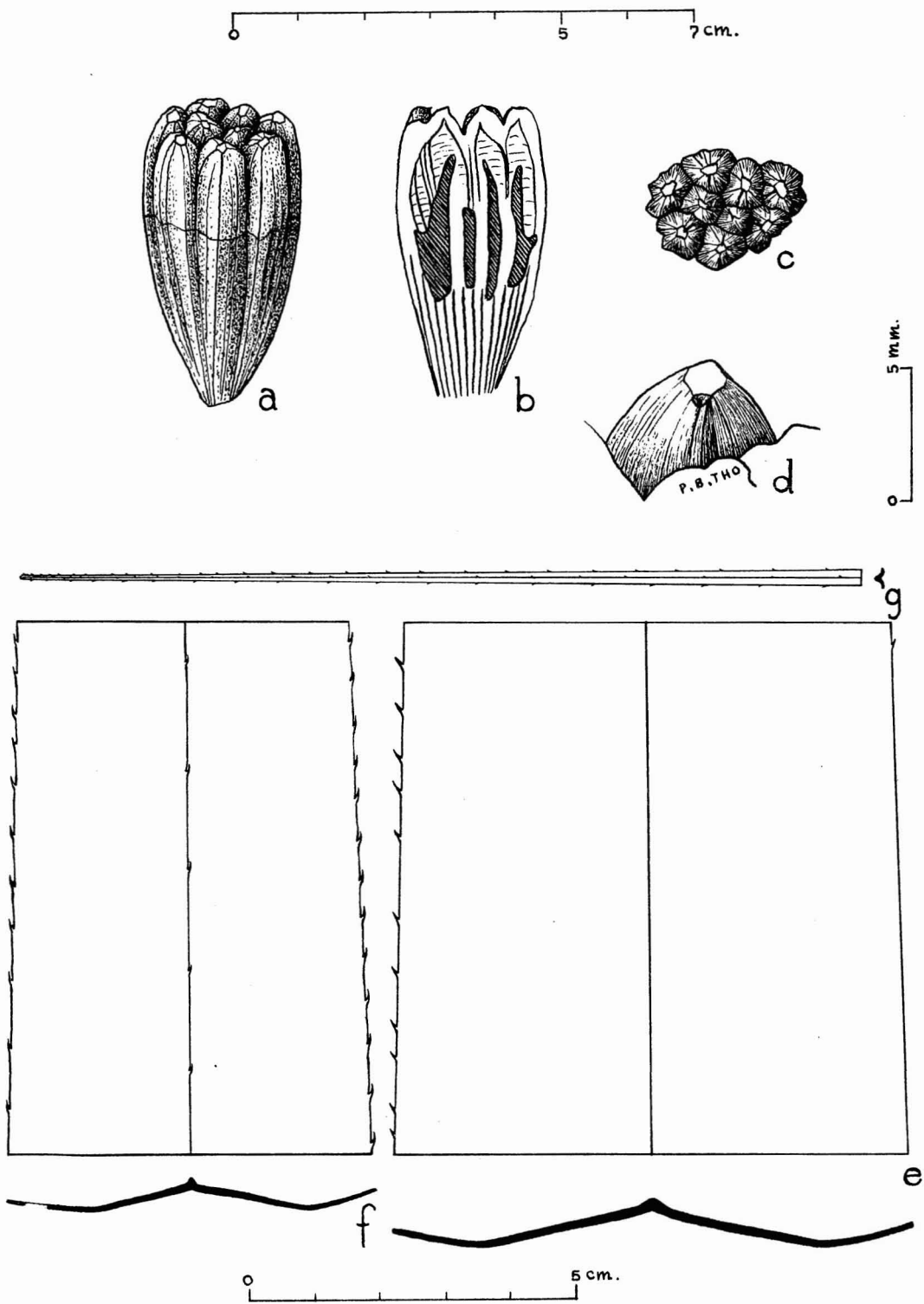


FIG. 124. *Pandanus radiceferus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

creased, centripetal, oblique; the proximal crease running about half way to the valley bottom; endocarp median or slightly inframedian, mahogany-colored, bony, massive, 2.5–3.2 cm long, the lateral margins 2–4 mm thick; seeds 13–15 mm long, 4 mm in diameter, ellipsoid; apical mesocarp forming in each carpel a cavern, these somewhat confluent and filled with white, medullary membranes; basal mesocarp fibrous and fleshy, the pulp fruity but astringent. Staminate trees appearing similar; staminate inflorescence 1.05 m long; peduncle 23 cm long, fleshy; lowest bracteal leaf (the one illustrated) 1.53 m long, 7 cm wide $\frac{1}{3}$ from the base, narrowing to the base and tapering to the long subulate apex which 10 cm down is 1.2 mm wide; at midsection the margins with prickles 1.5–2 mm long, 2–8 mm apart, pale arcuate ascending, flattened subulate; the nearby midrib with similar prickles 1.3–1.5 mm long, 6–10 mm apart; near the apex the margins and midrib below with prickles 0.5–0.8 mm long, 2–7 mm apart, subulate, ascending, this bracteal one here described, as no true foliage one was preserved; floral part about 75 cm long, with 17–20 spikes, these 5–8 cm long, 2 cm in diameter, dense; staminal columns 12–18 mm long, with about 20 stamens, borne on the upper half; free filament tips 1–1.5 mm long; anthers 2.2–3.2 mm long, narrowly lanceoloid, bearing at the apex a subulate projection of the connective 0.7–0.9 mm long.

HOLOTYPE: Australia, North Queensland, 5 miles w.n.w. of the junction of McIvor and Morgan Rivers, grove in wet savanna, with *Tristania suaveolens*, *Eucalyptus alba*, and *E. leptophleba*, Feb. 2, 1958, *H. St. John* 26,247 (BISH).

SPECIMENS EXAMINED: Australia, North Queensland, McIvor and Morgan Rivers, same locality, habitat, and data as above, *H. St. John* 26,248 (BISH); Smithfield, 10 miles n. of Cairns, at edge of fresh swampy stream bank, with *Melaleuca leucadendra*, *Albizzia procera*, *Hibiscus tiliaceus*, *Stenochlaena scandens*, Feb. 4, 1958, *H. St. John* 26,257 (BISH).

DISCUSSION: *P. punctatus* is a member of the section *Pandanus*. In that section its closest relative is *P. rivularis* St. John, of Queensland, a species which has prop roots none; leaves

1.68–1.81 m long, 6–7.6 cm wide, the apex acute and 10 cm down 16 mm wide, at midsection the margins with prickles 1–2 mm long, 6–13 mm apart; phalanges 5.1–5.3 cm long, the side of each carpel with 2–4 angles; apical central sinuses 4–7 mm deep; and the endocarp with lateral walls 4–6 mm thick. *P. punctatus* has prop roots 5–10 dm long, 1–3 cm in diameter, or none; leaves 1.7–2.33 m long, 8.5–12 cm wide, the apex long subulate and 10 cm down 1 mm wide, at midsection the margins with prickles 2.5–3.5 mm long, 4–8 mm apart; phalanges 5.3–6.3 cm long, the side of each carpel with 2–6 angles; apical central sinuses 3–6 mm deep; and the endocarp with lateral walls 2–4 mm thick.

The new epithet is the Latin adjective *punctatus*, with points or dots, given in reference to the roughened surface of the sides of the phalanges.

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

Figs. 124, 125, 123b–d, 126a, b

DIAGNOSIS HOLOTYPE: Arbor 13 m alta 20 cm diametro, corona late ellipsoidea, cortice ex radicillis 2–3 cm longis adpresse adscendentibus plerumque furcatis clausi, radicibus fulturosis nullis, foliis 1.6–2.1 m longis 7.5–8 cm latis coriaceis in sectione mediali cum 74 nervis secundariis in quaque latere, gladiformatis et ex basi in apice subulato 40 cm longo diminuentibus eo in puncto 10 cm ex apice 1.3 mm lato, basi amplexicauli et inermi sed ex 16–32 cm marginibus cum aculeis 1.5–2 mm longis 4–10 mm distantibus subulatis arcuatis adscendentibus brunneis, midnervo infra inermi in parte $\frac{2}{3}$ infera, in sectione mediali uno margine cum aculeis 2–2.3 mm longis 4–9 mm distantibus simulantibus sed gracilibus et adpresse adscendentibus basi pallida, sed margine altero inermi vel subinermi, proxima apicem marginibus et midnervo infra cum aculeis 0.3–0.4 mm longis 3–5 mm distantibus subulatis adscendentibus brunneis, inflorescentia foeminea terminali, pedunculo 27 cm longo 15–20 mm diametro trigono folioso, syncarpio solitario 20–30 cm diametro globoso cum 127 phalangibus eis 4.4–4.7 cm longis 1.6–2.5 cm latis 1.6–2.1 cm crassis oblanceoloideis apice truncato 5–6-angulosis quando submaturis apicibus viridibus lateribus

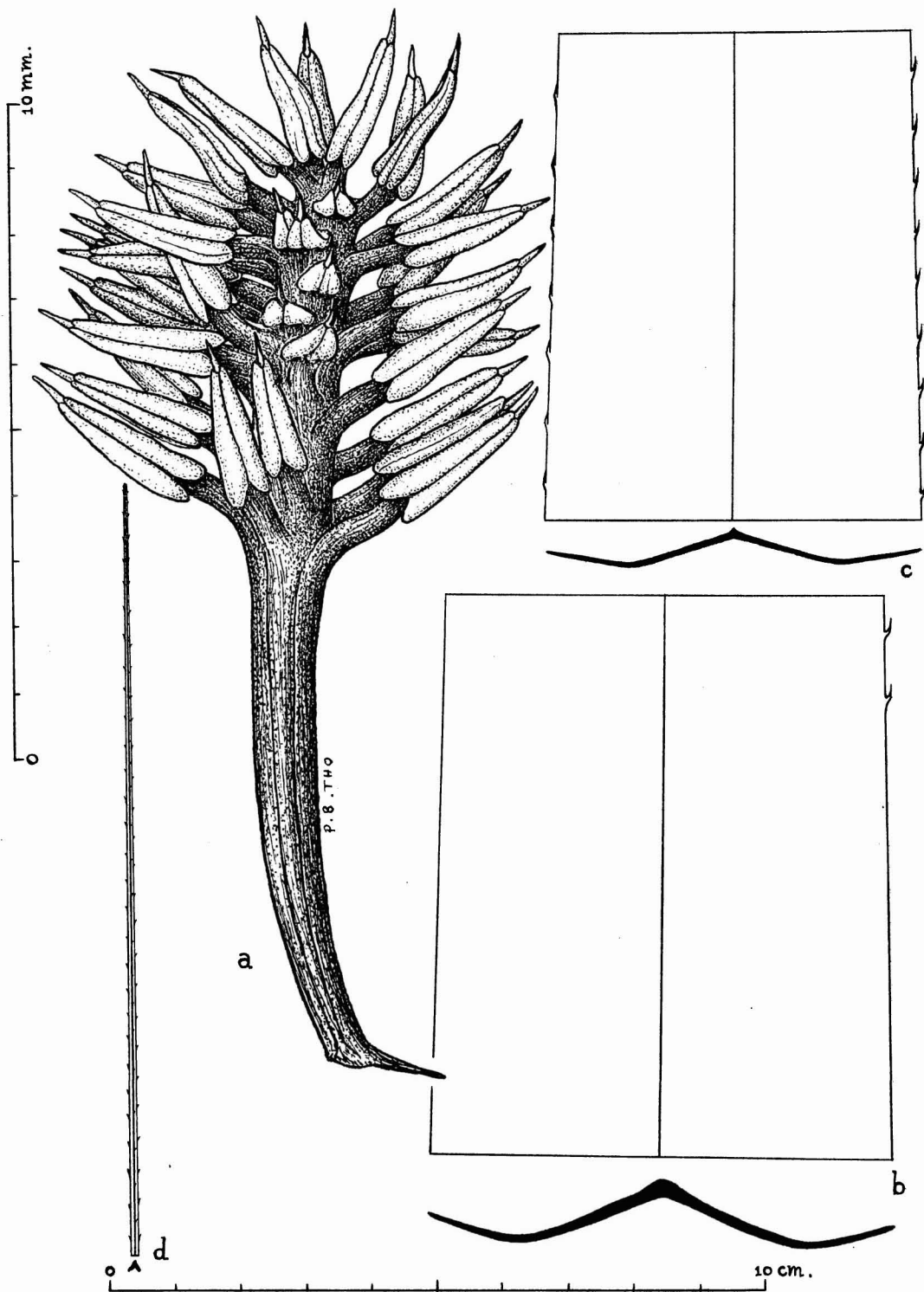


FIG. 125. *Pandanus radiceferus* St. John, from *St. John* 26,255. *a*, Staminate column with anthers, $\times 10$; *b*, leaf base, lower side, $\times 1$; *c*, leaf middle, lower side, $\times 1$; *d*, leaf apex, lower side, $\times 1$.

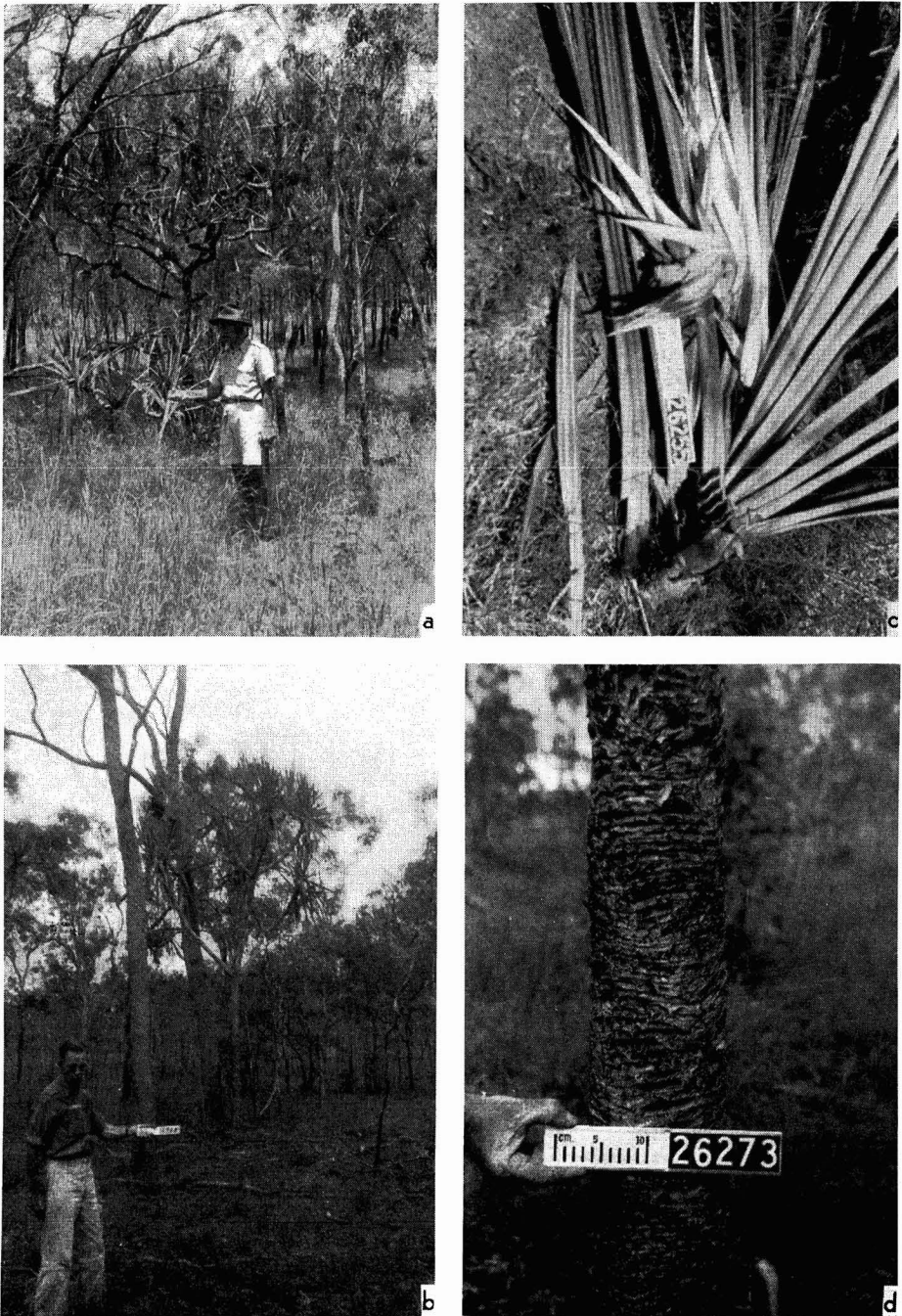


FIG. 126. *a*, *Pandanus radiceferus* St. John, staminate tree, habit from *St. John* 26,255, with S. Ernest Stevens; *b*, staminate inflorescence and foliage of same. *c*, *P. stoloniferus* St. John, from *St. John* 26,273, habit, with S. T. Blake; *d*, trunk with scorched bark.

exponitis cinnamoni-coloratis papillois sed sub-lucidis gradatim convexis parte $\frac{1}{3}$ supera libera, suturis lateralibus in parte $\frac{1}{2}$ – $\frac{2}{3}$ supera distinctis, sinibus centralibus apicalibus 2–5 mm profundis V-formatis, carpellis 5–10 plerumque 8–9 (sed in geminis 14–21 et phalangio 2.8–4.1 cm lato), apicibus ovoideis cum concavitate vel plana terminali lucido, stigmatibus 1–2 mm longis ellipticis vel obovatis sulcatis apice saepe truncato obliquis proximis, sinibus proximalibus $\frac{1}{2}$ vel tota ad fundam extentis, endocarpio mediali 18–20 mm longo osseoso obscure brunneo lateribus 1–2 mm crassis, seminibus 15 mm longis 3 mm diametro ellipsoideis, mesocarpio supero in carpella quaque cavernam cum fibris marginalibus et membranarum pallidis medullois formantibus, mesocarpio basali fibroso et carnoso.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Tree 13 m tall, 20 cm in diameter; crown broadly ellipsoid, of few branches; bark concealed by abundant, appressed ascending rootlets, these often forked, 2–3 cm long; prop roots absent or present and 2–4 dm long, 2–4 cm in diameter, muricate; leaves 1.6–2.1 m long, 7–8 cm wide, coriaceous, at midsection with 59–74 secondary veins on each side, swordlike, tapering from the base to the 40 cm subulate apex, this at the point 10 cm down 1.3 mm wide, the base amplexicaul and unarmed, but beginning 16–32 cm up the margins with prickles 1.5–2 mm long, 4–10 mm apart, stout subulate, arcuate ascending, brown; the midrib below unarmed for the lower $\frac{2}{3}$'s; at midsection the margins with prickles on one side 2–2.3 mm long, 4–9 mm apart, similar but slender and appressed ascending, and pale at base, but on the other margin few or none; near the apex the margins and midrib below with prickles 0.3–0.4 mm long, 3–5 mm apart, subulate, ascending, brown; pistillate inflorescence terminal; peduncle 27 cm long, 15–20 mm in diameter, trigonous, leafy bracted; syncarp solitary, 20–30 cm in diameter, globose, or subglobose and 14 cm long, 13 cm in diameter, bearing 90–127 phalanges, these 4.4–4.7 cm long, 1.6–2.9 cm wide, 1.6–2.7 cm thick, oblanceoloid with the apex truncate, 5–6-angled, when slightly immature the apices green, the exposed sides cinnamon, papillose but almost shiny, gently convex, upper

$\frac{1}{3}$ free, lateral sutures distinct down $\frac{1}{2}$ – $\frac{2}{3}$ way, central apical sinuses 2–5 mm deep, V-shaped; carpels 5–10, mostly 8–9 (but in doubles 14–21, and the phalanges 2.8–4.1 cm wide), the apices ovoid, with shallow, shining concavity or plane on the apex, distal of the stigma; stigmas 1–2 mm long, elliptic to obovate, creased, the apex often truncate, very oblique, on the proximal face of the carpel apex; proximal sinus wide, running half to all the way to the valley bottom; endocarp median, 18–20 mm long, bony, dark brown, the outer lateral walls 1–2 mm thick; seeds 15 mm long, 3 mm in diameter, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern outlined by fibers, crossed by delicate, pale, medullary membranes; basal mesocarp fibrous and fleshy. Staminate trees (no. 26,255) 10 m tall, 20 cm in diameter; prop roots none, but with a few spiny drop roots; at midsection the leaves with prickles 2–3 mm long, 5–13 mm apart on both margins; staminate inflorescences terminal, nodding, 60 cm long; peduncle 10 cm long, fleshy, leafy bracted; lowest floral bract 96 cm long, 6 cm wide, the lower fifth elliptic, white, mostly unarmed, the upper part swordlike, the margins and midrib below prickly, the apex long subulate; floral bracts white, the median one 30 cm long, 4 cm wide, chartaceous below, lanceolate, the exposed parts having on margins and midrib below prickles 0.5–1 mm long, simple or double; flowering spikes 20–25, crowded, 5–8 cm long, 2–2.5 cm in diameter, dense; staminal clusters 10–16 mm long, the naked base of the column longer than the tip; free filament tips 0.6–1.3 mm long; the anthers 1.8–2.4 mm long, linear-lanceolate, tipped by a subulate prolongation of the connective 0.6–0.8 mm long.

HOLOTYPUS: Australia, North Queensland, Black Mountain Road, junction with Morgan Smith Lookout Road, open forest by creek, with *Casuarina littoralis*, *Eucalyptus tereticornis*, 1,300 ft. alt., Feb. 4, 1958, *H. St. John* 26,256 (BISH).

SPECIMENS EXAMINED: Australia, North Queensland, same locality and date, fringing forest, staminate tree, *H. St. John* 26,255 (BISH); Quarantine Bay, top of granite boulder beach, with *Cerbera manghas*, *Calophyllum inophyllum*, Feb. 1, 1958, *H. St. John* 26,244 (BISH); and ditto, staminate, *H. St. John* 26,245 (BISH);

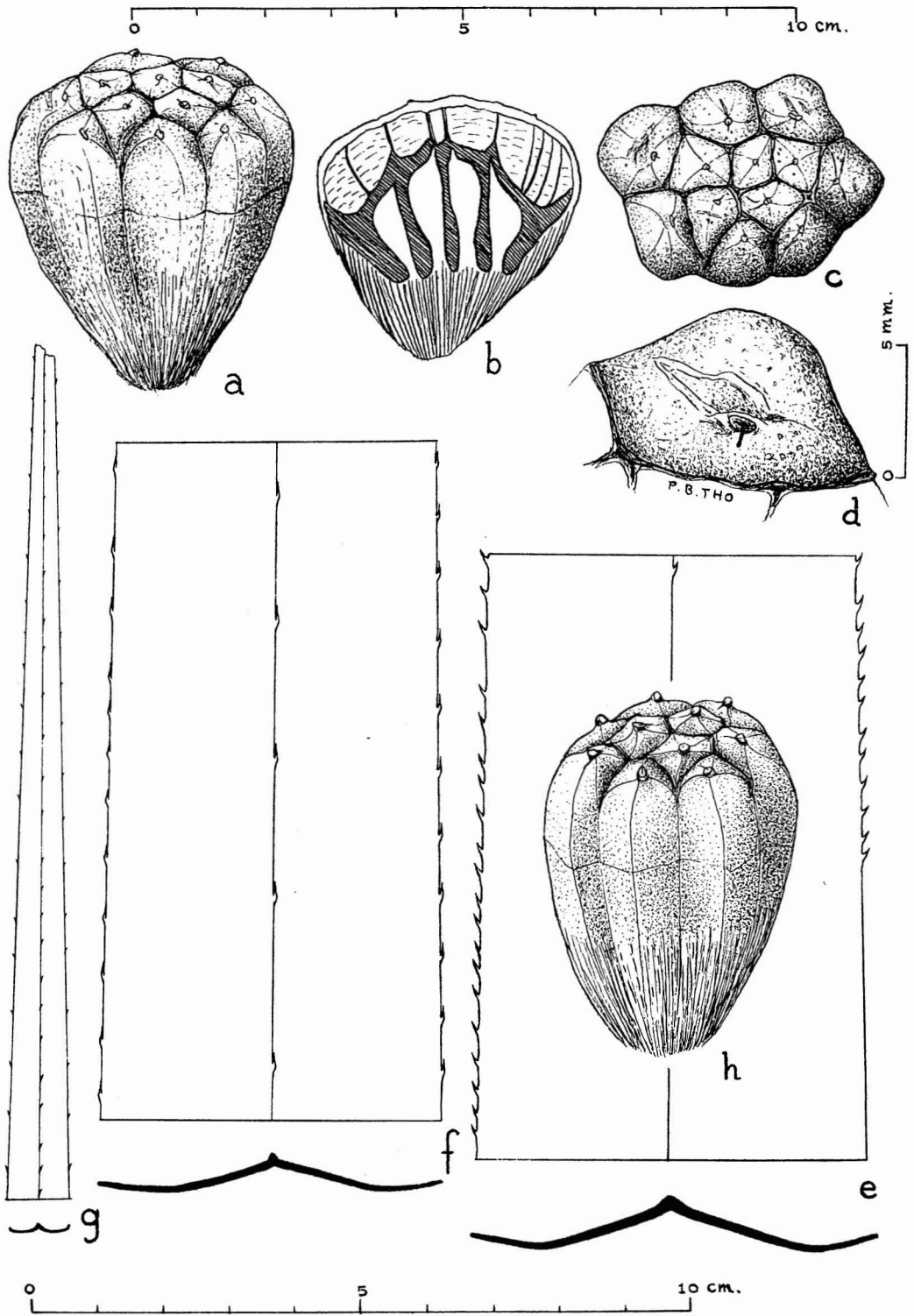


FIG. 127. *Pandanus sinuadosus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, apical view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$; *h*, occasional phalange with low conic carpel apices, lateral view, $\times 1$.

Archer Point, 8 miles s.e. of Cooktown, fringing forest by stream, with *Melaleuca*, *Eucalyptus leptophleba*, *E. intermedia*, *Tristania suaveolens*, Feb. 1, 1958, *H. St. John* 26,246 (BISH).

DISCUSSION: *P. radiceferus* is a member of the section *Pandanus*. Its closest relative, *P. punctatus* St. John, of Queensland, has the leaves 2.2–2.3 m long, 8.5–12 cm wide, the lower margins with prickles 2–3 mm long, 3–15 mm apart, and the midrib below prickly at the midsection; syncarp ovoid; phalanges 5.3–6.3 cm long, 2.6–4.2 cm wide; endocarp 2.5–3.2 cm long, the lateral walls 2–4 mm thick; and the anthers 2.2–3.2 mm long. On the other hand *P. radiceferus* has the leaves 1.6–2.1 m long, 7–8 cm wide, the lower margins with prickles 1.5–2 mm long, 4–10 mm apart, the midrib below unarmed for the lower $\frac{2}{3}$'s; syncarp globose or subglobose; phalanges 4.4–4.7 cm long, 1.6–2.9 cm wide; endocarp 1.8–2 cm long, the lateral walls 1–2 mm thick; and the anthers 1.8–2.4 mm long.

The new epithet is from the Latin *radix*, root, *fero*, to produce, because of the conspicuous production of rootlets which blanket the bark of the trunk.

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

Fig. 127

DIAGNOSIS HOLOTYPE: Arbor 8 m alta 18 cm diametro, cortice verrucoso, radicibus futurosus 1 m longis 3 cm diametro verrucoso, foliis 1.2 m longis 6 cm latis coriaceis in sectione depresso sinuositer M-formatis in sectione mediali cum 55 nervis secundariis in quoque latere, basi amplexicauli inermi sed ex 6–11 cm marginibus cum aculeis 1.7–3 mm longis 3–8 mm distantibus subulatis adscendentibus brunneo-apicalibus, midnervo infra ex 11–15 cm cum aculeis simulantibus arcuatis adscendentibus 11–30 mm distantibus in sectione mediali marginibus cum aculeis 2–2.5 mm longis 4–10 mm distantibus proxime adpresso adscendentibus, circa apicem marginibus et midnervo infra cum serris 0.5 mm longis 3–8 mm distantibus adpressis, syncarpio invisio, phalangibus 3.7–4.6 cm longis 2.9–4.1 cm latis 2.4–3.1 cm crassis in sicco brunneis late turbinatis compressis lateribus laevibus lucidis subconvexis 5–6-angulosis parte $\frac{1}{3}$ supera libera suturis lateralibus nullis,

sinibus centralibus apicalibus 0–0.9 mm profundis plerumque olim tessellatis, carpellis 8–15 apicibus inaequalibus eis marginalibus duplo majoribus plerumque et semper in majoribus apicibus olim subconvexis et aegre distinctis, stigmatibus 1–1.5 mm longis ellipticis sulcatis obliquis centripetalibus, sinibus proximalibus $\frac{1}{3}$ – $\frac{1}{2}$ ad fundam extentis, endocarpio paene supramediali osseoso brunneo intra lucido lateribus lateralibus 4–5 mm crassis, seminibus 9–10 mm longis 4 mm diametro late ellipsoideis, mesocarpio supero in apice carpellae quaeque late cavernoso cum fibris longitudinalibus et membranis albis medullosis, mesocarpio basali fibroso et carnosio.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Tree 3–8 m tall, 18 cm in diameter; bark warty, gray; prop roots 1 m long, 3 cm in diameter, warty; leaves 1.2 m long, 6 cm wide, coriaceous, at midsection with 55 secondary veins on each side, in section depressed, sinuous M-shaped, the base amplexicaul, unarmed, but beginning at 6–11 cm the margins with prickles 1.7–3 mm long, 3–8 mm apart, subulate, ascending, brown-tipped; the midrib below beginning at 11–15 cm with similar arcuate ascending prickles 11–30 mm apart; at midsection the margins with prickles 2–2.5 mm long, 4–10 mm apart, closely appressed ascending; near the subulate apex the margins and midrib below with appressed serrae 0.5 mm long, 3–8 mm apart; peduncle short, erect; syncarp 23–30 cm long, 13–15 cm in diameter, ellipsoid-oblong; phalanges 3.7–4.6 cm long, 2.9–4.1 cm wide, 2.4–3.1 cm thick, when dried brown, broadly turbinate, compressed, yellowish above, below orange, the sides smooth, shining, gently convex, 5–6-angled, upper $\frac{1}{3}$ free; lateral sutures none; central apical sinuses from 0–0.9 mm deep, usually merely a brown tessellate ruling but on some with low conic apices the sinuses perceptibly deep; carpels 8–15, the apices unequal, the marginal ones about twice as large as the inner ones, commonly and on all the large ones the apices only slightly convex, their profile scarcely distinguishable from that of the convex phalange apex, a few phalanges with the carpel apices depressed conic and the central sinuses almost 1 mm deep; stigmas 1–1.5 mm long, elliptic, creased, oblique, centripetal; proximal sinus

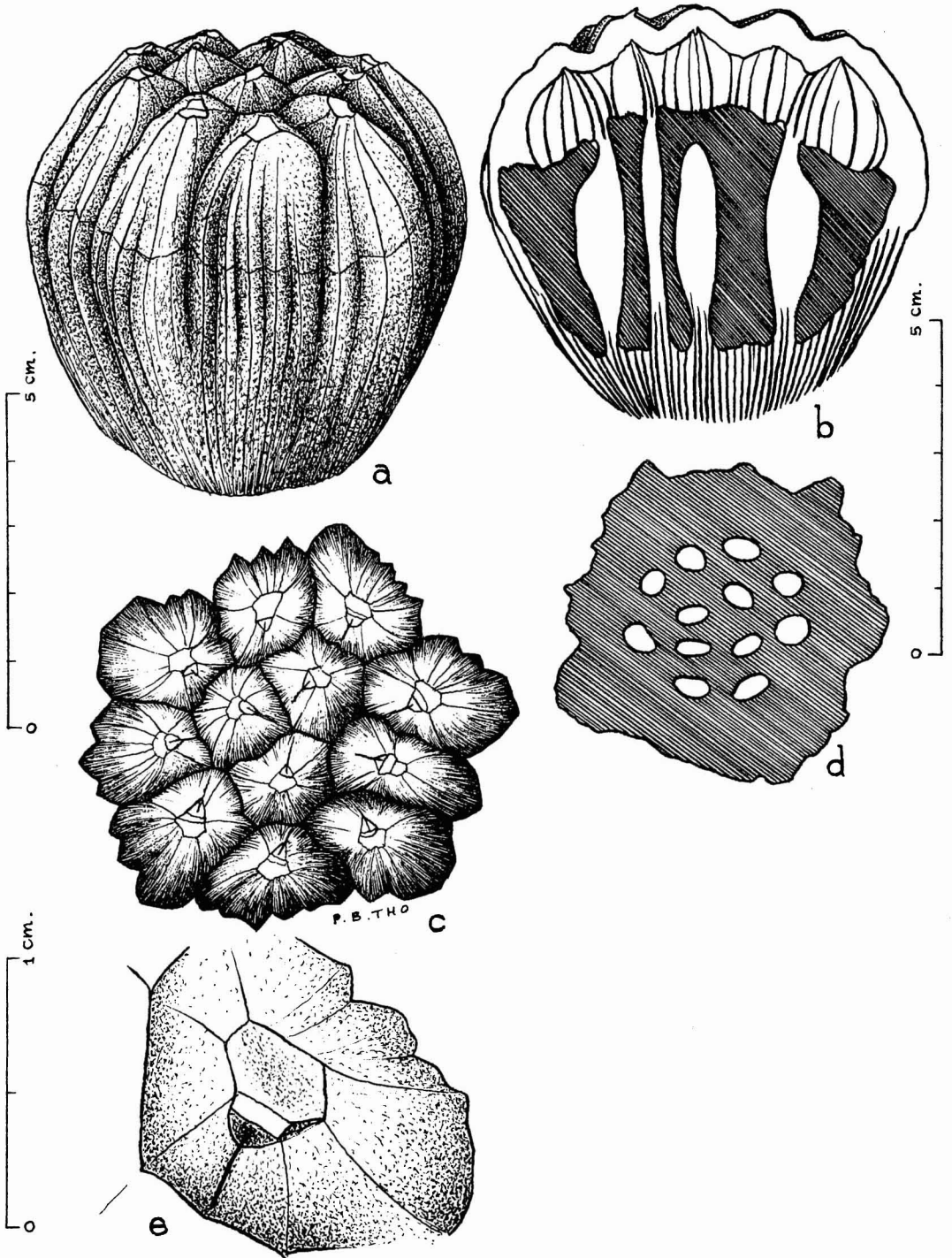


FIG. 128. *Pandanus stoloniferus* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, phalange, median transverse section, $\times 1$; *e*, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$.

running $\frac{1}{3}$ – $\frac{1}{2}$ way to valley bottom; endocarp slightly suprmedian, bony, brown, the inner surfaces shining, the lateral walls 4–5 mm thick; seeds 9–10 mm long, 4 mm in diameter, broad ellipsoid; upper mesocarp forming in the apex of each carpel a short, broad cavern with longitudinal fibers and white, glistening medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, Green Island, off Cairns, forest on coral sand, Feb. 9, 1958, *H. St. John* 26,268 (BISH).

SPECIMENS EXAMINED: Queensland, Port Curtis Dist., Emu Park, at edge of beach, Sept. 24, 1943, *S. T. Blake* 15,331 (BRI).

DISCUSSION: *P. sinuadosus* is a member of the section *Pandanus*. In that section is its closest relative, *P. tectorius* Soland. var. *timorensis* Martelli, of Timor Island, which has the phalanges almost truncate, the central apical sinuses apparently 2 mm deep; carpel apices subequal; stigmas broad reniform; and the endocarp slightly submedian. *P. sinuadosus* has the phalanges markedly convex at apex, the central apical sinuses too shallow to measure; carpel apices unequal, the marginal ones twice the larger; stigmas elliptic; and the endocarp slightly suprmedian.

The new epithet is from the Latin *sinus*, sinus, *vadosus*, shallow, in description of the very shallow central apical sinuses of the phalanges.

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

Figs. 128, 129, 130, 126c, d, 132a

DIAGNOSIS HOLOTYPI: Arbor 7 m alta 15 cm diametro erecta gracilis in 3 m ex terra furcatus pauce ramosa, cortice pallide brunneo et cum radicillis 3–8 mm longis remotis adpresse adscendentibus, radicibus fulturosis 5 dm longis 3 cm diametro sparse muriculatis, foliis 1–1.89 m longis 5.2–6.2 cm latis coriaceis in sectione mediali cum 65 nervis secundariis in quoque latere, sensim ex basi in apice subulato diminuentibus eo in puncto 10 cm ex apice 6–7 mm lato, basi amplexicauli inermi, sed ex 12.5–14 cm marginibus cum aculeis 2.5–3.5 mm longis 7–15 mm distantibus subulatis rectis vel arcuatis adscendentibus apice rubro, midnervo toto inermi, in sectione mediali marginibus cum aculeis 2–2.5 mm longis 11–21 mm distantibus

gracilibus subulatis adscendentibus adpressioribus, tertia supra et apice cum marginibus inermibus, pedunculo 15–25 cm longo terminali folioso, syncarpio solitario 20–25 cm longo 17.5–20 cm diametro ovoideo incarnato 39–50 phalangibus ferrentibus eis 5.7–6.5 cm longis 5.2–7.5 cm latis 4–6.7 cm crassis late obovoideis quadratis 4–6-angulosis, lateribus papillosis et punctatis sublucidis parte $\frac{1}{2}$ supra libera, apice depresso-convexo, suturis lateralibus distinctis $\frac{1}{2}$ – $\frac{2}{3}$ distantia, lateribus distalibus carpellarum marginalorum cum 2–6 angulis et valleculis, sinibus centralibus apicalibus 4–6 mm profundis late V-formatis, carpellis 12–15 apicibus pyramidalibus vel marginalibus oblato-pyramidalibus, stigmatibus 2.5–4 mm longis subcircularibus ad ellipticis brunneis sulcatis obliquis centripetalibus, sinibus proximalibus $\frac{1}{2}$ vel tota ad fundam extentibus, endocarpio minime submediali solido 3.5 m longo osseoso mahoganicolorato paginis interioribus lucidis marginibus lateralibus 7–10 mm crassis, seminibus 20–25 mm longis 7–8 mm diametro ellipsoideo, mesocarpio apicali in carpella quaque cavernoso cum fibris et membranibus medullosis, mesocarpio basali parvo sed fibroso et carnoso.

DESCRIPTION OF ALL SPECIMENS EXAMINED:

Tree 7–12 m tall, 15–20 cm in diameter, erect, slender, first forking 3 m from the ground, few branched and the obovoid crown sparse; bark pale brown (when not blackened by the annual bush fires), with remote, appressed ascending rootlets 3–8 mm long; prop roots 5 dm long, 3 cm in diameter, sparsely muriculate; leaves 1–1.89 m long, 5.2–6.2 cm wide, coriaceous, at midsection with 65 secondary veins on each side, gradually tapering from the base to the subulate apex which 10 cm down is 6–7 mm wide, the very base amplexicaul and unarmed for 12.5–14 cm, then the margins with prickles 2.5–3.5 mm long, 7–15 mm apart, subulate, straight or arcuate, ascending, red-tipped; the midrib unarmed throughout; at midsection the margins with prickles 2–2.5 mm long, 11–21 mm apart, slender subulate, ascending, closely appressed, the upper third and apex of the leaf with the margins unarmed; peduncle 15–25 cm long, terminal, leafy; syncarp solitary, 20–25 cm long, 17.5–20 cm in diameter, ovoid, vermilion, with 39–50 phalanges, these 5.7–6.5 cm

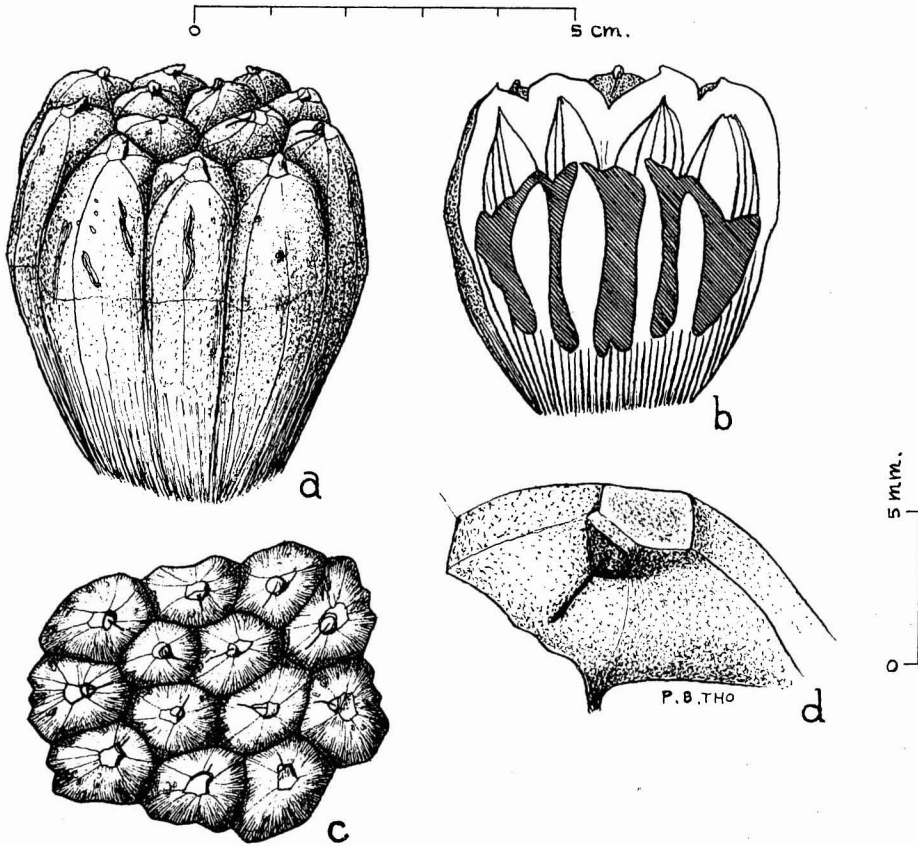


FIG. 129. *Pandanus stoloniferus* St. John, a depauperate syncarp from holotypic tree. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, with stigma, and proximal sinus, oblique view, $\times 4$.

long, 5.2–7.5 cm wide, 4–6.7 cm thick, broadly obovoid, quadrate, 4–6-angled, with a broad median band about 2 cm wide of deep vermilion color, the rest pale vermilion, the sides papillose and punctate, a little shiny, upper $\frac{1}{2}$ free, apex low convex, lateral sutures distinct $\frac{1}{2}$ – $\frac{2}{3}$ way, the outer side of each carpel with 2–6 prominent secondary ridges and valleys and hence mortised with the adjacent phalanges; central apical sinuses 4–6 mm deep, wide V-shaped; carpels 12–15, the apices pyramidal or the outer ones oblate pyramidal; stigmas 2.5–4 mm long, subcircular to elliptic, brown, creased, oblique, centripetal; proximal sinus running from half to all the way to the valley bottom; endocarp slightly submedian, massive,

3.5 cm long, bony, mahogany-colored, the inner surfaces polished, the lateral margins 7–10 mm thick; seeds 20–25 mm long, 7–8 mm in diameter, ellipsoid; apical mesocarp forming in each carpel a cavern with strong longitudinal fibers and white medullary membranes; basal mesocarp sparse, but fibrous and fleshy, the pulp with fruity odor, dry, mealy, the taste like that of a sweet potato then tardily slightly acrid. Staminate trees similar, but the leaves with the apex more slenderly long subulate, and 10 cm down only 2 mm wide, at the midsection the blade unarmed on one margin; in the upper third the midrib below with serrulations 0.2 mm long, 5–20 mm apart; staminate inflorescences terminal, cernuous, 70 cm long, with strong, sweet

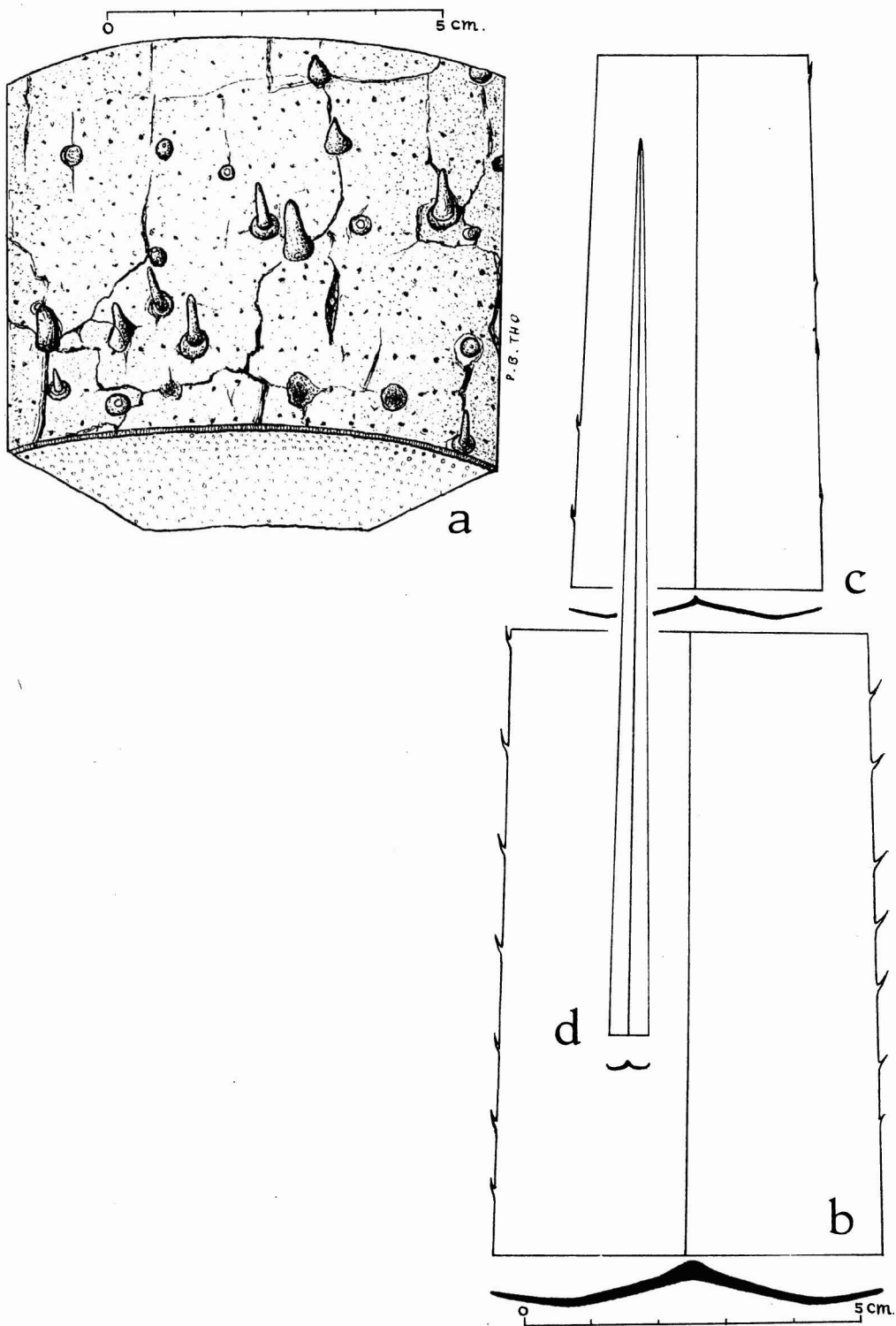


FIG. 130. *Pandanus stoloniferus* St. John, from *St. John* 26,273. *a*, Bark with adventitious ascending rootlets, and bundle scars, $\times 1$; *b*, leaf base, lower side, $\times 1$; *c*, leaf middle, lower side, $\times 1$; *d*, leaf apex, lower side, $\times 1$.

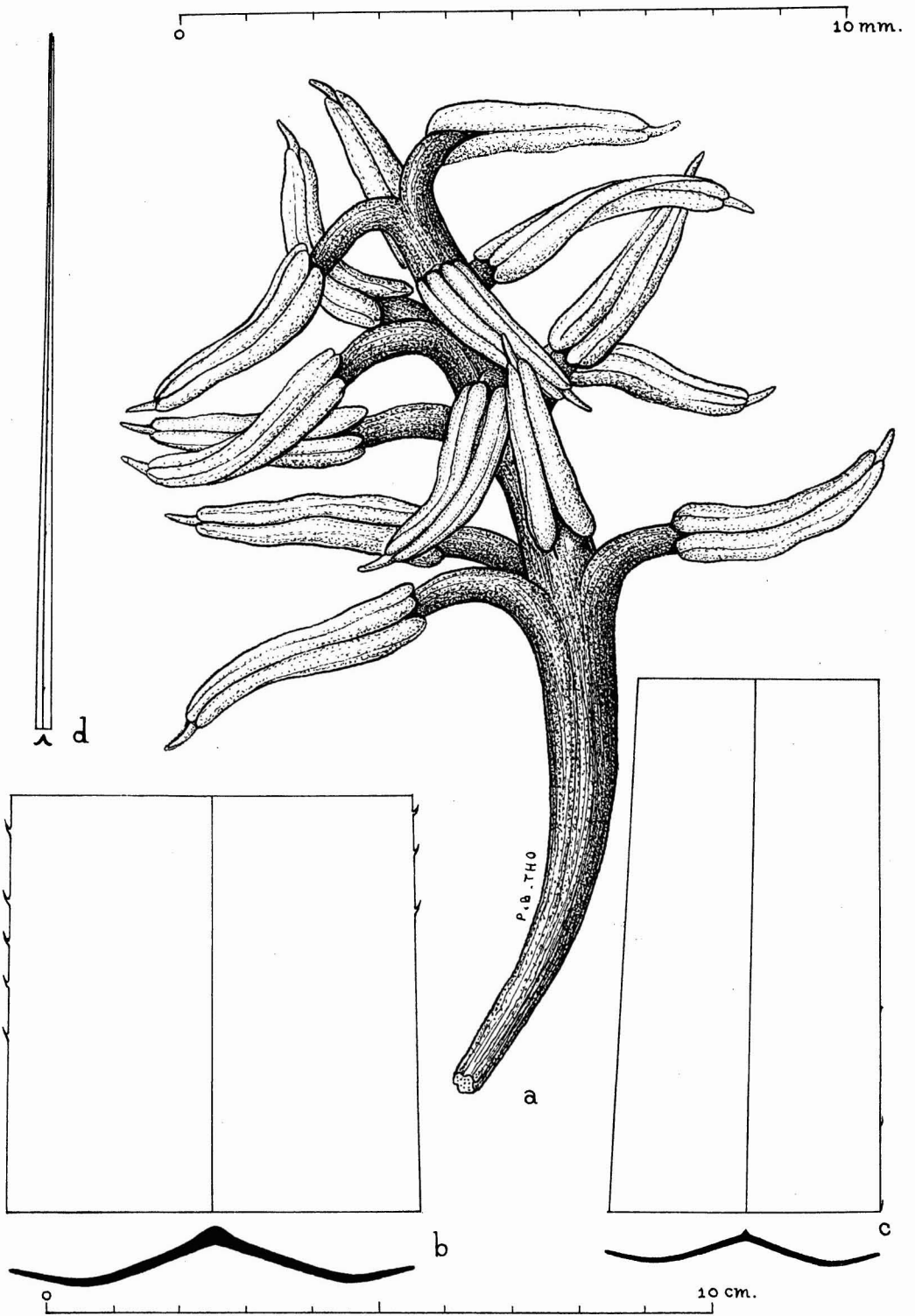


FIG. 131. *Pandanus stoloniferus* St. John, from *St. John* 26,275. *a*, Staminal column with anthers, $\times 10$; *b*, leaf base, lower side, $\times 1$; *c*, leaf middle, lower side, $\times 1$; *d*, leaf apex, lower side, $\times 1$.



FIG. 132a. *Pandanus stoloniferus* St. John, from *St. John* 26,275, showing buried stolon connecting mature staminate trees.

fragrance, and with many white bracts, the lower bracts foliaceous, the median ones 40 cm long, 3.4 cm wide, linear-lanceolate, long acuminate, the margins sparsely serrulate; the 18–20 spikes 5–7 cm long, 2 cm in diameter, dense; staminal columns 1–1.8 cm long, the lower half naked; free filament tips 1–1.5 mm long; anthers 3–4 mm long, linear-lanceoloid, beaked by the projecting, subulate apex of the connective 0.5 mm long.

HOLOTYPE: Australia, North Queensland, 15 miles w. of Mareeba, deep sandy soil, scrubby open forest with *Eucalyptus polycarpa*, and *Melaleuca nodosa*, 1,290 ft. alt., Feb. 10, 1958, *H. St. John* 26,274A (BISH).

SPECIMENS EXAMINED: Australia, North Queensland, same locality and data, and from the type tree, but a depauperate syncarp, *H. St. John* 26,274 (BISH); same locality and data, but from a different tree, *H. St. John* 26,273 (BISH); same data, staminate tree, with underground stolons to other trees in the grove, *H. St. John* 26,275 (BISH).

DISCUSSION: *P. stoloniferus* is a member of the section *Pandanus*. It is closely related to another Queensland species, *P. Whitei* Martelli, which has the leaves 8 cm wide, the margins in the lower third unarmed; phalanges 7–7.3 cm long, the apical central sinuses 3–5 mm deep; carpels 9–11; and the seeds 16–18 mm long, 3–5.5 mm in diameter. In contrast, *P. stoloniferus* has the leaves 5.2–6.2 cm wide, the margins near the base with prickles 2.5–3.5 mm long, 7–15 mm apart, subulate, red-tipped; phalanges 5.7–6.5 cm long, the apical central sinuses 4–6

mm deep; carpels 12–15; and the seeds 20–25 mm long, 7–8 mm in diameter.

There are evident differences between the pistillate and the staminate trees, in leaf shape, apex, and tothing. The staminate trees are stoloniferous and colony-forming. This character was not detected among the pistillate trees, and if these trees have stolons they must be at a much deeper level in the soil. None such were found.

One branch of the tree from which no. 26,274A was collected, was a lower, weak branch. From this branch was collected no. 26,274. This syncarp was only 9 cm long and 7 cm in diameter. All parts were like a smaller edition of the normal. The phalanges are 4.4–4.8 cm long, 4.3–4.9 cm wide, 3.8 cm thick. These details are not included in the description of the species, since they do not represent the normal. Though rarely so, the same type of depauperate heads with smaller phalanges has been found in a few other species. These smaller syncarps are produced on weak, lower branches, or more often as a secondary syncarp, lateral on the peduncle of the main and terminal syncarp. If collected without good data they could be the basis of a faulty classification.

The color of the ripe phalanges can be given in reference to the Royal Horticultural Society Color Chart, as follows: basal third, Saturn Red, (chart 13); middle band, Mandarin Red, (chart 17); the top, Brick Red, (chart 16).

The new epithet is formed from the Latin *stolo*, a stolon, *fero*, to bear, with reference to the stoloniferous habit of the male trees, a very unusual growth habit in the genus.

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

Figs. 133, 134, 135, 132b–d, 138a

DIAGNOSIS HOLOTYPI: Arbor 7–9 m alta 15 cm diametro pauciter furcata in corona aperta ellipsoidea, cortice cum radicillis adpresse adscendentibus, radicibus fulturosis nullis, foliis 1.4–1.5 m longis 6.3–6.6 cm latis coriaceis in sectione mediali cum 64 nervis secundariis in quoque latere, gladiformibus in medio 4.3–4.5 cm latis ex basi in apice longe subulato gradatim diminuentibus eo in puncto 10 cm ex apice 3.5–4 mm lato, basi amplexicauli et inermi sed ex 20 cm marginibus cum aculeis 1–2.3 mm longis



FIG. 132*b,c*. *P. subinermis* St. John, holotype. *b*, Tree habit, with S. T. Blake; *c*, fruiting branch with syncarp and phalanges.

7–14 mm distantibus arcuato-subulatis adscendentibus toto brunneis vel cum apicibus luteis, midnervo toto inermi, marginibus per parte $\frac{2}{3}$ ultima inermibus, pedunculo 35 cm longo ad apicem 2 cm diametro incrassatam obscure trigono folioso terminali, syncarpio solitario ca. 22 cm longo et 17 cm diametro ovoideo 35–40 phalangibus ferentibus centro ellipsoideo trigono in sicco multo contracto, phalangibus 5–5.7 cm longis 4–5.3 cm latis 2.7–4.5 cm crassis late obovoideis subcompressis 5–7-angulosis in sicco brunneo lateribus subconvexis sublaevibus parte $\frac{1}{3}$ supra libera, apice alte convexo vel semi-orbiculari suturis lateralibus enim ad mediam profundis et distinctis, sinibus centralibus apicalibus 2.5–5 mm profundis in basi angustis, carpellis 9–15 plerumque 13 apicibus depresso rotundato-pyramidalibus interioribus subaequalibus vel minime minoribus, stigmatibus 1–2 mm longis suborbicularibus vel cordatis obscure

brunneis papillosis obliquioribus centripetalibus sulcatis, sinu proximali tota vel fere ad fondam extento, endocarpio mediali 2.5 cm longo osseoso obscure brunneo intra brunneo et lucido lateribus lateralibus 5–6 mm crassis, seminibus 16 mm longis 6 mm diametro ellipsoideis, mesocarpio apicali in carpella quaque cum fibris longitudinalibus fortibus et membranis albis medullosis, mesocarpio basali fibroso et carnosio.

DESCRIPTION OF ALL SPECIMENS EXAMINED: Tree 7–9 m tall, 15 cm in diameter, loosely few forked into an open, ellipsoid crown; bark with appressed ascending rootlets; prop roots none; leaves 1.4–1.5 m long, 6.3–6.6 cm wide, at mid-section with 64 secondary veins on each side, gradually tapering from the base to the long subulate tip, this at about 10 cm down only 3.5–4 mm wide, the very base amplexicaul and unarmed, but beginning 20 cm up the margins with prickles 1–2.3 mm long, 7–14 mm apart,



FIG. 132d. *Pandanus subinermis*, habit of staminate tree, from *St. John* 26,259.

arcuate subulate, ascending, brownish throughout or with yellow tips; the midrib unarmed throughout; the margins for the outer $\frac{2}{3}$ unarmed; peduncle 35 cm long, increasing in width towards the apex which is 2 cm in diameter, obtusely trigonous, leafy bracted, terminal; syncarp solitary, about 22 cm long and 17 cm in diameter, ovoid with 35–40 phalanges; the core ellipsoid, trigonous, much shrunken on drying; phalanges 5–5.7 cm long, 4–5.3 cm wide, 2.7–4.5 cm thick, broadly obovoid, somewhat compressed, 5–7-angled, when dried brown, the sides gently convex, nearly smooth, upper $\frac{1}{3}$ free, the apex high convex to semi-orbicular; lateral sutures distinct and deep at least down to the middle; central apical sinuses 2.5–5 mm deep, the lower part narrow; carpels 9–15, mostly 13, the apices low rounded pyramidal, the inner ones subequal or slightly the smaller; stigmas 1–2 mm long, suborbicular to

cordate, dark brown, papillose, very oblique, centripetal, creased; proximal sinus running all or nearly all the way to the valley bottom; endocarp median, 2.5 cm long, bony, dark brown, the inner surfaces brown and shining, the outer lateral walls 5–6 mm thick; seeds 16 mm long, 6 mm in diameter, ellipsoid; apical mesocarp in each carpel cavernous with strong longitudinal fibers and white medullary membranes; basal mesocarp fibrous and fleshy. Staminate tree (no. 26,259) 7 m tall, 15 cm in diameter; leaves 52–75 cm long, 5–5.5 cm wide, coriaceous, gladiate, tapering from the base into the acute tip, this 10 cm down 11–15 mm wide, in section M-shaped, at midsection with 53 secondary parallel veins in each half, appearing unarmed, but actually near the base on one margin with prickles 0.9–1.2 mm long, 4–7 mm apart, subulate, brown, appressed ascending; midrib unarmed throughout; at the midsection almost unarmed; near the tip unarmed; staminate inflorescence terminal, 40–50 cm long; peduncle 10 cm long, bracts numerous, the outer foliaceous and acuminate, blending to the reduced, whitish lanceolate ones 10–20 cm long, 2–3 cm wide, that subtend the spikes; lateral rachises axillary, 5–7 cm long, densely flowered to the base; staminal columns numerous, crowded, 1.7–2.2 cm long, the lower half naked, the upper half bearing 25–28 racemose stamens, these with the free filament tip 1–2 mm long; anthers 4–6.5 mm long, linear, white, bipartite at base, at apex the subulate prolongation of the connective 0.7–1 mm long.

HOLOTYPUS: Australia, North Queensland, 6 miles s. of White Cliff Point, and 18 miles n. of Cairns, grove in savanna on granite boulder point, with *Eucalyptus tessularis*, *Albizia procera*, and *Heteropogon triticens*, 10–50 ft. alt., Feb. 5, 1958, *H. St. John* 26,258 (BISH).

SPECIMENS EXAMINED: Australia, North Queensland, same locality and data as above, staminate tree, *H. St. John* 26,259 (BISH).

DISCUSSION: *P. subinermis* is a member of the section *Pandanus*. Its close relative is *P. ferrimontanus* St. John, of Queensland, a species which has the leaves of the pistillate trees 5.8 cm wide, from the midsection to the tip the margins and midrib below prickly; phalanges 4.5–4.7 cm long, 3.4–3.5 cm wide; carpels 8–12,

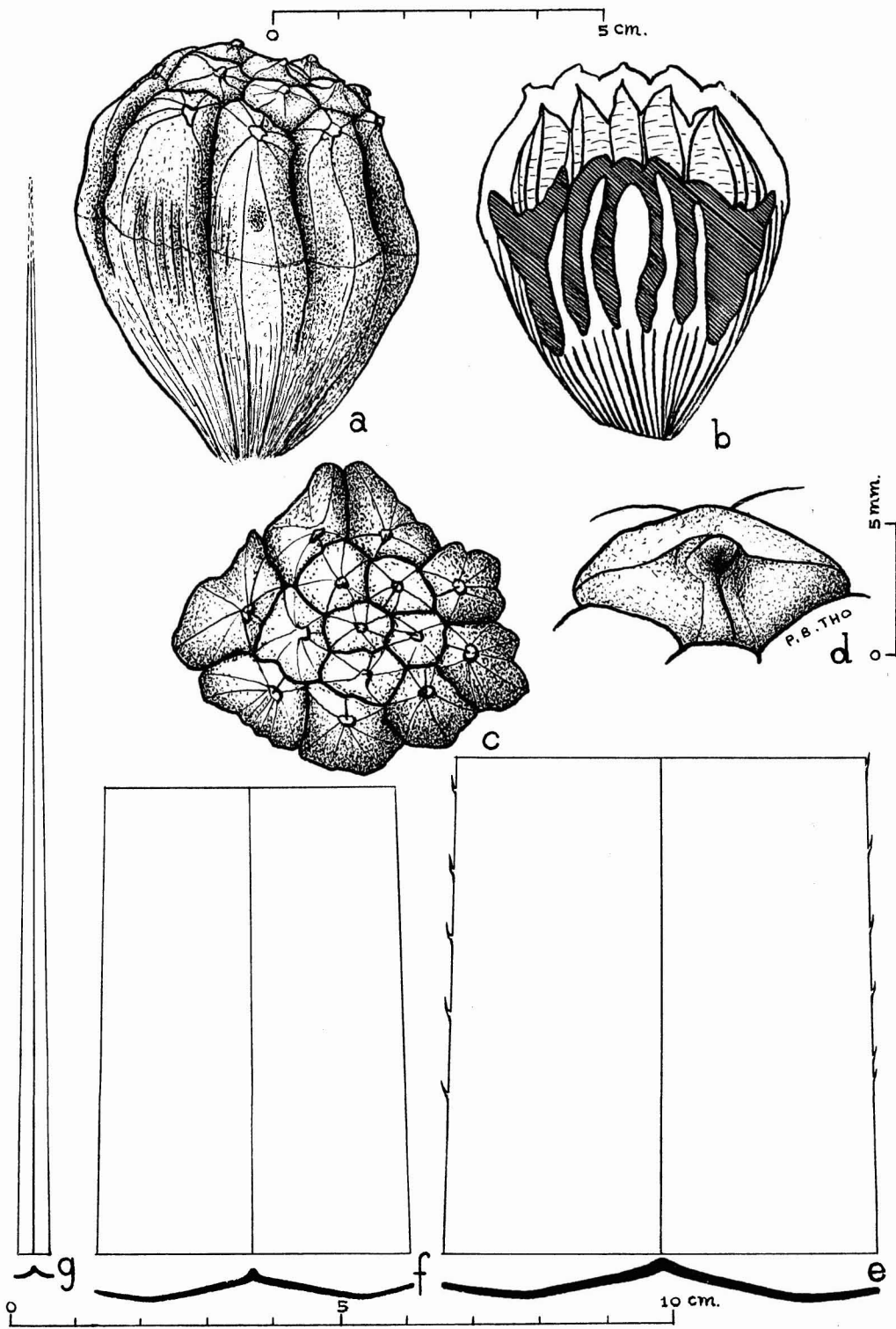


FIG. 133. *Pandanus subinermis* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, leaf apex, lower side, $\times 1$.

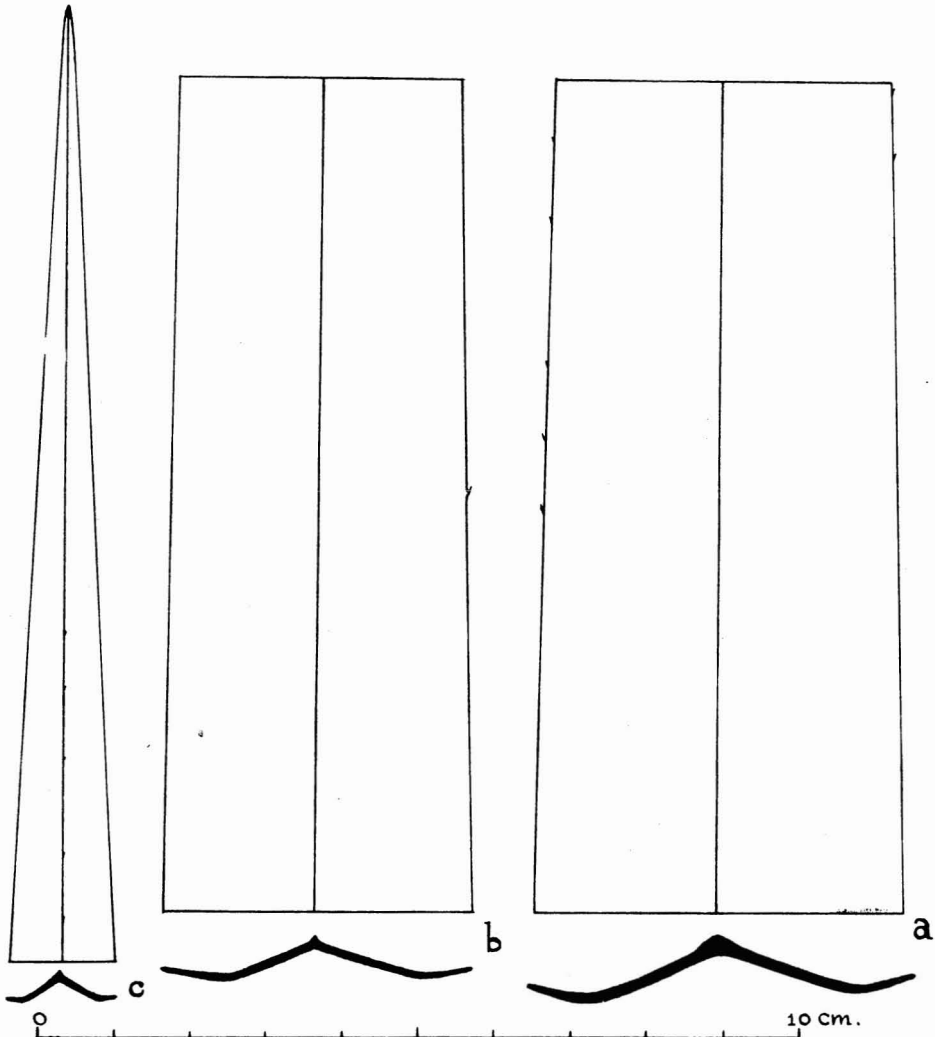


FIG. 134. *Pandanus subinermis* St. John, staminate tree, from *St. John* 26,259. a, Leaf base, lower side, $\times 1$; b, leaf middle, lower side, $\times 1$; c, leaf apex, lower side, $\times 1$.

the apices with an oblique concavity distal of the stigma; endocarp stramineous; and the apical mesocarp 5–9 mm long. In contrast, *P. subinermis* has the leaves of the pistillate trees 6.3–6.6 cm wide, the midrib unarmed and the margins in the outer $\frac{2}{3}$ unarmed; phalanges 5–5.7 cm long, 4–5.3 cm wide; carpels 9–15, mostly 13, the apices without concavity; endocarp dark brown; and the apical mesocarp 12–16 mm long.

The new epithet is the Latin adjective, *subi-*

nermis, almost unarmed, in reference to the leaves which are almost unarmed.

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

Fig. 136

DIAGNOSIS HOLOTYPI: Arbor 8 m alta 20 cm diametro, cortice verruculoso, radicibus fulturosis 1.5 m longis 4 cm diametro, foliis 1.2–1.4 m longis 6 cm latis coriaceis in sectione depresso M-formatis gladiformatis sensim ad apicem licet

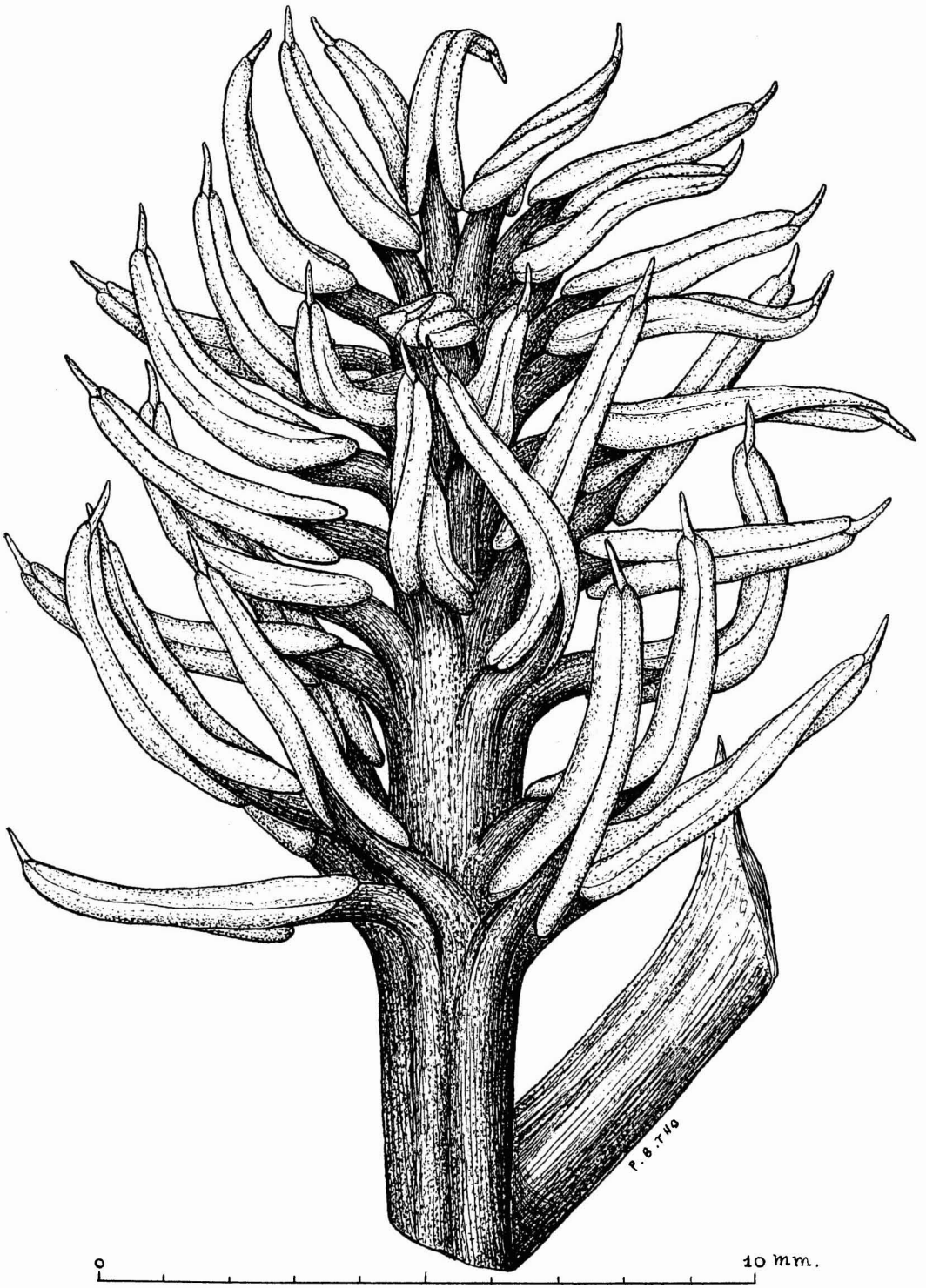


FIG. 135. *Pandanus subinermis* St. John, staminate tree, from *St. John* 26,259. Staminal column with anthers, $\times 10$.

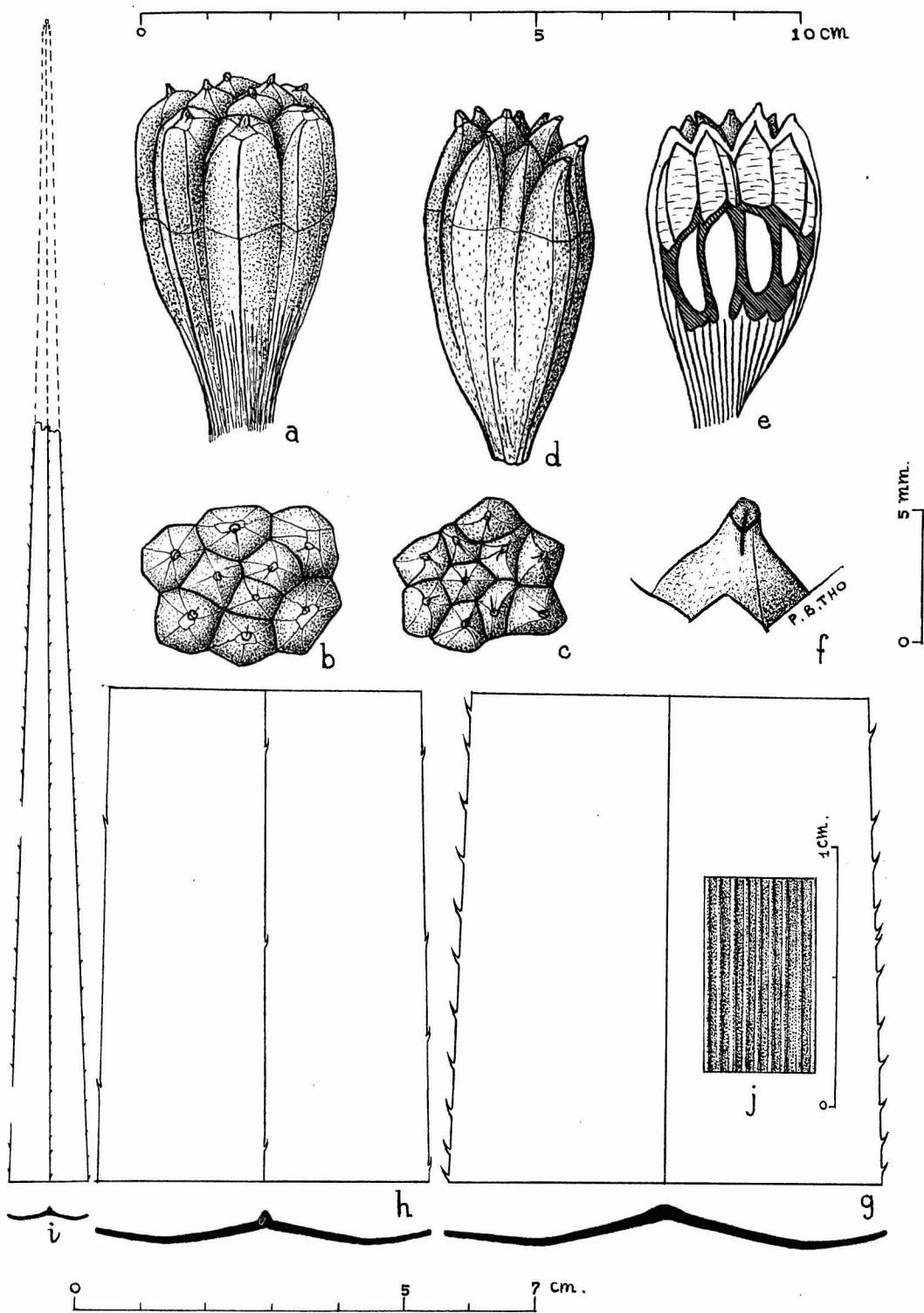


FIG. 136. *Pandanus viridinsularis* St. John, holotype. *a*, Basal phalange, lateral view, $\times 1$; *b*, same, apical view, $\times 1$; *c*, basal phalange, apical view, $\times 1$; *d*, typical middle or upper phalange, lateral view, $\times 1$; *e*, same, longitudinal median section, $\times 1$; *f*, same, carpel apex, stigma, and proximal sinus, oblique view, $\times 4$; *g*, leaf base, lower side, $\times 1$; *h*, leaf middle, lower side, $\times 1$; *i*, leaf apex, lower side, $\times 1$; *j*, secondary veins at midsection, lower side, $\times 4$.

subulatum diminuentibus basi amplexicauli et inermi sed ex 5–6 cm marginibus cum aculeis 2.5–4 mm longis 3–13 mm distantibus arcuato-subulatis adscendentibus apice brunneo, midnervo infra ex 17 cm cum aculeis 2 mm longis 13–28 mm distantibus arcuato-subulatis inferioribus reflexis, in regione mediali marginibus cum serrulis 1 mm longis 5–40 mm distantibus, midnervo infra cum aculeis 1.3–1.8 mm longis 16–32 mm distantibus graciliter subulatis adpresse adscendentibus, circa apicem marginibus et midnervo infra cum serrulis 0.1 mm longis 2–4 mm distantibus, syncarpio invisio, phalangibus 4.6–5.1 cm longis 2.3–3.2 cm latis 1.9–2.8 cm crassis eis medialibus et superis oblanceoloideis (aliquis basalibus brevioribus, latioribus et late oblanceoloideis) 5–6-angulosis lateribus laevibus sublucidis convexis parte $\frac{1}{4}$ supra libera apice convexo, dimidia suturis lateralibus ad mediam distinctis, sinibus centralibus apicalibus 3–5 mm profundis (in eis basalis 2–4 mm) V-formatis gradatim curvatis, carpellis 7–11 (in geminis 17, in triplo 30, et 4.3–6 cm latis) apicibus aequalibus vel subaequalibus lanceoloideis, eis centralibus symmetricalibus, eis marginalibus asymmetricalibus et apicibus divergentibus (in basalibus apicibus ovoideis acutis), stigmatibus 1.5–2 mm longis ellipticis ad subcircularis brunneis sulcatis valde obliquis proximalibus centripetalibus, sinibus proximalibus profundis $\frac{1}{3}$ – $\frac{1}{2}$ ad fondam extentis, endocarpio mediali 17–18 mm longo obscure brunneo intra lucido lateribus 2–2.5 mm crassis, seminibus 11–13 mm longis 3–4.5 mm diametro ellipsoideis, mesocarpio apicali in carpella quaque cavernam cum fibris paucis et membranis albis medullosis formanti, mesocarpio basali fibroso et carnoso.

DIAGNOSIS OF HOLOTYPE: Tree 8 m tall, 20 cm in diameter; bark warty; prop roots 1.5 m long, 4 cm in diameter; leaves 1.2–1.4 m long, 6 cm wide, coriaceous, in section low M-shaped, swordlike, tapering gradually to the apparently subulate tip, the base amplexicaul and unarmed, but beginning 5–6 cm up the margins with prickles 2.5–4 mm long, 3–13 mm apart, arcuate subulate, ascending, brown-tipped; the midrib below beginning at 17 cm with prickles 2 mm long, 13–28 mm apart, arcuate subulate,

the lower ones reflexed; at midsection the margins with serrulations 1 mm long, 5–40 mm apart; the nearby midrib below with prickles 1.3–1.8 mm long, 16–32 mm apart, slender subulate, appressed ascending; near the tip the margins and midrib below with serrulations 0.1 mm long, 2–4 mm apart; syncarp not seen; phalanges 4.6–5.1 cm long, 2.3–3.2 cm wide, 1.9–2.8 cm thick, the middle and upper ones oblanceoloid, (some of the basal ones shorter and broader, broadly oblanceoloid), 5–6-angled, the sides smooth and somewhat shiny, gently convex, upper $\frac{1}{4}$ free, the apex convex; about half of the lateral sutures perceptible half way down, but the other half invisible; central apical sinuses 3–5 mm deep (in the broad basal phalanges 2–4 mm), V-shaped, the sutures gently curving; carpels 7–11 (in a double 17, in a triple 30, and 4.3–6 cm wide), the apices equal or the central slightly smaller, lanceoloid, the central ones symmetric, the marginal ones asymmetric and the tips diverging, (in the basal phalanges the carpel apices ovoid, acute); stigmas 1.5–2 mm long, elliptic to subcircular, brown, creased, very oblique from apex down proximal side, centripetal; proximal sinus deep, running $\frac{1}{3}$ – $\frac{1}{2}$ way to valley bottom; endocarp median, 17–18 mm long, dark brown, bony, the inner surfaces shining, the lateral walls 2–2.5 mm thick; seeds 11–13 mm long, 3–4.5 mm in diameter, ellipsoid; upper mesocarp forming in the apex of each carpel a cavern with a few fibers and with white medullary membranes; basal mesocarp fibrous and fleshy.

HOLOTYPE: Australia, North Queensland, Green Island, off Cairns, beach forest with *Erythrina*, *Cordia subcordata*, *Morinda citrifolia*, Feb. 10, 1958, *H. St. John* 26,270 (BISH).

DISCUSSION: *P. viridinsularis* is a member of the section *Pandanus*. Its closest relative is *P. tectorius* Soland. var. *surigaensis* Martelli, which has the phalanges with the upper $\frac{1}{2}$ free, the apices of the central carpels pyramidal suborbicular, and those of the marginal ones erect; stigmas of marginal carpels horizontal. On the other hand, *P. viridinsularis* has the phalanges with the upper $\frac{1}{4}$ free, the apices of the central carpels lanceoloid, but of the marginal ones

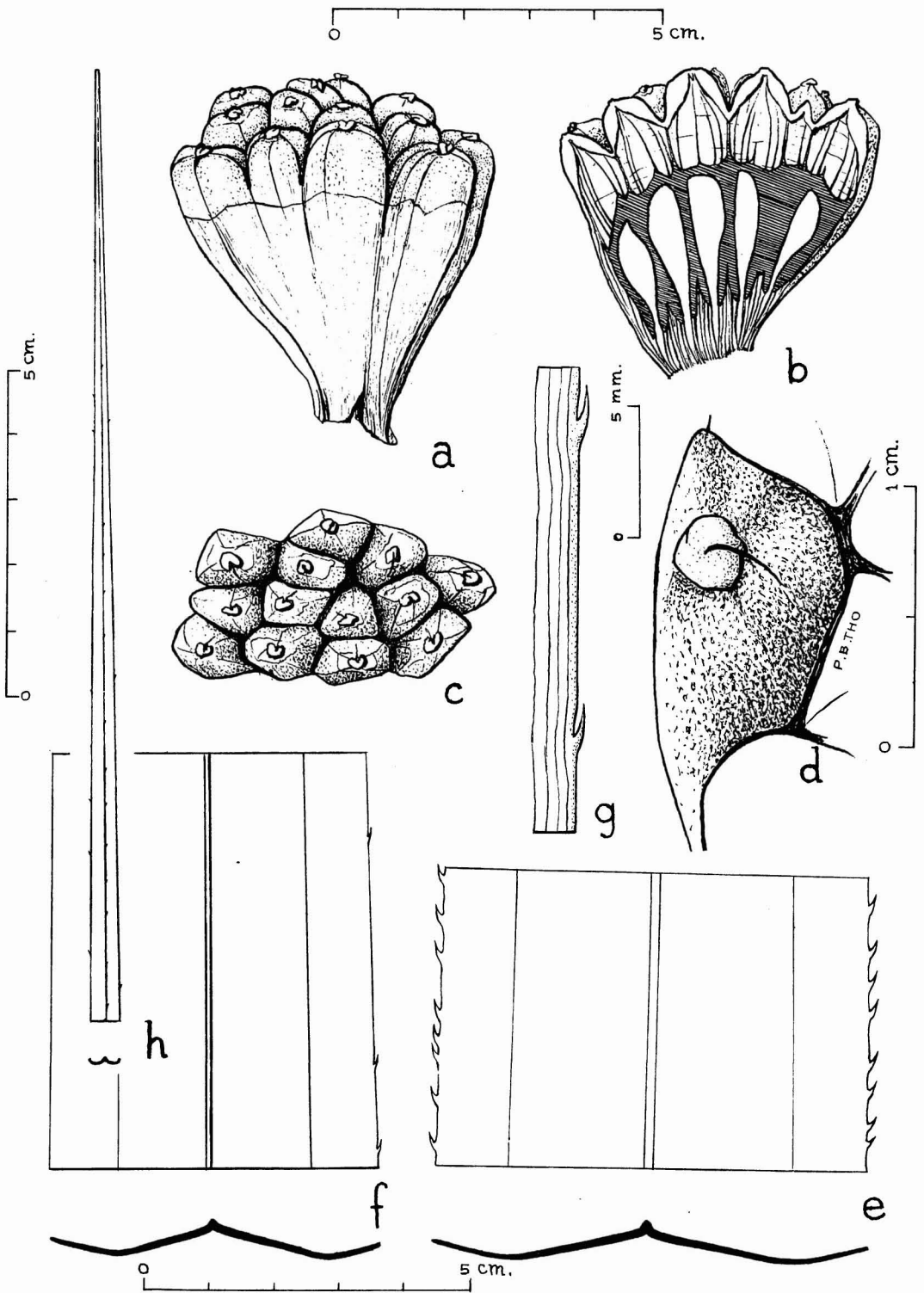


FIG. 137. *Pandanus yorkensis* St. John, holotype. *a*, Phalange, lateral view, $\times 1$; *b*, phalange, longitudinal median section, $\times 1$; *c*, phalange, apical view, $\times 1$; *d*, carpel apex, stigma, and proximal sinus, apical view, $\times 4$; *e*, leaf base, lower side, $\times 1$; *f*, leaf middle, lower side, $\times 1$; *g*, margin of leaf at midsection, $\times 4$; *h*, leaf apex, lower side, $\times 1$.



FIG. 138a. *Pandanus subinermis* St. John, from St. John 26,259, staminate inflorescence.

divergent; and the stigmas of all carpels oblique.

It is less closely related to the specimens from the Loyalty Islands illustrated by Martelli and merged by him with the Australian *P. pedunculatus* R. Br.

The new epithet is formed from the Latin words *viridis*, green, and *insularis*, of the island, in allusion to its type locality on Green Island.

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

Figs. 137, 138b

DIAGNOSIS HOLOTYPI: Arbor 5–8 m alta valde remoteque ramosa, trunco ramisque cum umbonibus brevibus sparse armatis, foliis 117 cm longis 6.7 cm latis subcoriaceis glaucis gladiiformatis ex basi in apice longiter subulata dimiuentibus, in puncto 10 cm ex apice 4 mm latis, basi inermi sed ex 4.5–5.5 cm marginibus cum aculeis 1.5–3 mm longis 3–7 mm distantibus crassiter subulatis luteis adscendentibus basi arcuata, midnervo infra inermi sed in puncto 20 cm ex basi cum aculeis 1.5 mm longis paucis remotis adpressi-adscendentibus, in sectio mediali marginibus in uno latere inermi sed in altero cum aculeis 2 mm longis 11–32 mm distantibus, midnervo inermi, in parte apicale marginibus

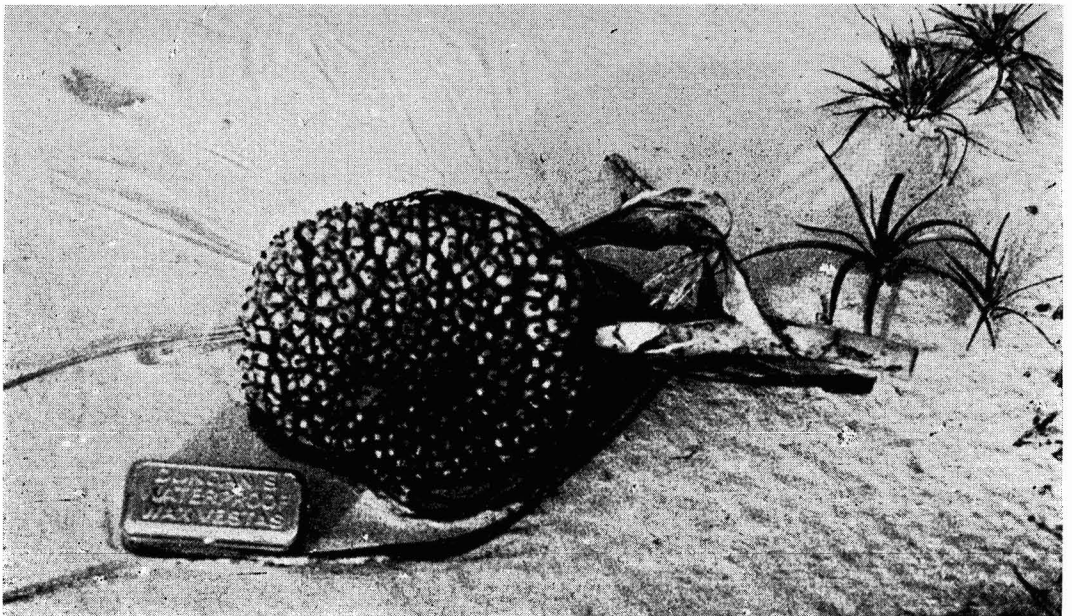


FIG. 138b. *Pandanus yorkensis* St. John, holotype, syncarp.



FIG. 139A. *a*, *Pandanus citraceus* St. John, holotype, trunk, leafy branch with syncarp in flower, and an old one with the phalanges shed from the core; *b*, tree habit, with S. T. Blake; *c*, trunk with appressed ascending adventitious rootlets. *d*, *P. orbicularis* St. John, holotype, tree habit, with S. T. Blake.

cum serris 0.2–0.3 mm longis 5–20 mm distantibus, midnervo inermi, pedunculo 15 cm longo sparse folioso-bracteato, syncarpio terminali solitario 15 cm longo 12 cm diametro late ovoideo triangulato cum circa 50 phalangibus eis 4.2–4.5 cm longis 3.1–4.9 cm latis 2.4–3 cm crassis late cuneiformibus 5–7-angulatis in sicco brunneis, lateribus laevibus lucidisque cum planis vel lateribus subcurvatis pluribus, in parte $\frac{1}{4}$ supera libera, apice late rotundato, suturis lateralibus angustis sed in quarto supero distinctis et rariter infra, sinibus centralibus apicalibus 6.5–8 mm profundis anguste V-formatis, carpelis 10–17 (sed in geminis 25 et phalangio 6.1 cm lato), apicibus ovoideis vel oblato-ovoides minute papillosis, stigmatibus 2–3 mm longis suborbicularibus vel late ellipticis obscuris sulcatis centripetalibus eis interioribus obliquis, sinu proximo $\frac{1}{4}$ – $\frac{1}{2}$ ad profundam extento, endocarpio paene submediali 2 cm longo osseoso pallido excepto partibus brunneis circum semines, lateribus exterioribus lateralibus 1–2 mm crassis, seminibus 13–17 mm longis 4–5 mm diametro ellipsoideis vel oblongo-ellipsoideis, mesocarpio supero in carpelis omnibus cavernam fibrosam et medullosam formanti.

DIAGNOSIS OF HOLOTYPE: Tree 5–8 m tall, freely and openly branched; trunk and branches "sparsely armed with short, stout bosses"; prop roots not mentioned; leaves 117 cm long, 6.7 cm wide, subcoriaceous, glaucous, swordlike, tapering from the base to the long subulate tip, this at 10 cm down only 4 mm wide, the very base unarmed, but beginning 4.5–5.5 cm up the margins with prickles 1.5–3 mm long, 3–7 mm apart, stout subulate, yellowish, ascending, the base arcuate; the nearby midrib below-unarmed, but beginning 20 cm up a few remote prickles 1.5 mm long, ascending, appressed; at the mid-section the margin on one side unarmed, on the other with prickles 2 mm long, 11–32 mm apart; the midrib unarmed; near the apex the margins with serrations 0.2–0.3 mm long, 5–20 mm apart; the midrib below unarmed towards the apex, but below 9 cm from the tip with

similar serrations 3–4 mm apart; peduncle at least 15 cm long sparsely leafy bracted; syncarp terminal, solitary, 15 cm long, 12 cm in diameter, broadly ovoid, 3-angled, with about 50 phalanges, these 4.2–4.5 cm long, 3.1–4.9 cm wide, 2.4–3 cm thick, broad cuneiform, 5–7-angled, when dried brown, the sides smooth and shiny, of several planes or gently curving surfaces, free in upper $\frac{1}{4}$, the apex broadly rounded; lateral sutures narrow but distinct in free upper quarter, rarely further down; central apical sinuses 6.5–8 mm deep, narrow V-shaped; carpels 10–17 (but in a double 25 and the phalange 6.1 cm wide), the apices equal or somewhat unequal, fully ovoid or oblately so, dull and minutely papillose; stigmas 2–3 mm long, subcircular to broadly elliptic, dark, creased, centripetal, the inner ones oblique and slightly the smaller; proximal sinus running $\frac{1}{4}$ – $\frac{1}{2}$ way to the valley bottom; endocarp slightly submedian, 2 cm long, bony, pale except for the brown portions near the seed cavities, the outer lateral walls 1–2 mm thick; seeds 13–17 mm long, 4–5 mm in diameter, ellipsoid to oblong-ellipsoid; upper mesocarp forming in each carpel apex a cavern crossed by numerous longitudinal fibers and with delicate, medullary membranes.

HOLOTYPE: Australia, Queensland, Cape York Peninsula, Newcastle Bay, $2\frac{1}{2}$ miles s. of Somerset, May 12, 1948, *L. J. Brass* 18,787 (BRI).

DISCUSSION: *P. yorkensis* is a member of the section *Pandanus*. The most similar known species is *P. duriocarpus* Martelli, of the Palau Islands. This has the phalanges 4.5–4.8 cm long, 2.5–4 cm wide; carpel apices pyramidal, lacking any concavity; and the apical central sinuses 5–7 mm deep. In contrast, *P. yorkensis* has the phalanges 4.2–4.5 cm long, 3.1–4.9 cm wide; carpel apices with an oblique, distal concavity adjacent to the stigma; and the apical, central sinuses 3.5–4.5 mm deep.

The new epithet is the geographic name York, plus *-ensis*, the Latin adjectival place ending.