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THE GENUS *PANTORHYTES* (COLEOPTERA: CURCULIONIDAE) DIVISION A

I. Additions and changes to the common and major cacao species[1]

By **Jeffrey N. L. Stibick**[2]

Abstract: Five species of *Pantorhytes*—*P. horni, P. fenneri, P. bourkei, P. bakeri* and *P. hassani*—are hereby described as new. Three species—*P. chrysomelas* (Montrouzier), *P. subcostatus* Heller and *P. fraudus* Janczyk—are synonymized under *P. stanleyanus* (White), and a subspecies, *P. batesi melanoticus* Heller, is raised to full specific status. A key to the species of Division A is provided.

This paper is the first of a series on the genus *Pantorhytes*. These weevils are known from throughout Papua New Guinea, West Irian, the Solomons and Queensland. Five new species belonging to Division A are described in order to make the names available for other D.P.I. personnel engaged in various studies on certain economic species. These species will be discussed more fully in a later paper. In addition, 3 names doubtfully recognized by Gressitt (1966) are here placed as synonyms of *P. stanleyanus* (White) and *P. batesi melanoticus* Heller is raised to full specific status.

Throughout this paper the following abbreviations are used for the various institutions and private collections listed:

AMIC—The Australian Museum, Sydney, Australia
AMNH—The American Museum, New York, U.S.A.
ANIC—Australian National Insect Collection, C.S.I.R.O., Canberra, Australia
BMNH—British Museum (Natural History), London, England
BISHOP—Bishop Museum, Honolulu, Hawaii, U.S.A.
BSIP—Insect Collection, Department of Agriculture, Honiara, Solomon Islands
FICB—Forest Insect Collection, Department of Primary Industry, Bulolo, Papua New Guinea
HORN—Hornabrook Collection
INDO—The Bogor Museum of Natural History, Bogor, Indonesia

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JNLS—Stibick Collection
KONE—The Central Reference Insect Collection, Department of Primary Industry, Papua New Guinea
LMLH—The Leiden Museum, Leiden, Holland
MNHP—The Natural History Museum, Paris, France
UPNG—The University of Papua New Guinea Collection, University of Papua New Guinea, Boroko, Papua New Guinea

GENUS **Pantorhytes** Faust

The key treats the *Pantorhytes* divisions of Gressitt (1966, *Pacif. Ins.* **8:** 915) and the species of Division A and supersedes Gressitt's couplets 1-16. However, even with the new key some difficulties may be encountered with specimens in which the scales or setae are more or less abraded.

KEY TO DIVISIONS AND DIVISION A SPECIES OF *Pantorhytes*

1. Elytron with distinctly large, usually reddish nodes (FIG. 1)[3] or long, raised, red ridges[4] (the studded *Pantorhytes*) [cf. Gressitt, 1966: couplets 3-16] . . . . . DIVISION B
Elytron without distinct or large, raised nodes or ridges 2

2(1). Anteocular foveae absent or with faint impression at best (FIG. 2); funicle slender on the whole, its 1st segment slender and 7th segment transverse (FIG. 6); body clothed above with grayish green to golden green scales or hairs, ground colour piceous-black (the montane *Pantorhytes*) [cf. Gressitt, 1966: couplets 54-65] . . . . . DIVISION C
Anteocular foveae present, deeply impressed and prominent (FIG. 3); funicle stout (rarely slender) on the whole, its 1st segment generally stout, 7th segment transverse to conical (FIG. 7, 8); body clothed above with shiny, metallic scales or whitish sometimes bluish greenish scales without lustre or scales absent and vestiture of pale, whitish hairs, ground colour piceous black, often with reddish elytra, this often shiny, sometimes smooth (the common and major cacao *Pantorhytes*) [cf. Gressitt, 1966: couplets 17-53] . . . . . DIVISION A . . . 3

3(2). Posterior part of prosternum just behind procoxae with scales (FIG. 4); scales also present in subocular setal rows, these sometimes more slender, rarely absent; body with more or less scattered, sometimes densely packed scales 10
Posterior part of prosternum with hairs only; subocular setal rows normally of hairs (rare specimens have 1 or 2 scale-like hairs); body with comparatively few if any scales, these generally concentrated towards elytral apex 4

4(3). Elytron with large red spot, in size about 1/2 total length of former and 1/4 length away from elytral base, ground colour otherwise black; Huon Peninsula (Morobe Distr.) . . . . . **melanoticus**
Elytron almost completely red except at apex, or duller with red fading to nearly piceous or black. 5

5(4). With either amygdaliform white-yellowish or bluish scales on elytron (FIG. 5), these generally clustered in patches towards elytral apex and scattered elsewhere on body, or rarely with scales completely absent; legs solidly piceous-black; funicle segment 7 conical (FIG. 7) 9

3. Nodes here defined as evenly convex, smooth prominences on and distinct from the elytral surface. They may be colourless or very rarely minute and scarcely visible to the naked eye as bright red dots.
4. The surface may have regular to irregular serrations or prominent nodules of irregular shape and outline or even be nodose, but in any case such features are not an apparently separated structure on the elytral surface.

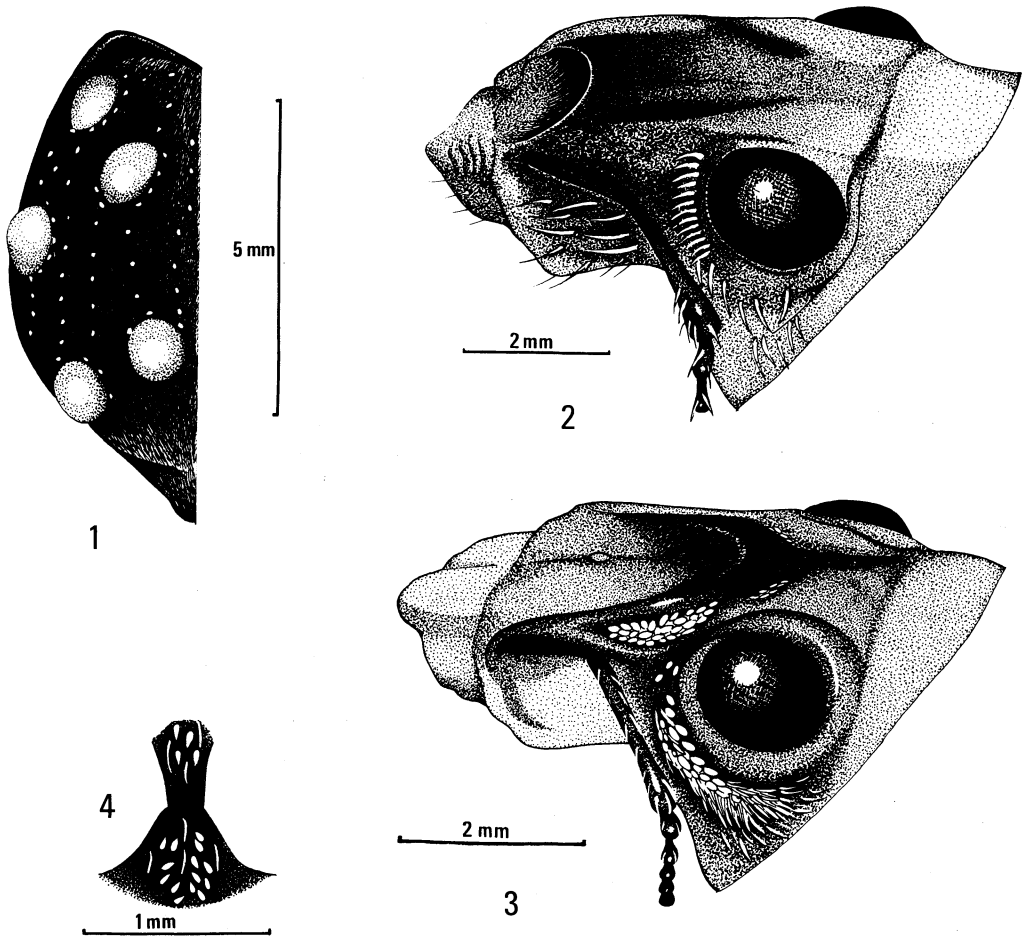


FIG. 1-4. 1, elytra of *Pantorhytes decempustulatus* (Gestro), dorsal view, showing nodes. 2, head of *Pantorhytes maai* Gressitt, dorsolateral view, showing details of frontal impressions; setae of subocular setal row and anteocular impression only. 3, head of *Pantorhytes albopunctulatus* Heller, dorsolateral view, showing details of frontal impressions; scales and setae of subocular setal row and anteocular fovea only included. 4, prosternum of *Pantorhytes albopunctulatus* Heller, ventral view, showing scales and setae.

With a sparse to dense cover of trichoid to amygdaliform scales (FIG. 5) more or less evenly spread over elytra (may be absent towards middle); legs with red bands on femora and/or tibia, fading away in some specimens; funicle segment 7 transverse (FIG. 8) 6

6(5). Scale-like hairs dense, setal pattern of elytron crowded and generally in contiguous patches, but usually absent in middle of elytron (FIG. 9); Mt Lamington (Northern Distr.) ..... **lamingtona**

Scale-like hairs scattered, individual setae well spaced and not contiguous 7

7(6). Elytra with a clearly visible overall loose pattern of scales and setae. 8

Elytra without such a pattern, scales and brownish setae evenly and sparsely distributed to present a fine, ash-like cover (FIG. 10); Woitape, Orrori (Central Distr.); Biagi Valley, Kapurahambo (Northern Distr.) ..... **healyi**

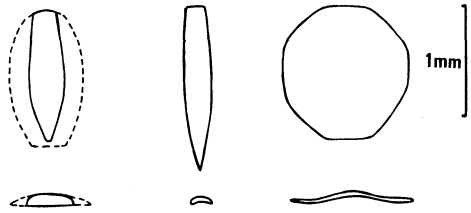


FIG. 5. Scale types, amydgaliform, trichoid and laminate.

8(7). Scales greenish, generally clustered in a strong and clearly visible loose elytral pattern of moderately stout to nearly blunt scales; Mt Suckling . . . . . **fenneri,** n. sp.
Scales brownish, long and slender, rather scattered, with a faint, ash-like and rather loose elytral pattern; Iongai (Northern Distr.) . . . . . **sedlaceki**

9(5). Elytron highly strigose and dull in appearance, punctures feeble, often absent; Astrolabe Mts (Central Distr.) . . . . . **opacus**
Elytron smooth and shiny, punctures well impressed; Markham Valley (Morobe Distr.) . . . . . **batesi**

10(3). Scales grouped in large patches on elytra, these brilliant and shiny except in specimens from the Solomons, Bougainville, Queensland and, rarely, SE New Guinea; scales laminate (FIG. 5) green, blue, red or yellow, rarely a duller, shining, pearly white in colour 15
Scales dull white, yellow-brown or with greenish cast, often appearing as small rusty patches especially at elytral apex; elytral scales generally amygdaliform (FIG. 5); body generally dull in appearance with black ground colour and reddish (rarely completely piceous) elytron 11

11(10). Elytral scales pale white or with greenish cast; generally confined to blackish elytral apex; surface of body rather smooth, shiny 14
Elytral scales yellow-brown, giving body a rather rusty appearance, prominently scattered over apex and sometimes most of elytra; pronotum usually similarly rusty in appearance 12

12(11). Surface of elytra smooth, evenly punctate, very finely microreticulate so as to appear very finely microgranulate and opaque, scales usually broader and flatter than in following 2 species; Garaina (Northern Distr.), Guari (Central Distr.) . . . . . **bourkei,** n. sp.
Surface of elytra more or less rugose, either nonpunctate or punctures present only in middle, not microreticulate and generally shiny, scales smaller and more convex 13

13(12). Pronotum more or less smooth, elytra more or less punctate in middle; scale patches generally confined to elytral apex; scales somewhat rounded in appearance; Popondetta, Sangara (Northern Distr.) . . . . . **szentivanyi**
Pronotum more or less nodose, elytra scarcely if at all punctate; scale patches dense and usually running over most of elytra; scales mostly pointed and convex; Aroa, Kokoda (Northern Distr.) . . . . . **albopunctulatus**

14(11). Scales with a greenish blue cast; elytral punctation somewhat confused in middle, intervals flat; Goodenough Island (Milne Bay Distr.) . . . . . **bakeri,** n. sp.
Scales with a whitish case; elytral punctations normally in more or less widely separated rows, intervals somewhat convex; British Solomon Islands Protectorate . . . . . **hassani,** n. sp.

15(10). Elytra either completely red except at apex or with prominent large red spot; scale pattern either of numerous small white patches over elytra or large shiny patches and stripes around but not in middle; New Britain, New Ireland, Solomons, Central Distr 16
Elytra completely black, rarely a very dull red; scale pattern complete in large shiny patches over elytra (rarely abraded); SE New Guinea, nearby islands, Queensland 17

16(15). Scales more or less covering elytra in longitudinal, whitish bands, rarely somewhat abraded; British Solomon Islands Protectorate, Bougainville . . . . . **biplagiatus**

Scales present in shiny, metallic green patches or stripes, mostly about edges of reddish area of elytra . 18

17(15). Funicle segment 7 transverse; pronotum and elytra nodose; Opi Region (Northern Distr.) . . . . . **horni,** n. sp.

Funicle segment 7 conical (cf. FIG. 7); pronotum smooth, elytra variable, usually smooth but sometimes quite nodose; SE New Guinea, Milne Bay Islands to Queensland. . . . . **stanleyanus**

18(16). Reddish area limited to centre of elytra only; apex of elytron with a row of shiny, often confluent green scales on each side, coverging at apex, prominent scale patches also present on pronotum; New Britain, New Ireland, adjacent islands . . . . . **plutus**

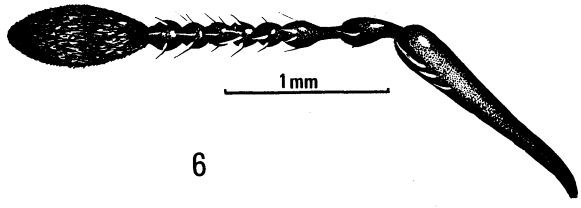
Reddish area covering most of elytra except for edges and apex; scale patches small, somewhat shiny, well separated; pronotum with a few small scale patches; Central Distr. . . . . **proximus**

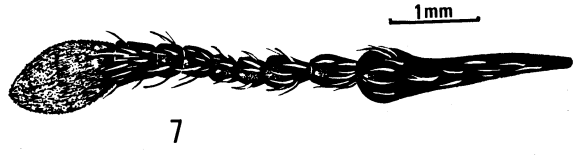
Pantorhytes—Division A

The common and major cacao *Pantorhytes*

Gressitt's 1966 revision divided the *Pantorhytes* into 3 divisions based on external features as viewed from the dorsum. Pending a clarification of the exact limits and relationships of each of these 3 divisions, a revised and tentative definition of Division A is given below.

Body. Clothed above with vestiture of pale, whitish hairs, sometimes with shiny metallic scales or whitish to bluish-greenish scales without lustre; general appearance often shiny, sometimes smooth especially on elytra. *Head.* Anteocular foveae present, deeply impressed and prominent; funicle stout (rarely slender), 1st segment generally





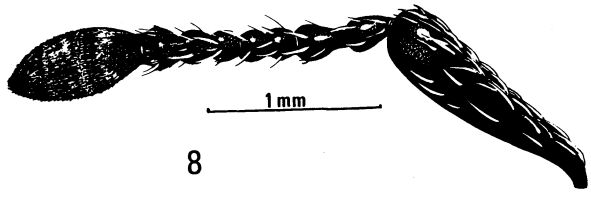


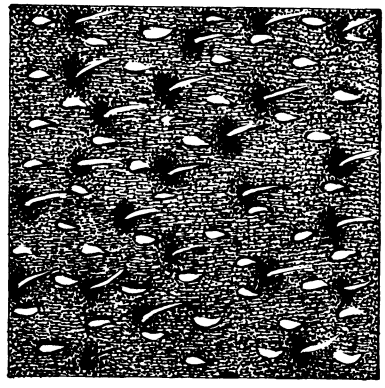
FIG. 6-8. 6, antenna of *Pantorhytes maai* Gressitt. 7, antenna of *Pantorhytes albopunctulatus* Heller. 8, antenna of *Pantorhytes lamingtona* Gressitt.

stout, 7th segment varying from transverse to conical. *Thorax*. Elytra without distinct or large raised nodes or ridges, often reddish in colour, otherwise red area limited to clearly defined spot or ground colour completely black.

Pantorhytes horni Stibick, new species FIG. 11, 15, 20, 25

Ground colour black with large patches of shiny, laminate green to occasionally yellow or reddish scales all over body, under eyes and behind procoxae; elytra and pronotum both densely nodose; antennae slender, funicle segment 7 transverse; body short, stubby, average length 8-11 mm.

Head. Scales densely scattered over head but concentrated between eyes, on vertex and from just in front of to underneath eyes in subocular setal rows; anteocular foveae deeply impressed, crowded with both scales and whitish hair-like setae; shallow median fovea extending from middle of rostrum to vertex, this sometimes reduced to a deep pit on rostrum, with another pit just behind rostrum; rostrum approximately as long as wide, closely punctate,



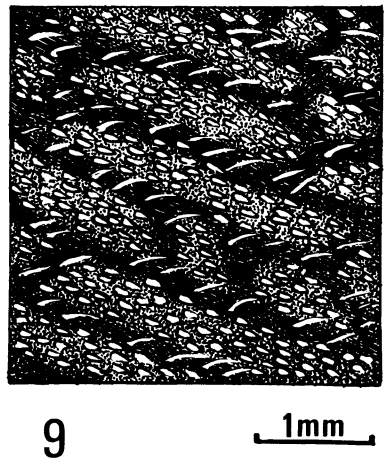
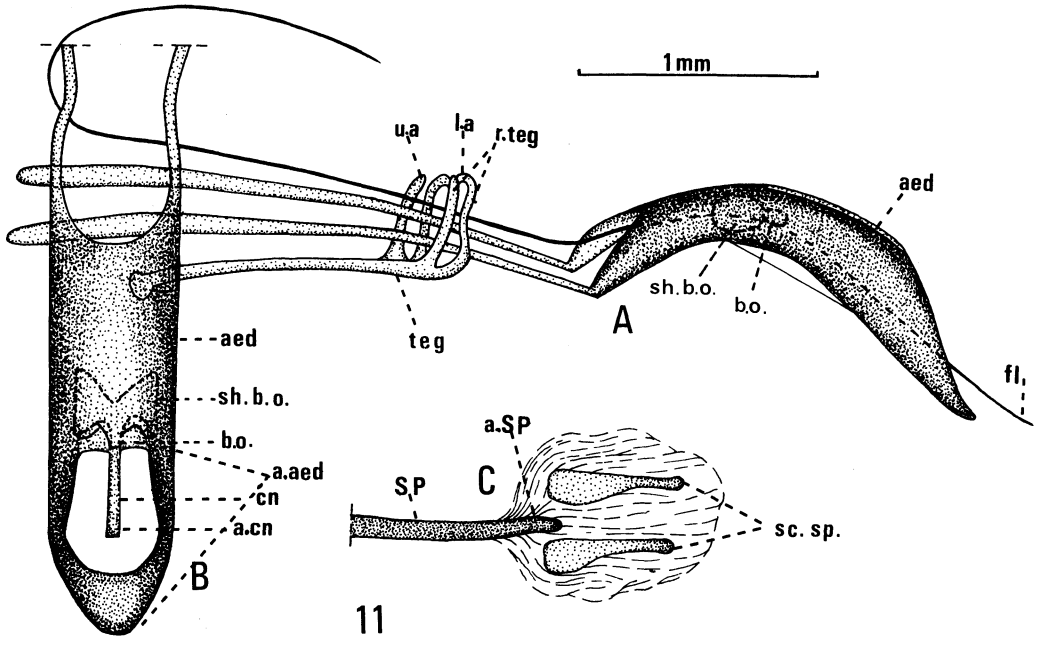


FIG. 9-10. 9, section of elytron, *Pantorhytes lamingtona* Gressitt, dorsal view, showing setal pattern. 10, section of elytron, *Pantorhytes healyi* Gressitt, dorsal view, showing setal pattern.



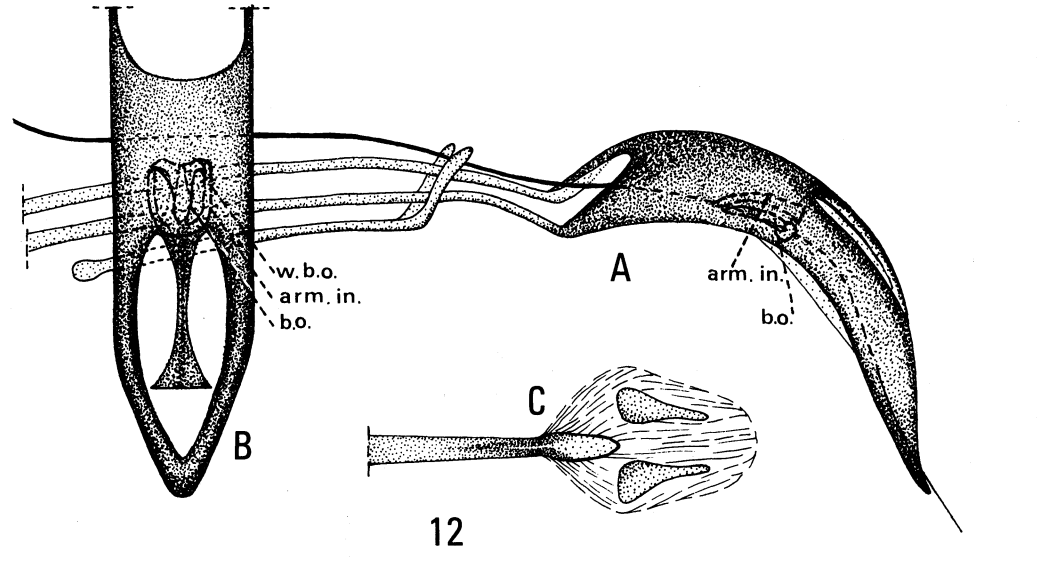


FIG. 11-12. Aedeagi, side and dorsal views: A, lateral view; B, dorsal view of phallobase only; C, dorsal view of spiculum gastrale only. 11, *Pantorhytes horni*, n. sp. 12, *Pantorhytes fenneri*, n. sp.

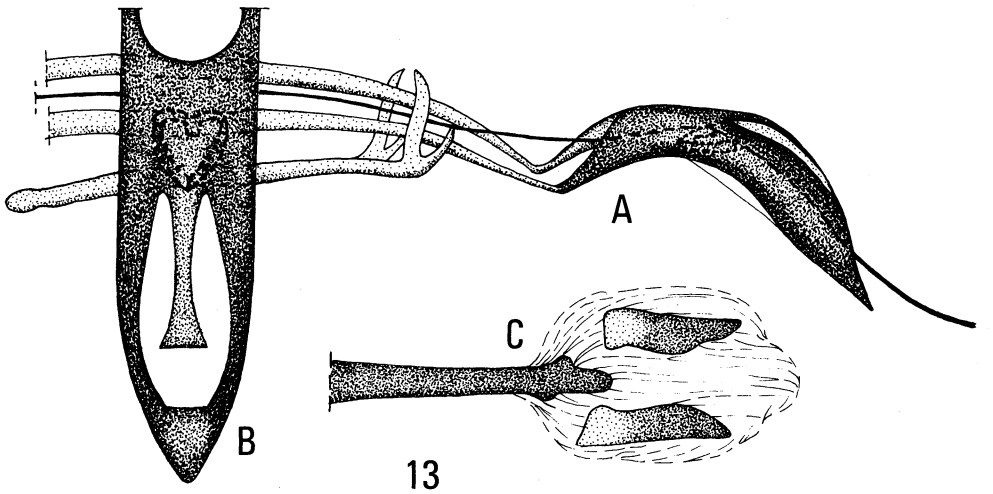
punctures of 2 sizes, surface shining, antennae with slender funicle, segments slender, 2nd segment longer than 3rd and 4th together, 3rd to 6th segments transverse and subequal in size, 7th segment transverse, slightly larger than 6th and distinctly separate from club; club oblong. *Thorax*. Pronotum approximately as wide as long, constricted at base, sides broadly rounded in anterior 2/3, widest just beyond middle, nonpunctate, scales scattered over surface, more closely clustered mediad and along sides; surface nonpunctate, densely nodose, nodules shining, nearly contiguous in middle, more scattered on sides, surface between nodules densely alutaceous. Prosternum with a dense cluster of scales just behind procoxae. *Elytra* about 1/3 as long as wide (ratio 5.7:7.2), evenly convex, apex not projecting, edges raised along sides especially at humeral angle; nonpunctate, 8 intervals present, each with a row of medium to large, shining nodules, these largest on 2nd, 3rd and 4th intervals; surface between nodules alutaceous; scales chiefly in large shiny patches along intervals between nodes, 2nd interval with usually 4 to 5 patches, 4th and 6th usually with 2, 8th with from 4 to 5 more or less well or ill defined patches, scattered clusters of 2 to 6 scales present elsewhere on intervals, punctures absent; ventral surface smooth, shining, scattered fine punctation, scales grouped in a large patch behind mesocoxae and again behind metacoxae. *Legs* moderately slender about 1/3 of length of femur surpassing elytral apex, femur generally shiny, with scattered nodules, widest before elytral apex, slightly notched on inside before its own apex, tibia alutaceous with only a few nodules, scattering of slender, hairlike, usually whitish, golden or greenish setae on both parts. *Abdomen*. Fifth abdominal segment finely and evenly punctate, with 2 more or less well impressed pits on sides.

♂. Length usually 8-9 mm. Genitalia (FIG. 11) with reduced or triangulate intersclerites close to 9th segment (spiculum gastrale); centerpiece with moderately wide apex; aedeagal apex wide, broad and blunt; phallobase struts broad; apex of spiculum gastrale with straight sides, no flanges; flagellum elongate, slender, internal end of 2 spines only; ring of tegmen with upper arms well developed, lower arms fused and elongated into broad ring; internal sac without armature but with broad shoulders on basal orifice developed posteriorly for leverage, basal orifice in front of (anterior to) base of centerpiece.

♀. Length usually 10-11 mm. Genitalia (FIG. 15) with robust spermatheca, this with slender and short duct projection, slender and elongate gland projection, apex blunt, V-shape orientation with proximal end parallel to body, terminal end relatively straight.

Holotype ♂ (BISHOP 10,751), PNG: New Guinea (SE): Northern Distr.: Poho, 27.VIII.1971, on cacao, Aiga Patrol; allotype ♀, Korisata, 21.VIII.1971, on cacao, Aiga Patrol; paratypes: 5, same data as allotype; 1, same data but 20.VIII.1971; 2, Osako-Aurita track, 23.VIII.1971, on cacao, Aiga Patrol; 2, Konininda, 27.VIII.1971, on cacao, Aiga Patrol; 1, Sogere, 16.VIII.1971, on cacao, Aiga Patrol; 1, Oitataudi, Dunstan's cacao garden, 19.VIII.1971, on cacao, Aiga Patrol; 5, Hurata, 20.VIII.1971, on cacao, Aiga Patrol; 2, Hurata, 19.VIII.1967, on cacao, J. Horne, C-62; 2, Opi Region, X.1968, Horne; 1, Popondetta, Bisi Plantation, 7.X.1971, on cacao, G. Baker; 3, Mt Suckling (boundary between Central, Northern and Milne Bay Districts), camp Mayu 1, VI.1972, crawling on tent, G. Leach, Mt Suckling expedition. All above from (KONE); following paratypes from other collections, as indicated: 1, Popondetta, VI. 1966, P. Shanahan (BISHOP); 1, same data as preceding but VII.1966; 1, Mt Lamington Distr., Northern Division, X.1929, C. T. McNamara (AMIC); 2, Mt Lamington, NE Papua, 1300-1500 ft (397-458 m), 17.I.1950, McNamara (BMNH).

The holotype, allotype, and 10 (KONE) paratypes are deposited in BISHOP. Two (KONE) paratypes each are deposited in the following institutions: BMNH, ANIC, FICB, UPNG, AMNH, MNHP, LMLH, INDO. Ten (KONE) paratypes are in that collection and 9 paratypes are in the JNLS collection.



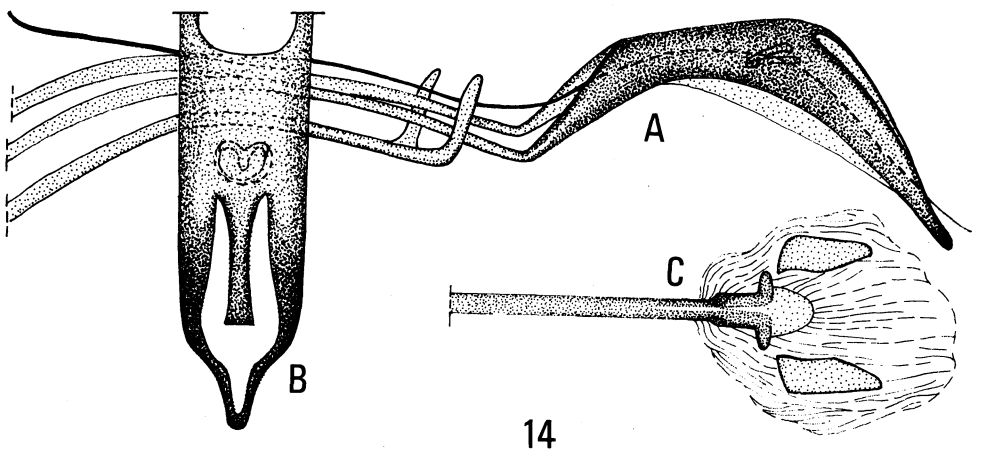


FIG. 13-14. Aedeagi, side and dorsal views: A, lateral view; B, dorsal view of phallobase only; C, dorsal view of spiculum gastrale only. 13, *Pantorhytes bourkei,* n. sp. 14, *Pantorhytes hassani,* n. sp.

This distinctive species first came to the attention of D.P.I. Officers in 1967, when it was thought to be *P. chrysomelas* (Montrouzier) (Anon. 1968, p. 182). The larvae and adults feed on watershoots, branches and lower flush growth of cacao trees, and the species has rapidly increased in numbers in the Opi Region. It is found on trees with *P. szentivanyi* Marshall, but is apparently not as destructive as *P. szentivanyi.* Adults concentrate on the chupons, flush growth, pods and flowers of the main branches, while the larvae are con-

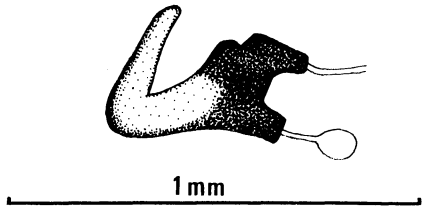


FIG. 15. Spermatheca of *Pantorhytes horni*, n. sp., side view.

centrated in the jorquette, trunk and main branches. Studies on the biology and ecology are presently underway by D.P.I., Popondetta.

P. horni is named in honour of Mr John Horne, former Rural Development Officer, Saiho, Northern District, Papua New Guinea, for his role in the discovery, subsequent study and reports on this species.

Pantorhytes fenneri Stibick, new species FIG. 12, 16, 21, 25

Ground colour predominantly a deep, dark red on dorsum, tending to piceous or pitchy black along sides, margins and head, venter piceous, central portion of femora and tibiae bright to wine red, ends and tarsi pitchy black, with creamy green trichoid to nearly amygdaliform scales over body, but chiefly on dorsum, forming loose clusters in a checkered, greenish pattern over the elytra, absent under eyes and behind procoxae; whitish, hair-like setae more or less evenly scattered over body; surface dull, not shiny; antennae stout but with funicle segment 7 transverse; body normally oblong for genus; length 11-15 mm.

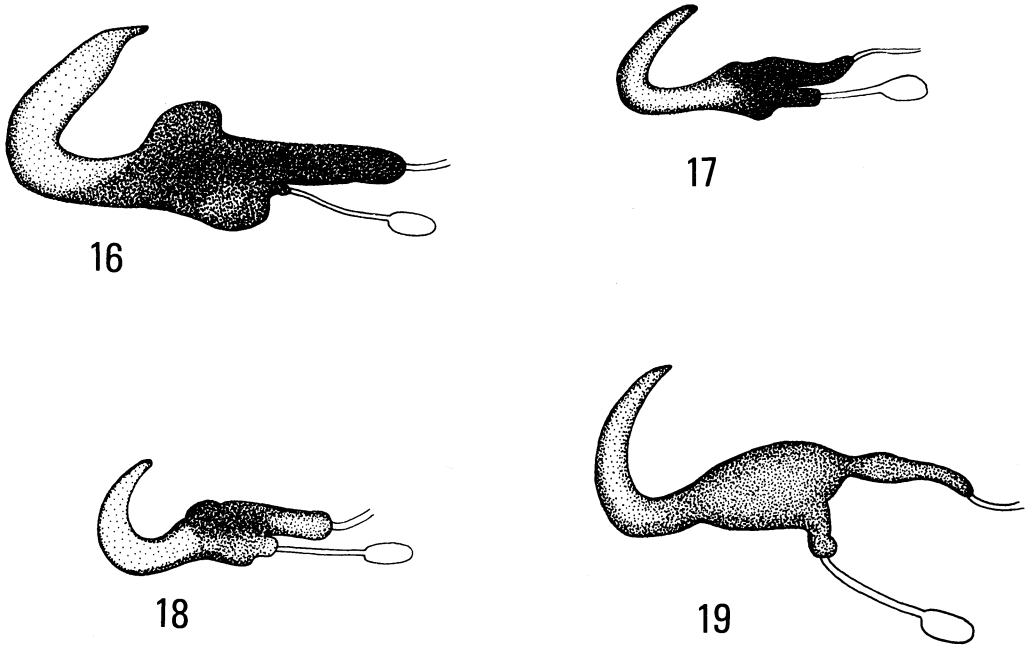


FIG. 16-19. Spermatheca, side view: 16, *Pantorhytes fenneri*, n. sp.; 17, *Pantorhytes bourkei*, n. sp.; 18, *Pantorhytes bakeri*, n. sp.; 19, *Pantorhytes hassani*, n. sp.

Head. A few scales scattered on front between eyes, rarely isolated scales elsewhere, none in subocular setal rows; anteocular fovea strongly but not very deeply impressed, with only scattered hairs and sometimes a few scales; median fovea either prominent, deep and broadly ovate in shape, extending from middle of rostrum to just before eyes and then continuing as a shallow trough between eyes to vertex or to trough or obsolete, ending at eyes; rostrum very slightly wider than long, closely punctate, punctures of 2 sizes, surface feebly shiny to dull, slightly alutaceous and rugose on vertex; antennae with stout funicle, segments stout, 2nd segment shorter than 3rd and 4th together, 3rd to 6th segments nearly parallel-sided, as long as wide and subequal, 7th segment slightly larger, evidently transverse and distinctly separate from club; club oblong. *Thorax.* Pronotum approximately as wide as long, slightly constricted at base, sides moderately expanded in anterior 3/4, widest in middle, with a moderate number of feeble punctures and scattered nearly amygdaliform scales more concentrated towards base, middle and sides; whitish hairs evenly scattered; surface rugose, feebly alutaceous and dull in appearance. Prosternum clothed with scattered hairs and a few stray scales, no scales behind procoxae. *Elytra* slightly longer than wide (ratio 8:9), evenly convex, apex very feebly turned out, outside edges raised, especially so along humeral angle, but not at all along sutural margin; surface nonpunctate, striae and intervals obsolete, surface highly strigose with feeble, individual or small clusters of tiny nodules strung out especially towards middle and generally along apparently vague striae but often on apparent interval areas, appearance dull, nodules slightly shiny; scales mostly trichoid, tending to amygdaliform in some specimens, clustered in checkerboard pattern of numerous loose patches with more scattered scales in between, ventral surfaces smooth, somewhat shiny, hairs moderately dense to scattered, very elongate, especially those between mesocoxae. *Legs* moderately slender with slightly less than 1/3 length of femur

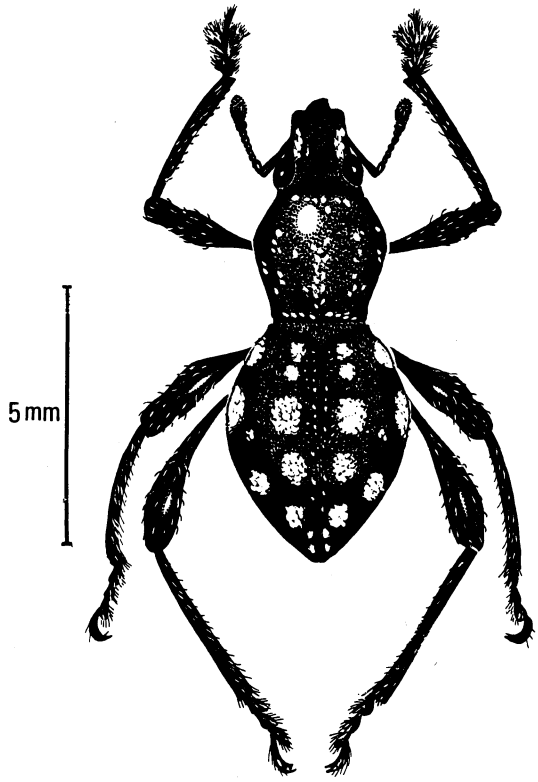


FIG. 20. Dorsal view of *Pantorhytes horni,* n. sp.

surpassing elytral apex; femur widest before elytral apex, slightly notched on inside before its own apex, femur shiny, smooth to notch, rugose at apex, pitchy black in basal and apical portions, middle section bright to wine red, with scattered, whitish hairs; tibia slightly alutaceous, generally smooth, bright to wine red except for ends which are pitchy black; tarsae pitchy black. *Abdomen*. Smooth, slightly alutaceous, 5th segment finely punctate along edges.

♂. 11-15 mm in length, with clearly defined suture between 1st and 2nd abdominal segments. Genitalia (FIG. 12) with reduced or triangulate intersclerites close to 9th segment (spiculum gastrale); centerpiece with moderately wide apex; aedeagal apex acuminate and pointed; phallobase struts slender; apex of spiculum gastrale with feeble flanges; flagellum elongate, slender, internal end heart-shaped; ring of tegmen with lower arms reduced, fused to upper arms or absent; armature of internal sac of 2 broad, curved blades joined in a parabola, this free from centerpiece and articulate to basal orifice; basal orifice large, located in front of (anterior to) base of centerpiece, apex almost reaching apex of armature and somewhat elaborately flanged at end, wings simple.

♀. 13-15 mm in length; suture between 1st and 2nd abdominal segments obsolete in middle. Genitalia (FIG. 16) with slender spermatheca, this with duct projection wide and elongate, gland projection slender and elongate, somewhat pointed apex with V- to U- shape orientation with proximal end parallel to body, terminal end straight or curved parallel over body.

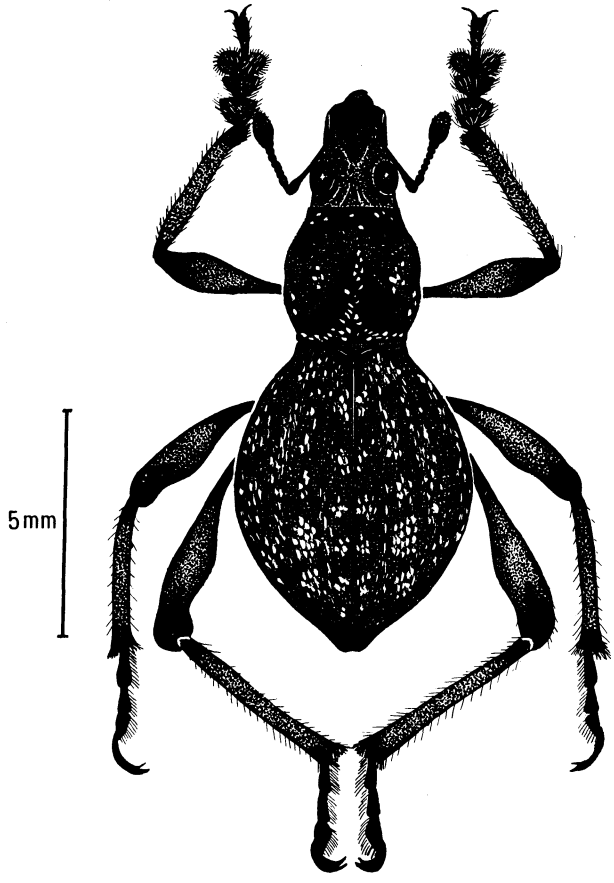


FIG. 21. Dorsal view of *Pantorhytes fenneri*, n. sp.

Holotype ♂ (BISHOP 10,752), PNG: New Guinea (SE): Mt Suckling, Camp Mayu 2, Mt Suckling Expedition, 4.VII.1972, ex *Pipturus* sp., 1700 m, T. L. Fenner; allotype ♀, same data as holotype except 9.VII.1972; paratypes: 9, same data as holotype; 2, same data as allotype, 8, Mayu R, Mt Suckling Expedition, 5.VII.1972, 1700 m, Fenner.

All specimens are from the KONE collection. The holotype, allotype and 4 paratypes are deposited in BISHOP. One paratype each is deposited in the following collections: BMNH, ANIC, FICB, UPNG, AMNH, MNHP, LMLH, INDO. Four paratypes are in the KONE and 3 paratypes are in the JNLS collection.

The species is closely related to *P. lamingtona* Gressitt, *P. healyi* Gressitt and *P. sedlaceki* Gressitt, all of which have distinctively red banded legs. As with these other 3 species *P. fenneri* is unlikely to be of economic interest, as it exists above the altitude limitations for cacao and, in any event, occurs far from any cacao growing area.

This species is named in honour of Mr T. L. Fenner, Principal Entomologist, D.A.S.F., who obtained the above specimens during the Department of Forests' 1972 Mt Suckling expedition.

Pantorhytes bourkei Stibick, new species FIG. 13, 17, 22, 25

Ground colour black on head, pronotum and underside, elytra ranging from deep wine red to orange or yellow, piceous towards apex, with creamy to light, rusty brown somewhat broadened, flattened amygdaliform scales over body, especially on pronotum, vertex and sides of elytra, under eyes and behind procoxae; whitish hair-like setae often with greenish tint evenly scattered over body, surface generally dull; pronotum more or less rugose and elytra very matt; antennae stout but with funicle segment 7 transverse; body normally oblong for genus, length 10.5–14 mm.

Head. Usually with numerous scales crowded on front between eyes and often so on vertex; generally some scales in subocular setal rows; anteocular fovea deeply impressed, with scattered hairs and crowded scales; median fovea ovate, moderately impressed, extending from middle of rostrum to just before eyes and then continuing as a shallow trough between eyes to vertex or trough, variously obsolete along its length; rostrum scarcely wider than long, closely punctate, punctures of 2 sizes, surface including front and vertex somewhat rugose, feebly shiny; antennae with stout funicle, segments stout, 2nd segment slightly shorter than 3rd and 4th together, 3rd to 6th segments nearly parallel-sided, about as long as wide and subequal, 7th segment larger, evidently transverse and distinctly separate from club, club oblong. *Thorax.* Pronotum slightly wider than long, very feebly to moderately constricted at ends, almost parallel-sided to feebly convex on sides and widest in middle, surface feebly shiny, slightly alutaceous to rugose especially on sides, punctures present especially on disk, well impressed, with numerous scales especially along sides and median line, whitish hairs evenly scattered. Prosternum clothed with a few hairs and generally many scales before and behind procoxae. *Elytra* longer than wide (ratio 4:5), evenly convex, apex very feebly turned out, outside edges raised along humeral angle and apical margin; surface more or less evenly but shallowly punctate along obsolete striae, punctures otherwise of moderate size, striae and intervals obsolete, surface densely matt, otherwise smooth and very dull in appearance; scales in large patches, especially along sides and towards apex of elytra, generally slender and more amygdaliform in shape than pronotal scales; ventral surfaces rather smooth and shiny, moderately punctate and evenly clothed in hairs, scales concentrated behind coxae. Legs moderately slender; apex of femur surpassing elytral apex by 1/3 length of femur, slightly notched on inside before apex, widest just before notch, surface smooth, rugose towards apex, with scattered whitish hairs; tibia more or less alutaceous, tending to slight rugosity, with scattered whitish hairs. *Abdomen.* Smooth, alutaceous, 5th segment finely and evenly punctate.

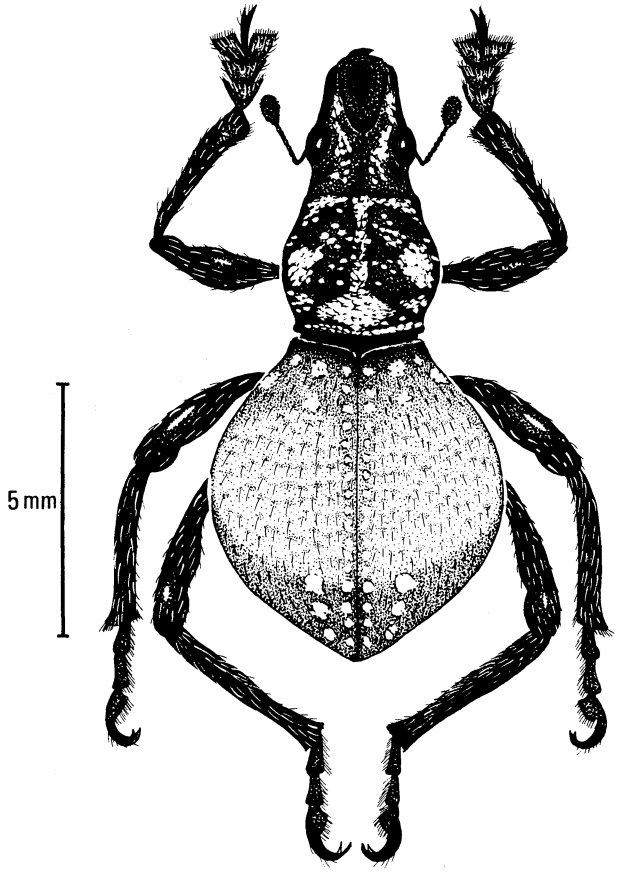


FIG. 22. Dorsal view of *Pantorhytes bourkei*, n. sp.

♂. 10.5-14 mm in length. Genitalia (FIG. 13) with rectangular intersclerites close to 9th segment (spiculum gastrale); apex of centerpiece broad and wide; aedeagal apex acuminate and pointed; phallobase struts slender; apex of spiculum gastrale blunt, with flanges; flagellum elongate, slender, internal end heart-shaped; ring of tegmen with lower arms present, well developed; armature of internal sac of 2 thin-curved blades joined in a parabola, this free from centerpiece and articulate to basal orifice; basal orifice small, located in front of (anterior to) base of centerpiece, scarcely 1/3 length of armature, with simple apex and wings.

♀. 12-14 mm in length. Genitalia (FIG. 17) with slender spermatheca, this with duct projection slender and elongate, gland projection slender and elongate, apex blunt, with V-shape orientation with proximal end parallel to body, terminal end straight, not curved over body.

Holotype ♂ (BISHOP 10,753), allotype ♀, PNG: New Guinea (NE): Morobe Distr., Garaina, VIII.1970, A. B. Mirza; paratypes: 5, same data as holotype; 3, same as above but 16.I.1968, 800 m; 3, same as above but VIII.19(?), 900-1800 m; 1, same as above but 20.XI-17.XII.1969, A. M. Hutton (all BISHOP); 4, same as above but 28.VII.1971, R. Hornabrook (HORN); 2, same as above but 20.VI.1967, 2500 ft (763 m), ex *Schuurmansia*

sp., T. L. Fenner (KONE); Morobe Distr. (all BISHOP): 22, Garaina, 800 m, 16.I.1968, J. & M. Sedlacek; 1, S Garaina, 800-900 m, 8-14.I.1968, J. & M. Sedlacek; 12, 30 km S of Garaina, 2000 m, 9.I.1968, J. & M. Sedlacek; 15, Garaina, 20.XI-17.XII.1969, Mirza; 5, Garaina, 800 m, 4.I.1968, J. H. Sedlacek; 2, Garaina, 13-15.I.1968, Sedlacek; 3, Garaina-Saurela, 9-1400 m, 5.I.1968, J. & M. Sedlacek; 1, Saurel-Arabuka, 15-1800 m, 6.I.1968, J. Sedlacek; 3, Arabuka, 15-2000 m, 7.I.1968; 3, Arabuka-Moime, 19-2100 m, 7.I.1968, Sedlacek; New Guinea (SE): Central Distr., 3, Kamulai, Guari, 14.V.1972, R. Straatman (KONE).

The holotype, allotype, 57 (BISHOP) paratypes and 1 (HORN) paratype are deposited in BISHOP. Two (BISHOP) paratypes are deposited in each of the following collections: BMNH, ANIC, UPNG, AMNH, MNHP, LMLH, INDO. Two (HORN) paratypes are in that collection. One (HORN) paratype is deposited in BISHOP and 1 in the JNLS collection. Eight (KONE) and 5 (BISHOP) paratypes are in the KONE. Two (KONE, BISHOP) paratypes are in the FICB and 1 (KONE), 3 (BISHOP) paratypes are in the JNLS collection.

This species is closely allied to *P. szentivanyi* Marshall and *P. albopunctulatus* Heller and has previously been confused with the latter species by earlier students. It is unlikely to become a pest as possible suitable economic hosts are not grown in the area.

The species is named in honour of Papua New Guinea's former Chief Entomologist, Mr T. V. Bourke.

Pantorhytes bakeri Stibick, new species FIG. 18, 23, 25

Ground colour black on head, pronotum and underside; elytra deep red, piceous towards apex, with pale white amygdaliform scales, these tending to greenish or shiny greenish cast, found in small patches along sides and apex of elytra, pronotum, on head, under eyes and on sterna between, beside or behind coxae; greenish hair-like setae fairly sparsely scattered over body, somewhat concentrated behind mesocoxae; surface uniformly shiny, more or less smooth; antennae stout and funicle segment 7 conical, merging with club.

Head. With a few scales on front between eyes, perhaps a few on vertex, some to many scales in subocular setal rows, anteocular foveae deeply impressed, with scattered hairs and a few to some scales; median fovea deeply impressed, oval, with prominent pit at apex, abruptly narrowing between eyes into deep groove running to small pit midway between eyes and thence as a groove to vertex; rostrum somewhat wider than long, closely punctate, punctures of 2 sizes; surface of head shiny, though variously shaped by foveae; antennae with stout funicle, segments stout, 2nd segment 2/3 length of 3rd and 4th together, 3rd to 6th segments nearly parallel-sided, about as long as wide and subequal, 7th segment larger, somewhat conical and merging with club, club oblong. *Thorax.* Pronotum slightly wider than long, moderately constricted at ends, moderately and evenly convex on sides and widest in middle; surface very bright, shiny, generally smooth on disk, may be rugose on sides; punctation moderate, a few somewhat rounded scales present on sides and at base, hairs sparsely, evenly distributed. Prosternum clothed with a few hairs and some scales, these mostly behind procoxae. *Elytra* longer than wide (ratio 5.5:7), evenly convex, apex practically vertical, only feebly turned out, edges raised only along humeral angle, base, and apex, surface bright and shiny, more or less regularly punctate striae, these moderately impressed, somewhat confused in centre; scales single or in a few small clusters at apex and along sides near apex, these quite slender and amygdaliform; ventral surfaces smooth and shiny, moderately punctate and clothed with a moderate number of hairs and scales, especially behind and outside of coxae. *Legs* moderately slender; apex of femur scarcely surpassing elytral apex, slightly notched on inside before apex, widest slightly before notch; surface shiny and smooth, slightly rugose towards apex, with scattered greenish hairs; tibia somewhat alutaceous, otherwise

rather smooth, with scattered greenish hairs. *Abdomen.* Smooth, rather shiny though somewhat alutaceous, 5th segment finely, evenly punctate.

♂. Unknown.

♀. 13-14mm in length. Genitalia (FIG. 18) with robust spermatheca, this with duct projection wide and elongate, gland projection blunt, wide and short, apex blunt, with L-shape orientation with proximal end below body, terminal end straight, at right angles to body.

Holotype ♀ (BISHOP 10,754), 1 ♀ paratype, PNG: New Guinea (SE): Milne Bay Distr.: Goodenough I, Bowa, 21.VI.1970, nr track to 400 m, on *Pipturus* sp. leaf, B. Gray (FICB); 1 ♀ paratype, Goodenough I, Faiava Vill, 21.VI.1970, ex secondary forest, H. Iupa (KONE).

The (FICB) holotype is in the BISHOP, and the (FICB and KONE) paratypes are in their respective collections.

Pantorhytes bakeri is at present only a bush species. However, it is closely related to *P. szentivanyi* Marshall and as such could possibly pose a threat to cacao grown within its area of distribution.

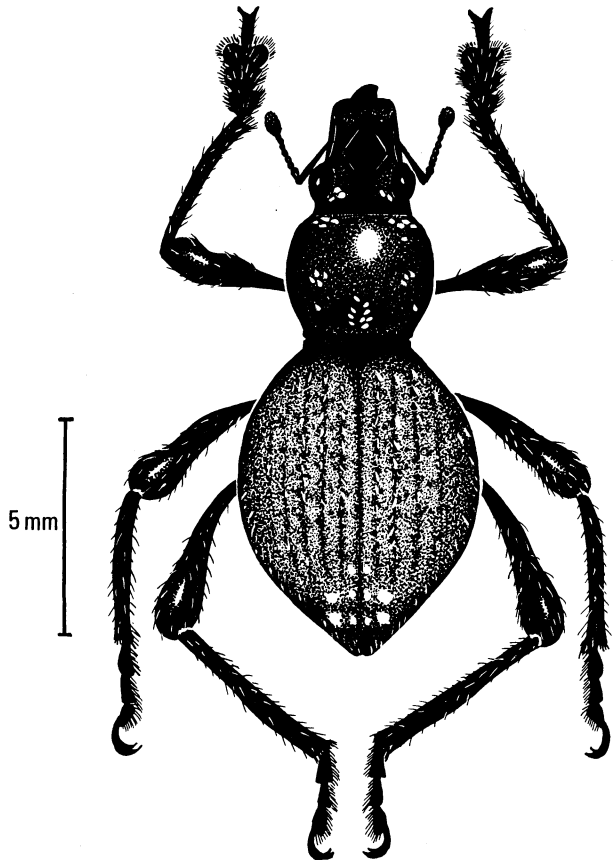


FIG. 23. Dorsal view of *Pantorhytes bakeri,* n. sp.

This species is named in honour of Mr Graeme Baker, former Senior Entomologist, Kuk Tea Research Station, Mt Hagen, Papua New Guinea, who has carried out research on the predators and parasites of *Pantorhytes* and other pests of cacao.

Pantorhytes hassani Stibick, new species FIG. 14, 19, 24, 26

Ground colour black on head, pronotum and underside, elytra dark to light red, piceous towards apex, with pale white to faintly greenish, amygdaliform scales, these generally found in small patches at base and apex and along sides near apex of elytra, on sides and base of pronotum, on head, under eyes and on sterna between or besides coxae; whitish, sometimes greenish-tinged, hair-like setae sparsely scattered over body; surface uniformly shiny, more or less smooth; antennae stout and funicle segment conical, merging with club.

Head. With a few scales on rostrum, more between eyes, on vertex and in subocular setal rows; anteocular foveae rather oblong, moderately impressed, with scattered hairs and a few to some scales; median fovea only moderately impressed, often with deep groove in middle, faint to moderately prominent groove from between eyes to vertex; rostrum about as wide as long, closely punctate, punctures of 2 sizes; surface of head shiny though somewhat alutaceous and variously impressed by foveae; antennae with stout funicle, segments stout, 2nd segment 2/3 length

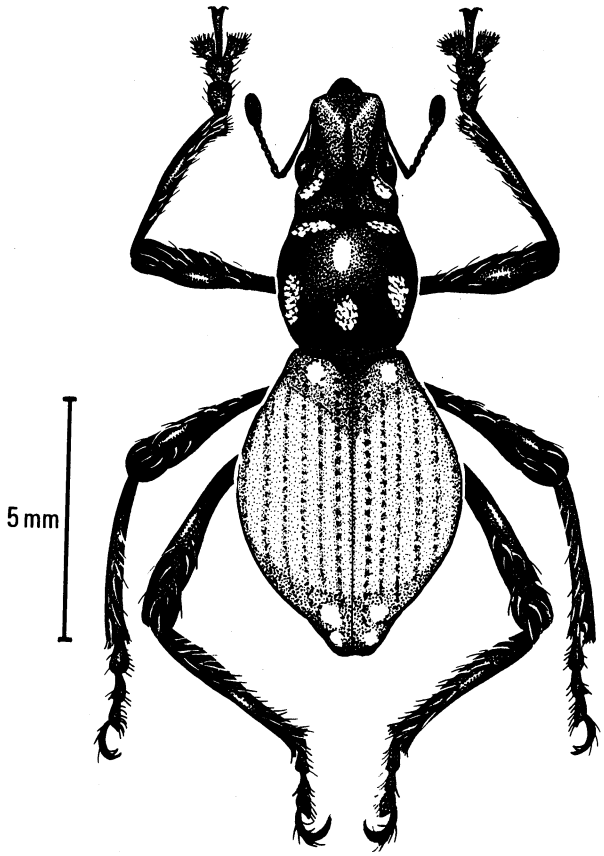


FIG. 24. Dorsal view of *Pantorhytes hassani*, n. sp.

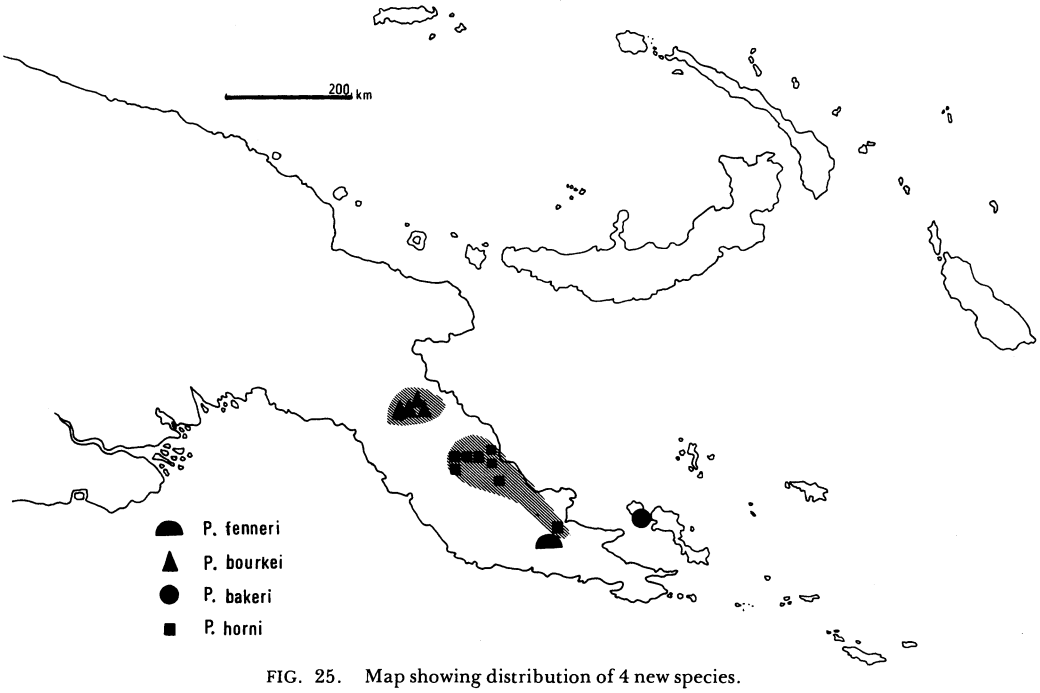


FIG. 25. Map showing distribution of 4 new species.

of 3rd and 4th together, 3rd to 6th segments nearly parallel-sided, about as long as wide and subequal, 7th segment larger, somewhat conical and merging with club; club oblong. *Thorax*. Pronotum wider than long (ratio 6.7:7.3), somewhat constricted at ends, moderately convex on sides, widest in front of middle; surface very bright, shiny, generally smooth on disk, somewhat rugose on sides; punctation moderate, more noticeable on sides, a patch of rounded scales about halfway along each side and 1 in middle at base of pronotum, hairs very sparsely, evenly distributed. Prosternum clothed with a few hairs and many scales crowded behind and between procoxae. *Elytra* longer than wide (ratio 5.7:7), evenly convex, apex practically vertical, somewhat turned out, edges raised along humeral angle, less so at apex and along outside near humeral angles; surface very bright and shiny, with strong, rather deep striae, these deeply punctate and more or less straight and regular, sometimes slightly confused in the middle, slender, amygaliform scales in small patches along sides near and at apex of elytra and 1 patch also at base; ventral surfaces smooth and shiny, moderately punctate and sparsely clothed with hairs and scales, especially behind and outside of coxae. *Legs* moderately slender; apex of femur scarcely surpassing elytral apex, slightly notched on inside before apex, widest slightly before notch, surface shiny and smooth in middle, slightly alutaceous near base and rugose at apex, with scattered, greenish hairs; tibia alutaceous, otherwise smooth, with scattered, rather long, greenish hairs. *Abdomen*. Smooth, rather shiny, more or less alutaceous, 5th segment moderately and evenly punctate.

♂. 11-13 mm in length, with clearly defined suture between 1st and 2nd abdominal segments. Genitalia (FIG. 14) with triangulate intersclerites close to 9th segment (spiculum gastrale); centerpiece with apex ribbon-like, not widened; aedeagal apex acuminate, pointed; phallobase struts slender; apex of spiculum gastrale blunt, with flanges; flagellum elongate, slender, internal end heart-shaped; ring of tegmen with lower arms absent; armature of internal sac of 2 small, thin, curved blades joined in a circular arc, this free from centerpiece and articulate to basal orifice; basal orifice small, located in front of (anterior to) base of centerpiece, but nearly attaining apex of armature, with simple apex and wings.

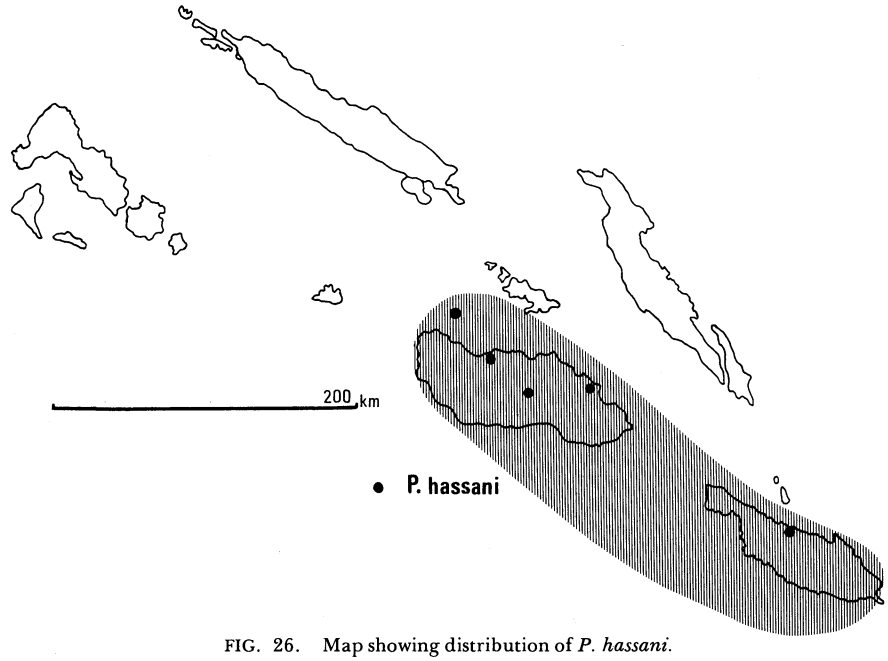


FIG. 26. Map showing distribution of *P. hassani*.

♀. 13–15 mm in length, with faint, sometimes ill-defined suture between 1st and 2nd abdominal segments. Genitalia (FIG. 19) with slender spermatheca, this with duct projection slender and elongate, gland projection blunt, wide and short, blunt apex with L-shape orientation, proximal end below body, terminal end straight and perpendicular to body with extreme end bent towards body.

Holotype ♂ (BISHOP 10,755), SOLOMON IS.: San Cristobal I: Ahi Ahi (Rave R), 4.VIII.1960, C. W. O'Brien; allotype ♀, Guadalcanal I: VII.1927, acc. 27590 (AMNH); paratypes: Guadalcanal I: 4, Kukum, 23.I.1958, P. G. Fenemore, 427 (BSIP); 3, same as before but 12.XI.1961, P. Greenslade, 164 (BSIP); 1, same as before but 8.XII.1962, 3017 (BSIP); 1, same as before but 9.V.1962 (BISHOP); 1, same as before but 18.IX.1955, E. S. Brown (BSIP); 1, same as before but 20.I.1957, on *Ficus* sp., Fenemore, 102 (BSIP); 1, same as before but 16.VIII.1958, 669 (BSIP); 1, Gold Ridge, 20.IX.1958, Fenemore, 691 (BSIP); 1, Rere, 16.VIII.1965, Brown, 3525 (BSIP); 18, Kukum, 9.V.1962, P. Greenslade & M. McQuillan (BMNH); 1, same locality but 20.II.1957, ex *Ficus* sp., Fenemore (BMNH); 2, XI.1920, J. A. Kusche (BMNH); Savo I: 2, 6.IV.1962, Greenslade, 1469 (BSIP, BISHOP).

The holotype and 2 (BISHOP) paratypes are deposited in BISHOP. The allotype and 1 (BSIP) paratype are deposited in the AMNH. Four paratypes are deposited in the BSIP. One (BSIP) paratype is deposited in each of the following collections; BMNH, ANIC, UPNG, MNHP, LMLH, INDO, FICB, KONE. One (BSIP) paratype and 4 (BMNH) paratypes are also deposited in the JNLS collection. Seventeen (BMNH) paratypes are in that collection.

This species has been confused with *Pantorhytes biplagiatus* Guerin, a serious cacao pest on Bougainville, New Georgia, Santa Ysabel, Malaita and Nggela islands.

Named in honour of Dr E. Hassan, former Senior Entomologist, D.A.S.F. Popondetta, who has carried out research on the ecology and behaviour of *Pantorhytes*.

Pantorhytes stanleyanus (White)

Pachyrrhynchus stanleyanus White, 1852, in MacGillivray, Narr. Exped. Rattlesnake **2:** 388.

Pantorhytes stanleyanus (White) Heller, 1912, Ent. Mitt. **1:** 364.—Gressitt, 1966, Pacif. Ins. **8:** 931.

Pantorhytes granulatus Heller, 1905, Wien. Ent. Ztg. **24:** 305, 307.—Gressitt, 1966, Pacif. Ins. **8:** 931.

Pachyrrhynchus chrysomelas Montrouzier, 1855, Ann. Soc. Agr. Lyon **7:** 46. **New synonymy.**

Pantorhytes chrysomelas (Montrouzier) Faust, 1892, Stett. Ent. Ztg. **53:** 193.—Heller, 1903, Abh. Ber. Zool. Mus. Dresden **10:** 14.—Gressitt, 1966, Pacif. Ins. **8:** 931.

Pachyrrhynchus australasiae Boheman, 1859, Eugenies Resa. Ent. 119.—Gressitt, 1966, Pacif. Ins. **8:** 931.

Pantorhytes subcostatus Heller, 1905, Wien. Ent. Ztg. **24:** 306, 308.—Gressitt, 1966, Pacif. Ins. **8:** 931. **New synonymy.**

Pantorhytes fraudus Janczyk, 1959, Ann. Naturh. Mus. Wien **63:** 434.—Gressitt, 1966, Pacif. Ins. **8:** 931. **New synonymy.**

The above synonymy is presented to show all the names and combinations now placed under *P. stanleyanus* White. This synonymy has arisen due to a number of variable characters in the species. These include variations in punctation, rugosity and scale colouration. Scale colour is the most responsible single factor for the profusion of names and is highly correlated with locality: white—Queensland, Central District (SE New Guinea); yellow-red—Gona Area (Northern Distr.), Trobriands, Woodlark, Misima and Yule (?) islands (SE New Guinea); green—Milne Bay, D'Entrecasteaux and (except Misima) Louisiade islands (SE New Guinea); blue—lower arm of Milne Bay (SE New Guinea).

Biogeographical comments will follow in a later paper. For the new synonyms, the following applies:

P. stanleyanus (White). Type locality, Pariwara Island, Queensland. Type in British Museum. This is the generally whitish form (scales sometimes with greenish tinge). Mr R. T. Thompson of the British Museum has kindly compared a specimen of this form from Queensland with the type and declared them conspecific. Gressitt (1966) correctly placed Queensland specimens under *P. stanleyanus,* but Britton (1970) followed earlier authors in citing *P. chrysomelas* (Montrouzier).

P. chrysomelas (Montrouzier). Type locality, Woodlark Island (SE New Guinea). Type in Paris Museum. This is the typical yellow-red form of *P. stanleyanus.* Mlle H. Perrin of the Paris Museum has kindly compared a typical yellow-red specimen from the Trobriands and

the green form from Normanby Island with the type and confirmed that they are all one species.

P. subcostatus Heller. Type locality, Sudest Island (SE New Guinea). Type in Paris Museum. This is typical of the brightly metallic green form of *P. stanleyanus*. Mlle H. Perrin has also kindly compared the type with specimens and a colour slide of the 4 forms to confirm that it is the green phase of *P. stanleyanus*.

P. fraudus Janczyk. Type locality, Yule Island (SE New Guinea). Type in Wien Museum. I have not seen the type or any specimens from Yule Island. However, the description appears applicable to the yellow-red form of *P. stanleyanus,* a factor which fits my biogeographical model of the species of the type. For the present this synonymization seems warranted.

Pantorhytes melanoticus Heller, new status

Pantorhytes batesi melanoticus Heller, 1935, Nova Guinea Zool. **17:** 157.—Gressitt, 1966, Pacif. Ins. **8:** 934.

During the course of this study hundreds of *P. batesi batesi* (Faust) and a few series of *P. batesi melanoticus* Heller were examined. The elytra of *P. batesi* varies from bright red to rarely piceous, but the red colour (when present) never becomes sharply limited in area as in *P. melanoticus*. The spot of the latter species may also vary from bright red to piceous, but it is always definitely limited to the central area of the elytron. Genitalia examination revealed the following differences:

♀ *P. batesi*—Spermatheca gland projection slender and elongate.

♀ *P. melanoticus*—Spermatheca gland projection blunt, wide and short.

♂ *P. batesi*—Interscleries of 9th segment distant from base, centerpiece moderately expanded at apex, apex of aedeagus with wide flange, phallobase struts slender, apical shape of manubrium feebly wider.

♂ *P. melanoticus*—Interscleries of 9th segment near base, centerpiece ribbonlike, not expanded at apex, apex of aedeagus acuminate, pointed, phallobase struts broad, apical shape of manubrium straight, ribbonlike.

These features, taken in conjunction with specific differences between other closely related species of the genus, seem to show that *P. melanoticus* is a species in its own right, and this paper treats *P. batesi* and *P. melanoticus* as 2 distinct species.

Acknowledgments: I am very grateful to Dr J. L. Gressitt, Bishop Museum, for encouragement in studying these weevils and to both him and Dr G. A. Samuelson for the loan of BISHOP and other material without which this study would have been impossible. I am also grateful to Dr G. Kuschel, Department of Scientific and Industrial Research, Nelson, New Zealand, for assistance on genitalia morphology. I wish to thank Mrs Susan Sands, Port Moresby for the drawings presented here. My thanks to Mr R. Straatman for taking *Pantorhytes* specimens to the British and Paris Museums in 1971 and contacting Mr R. T. Thompson and Mlle Perrin, respectively, to whom my appreciation for studying and comparing the specimens with the types goes. To Mr Thompson also, my gratitude for his assistance during my 1974 visit and for the subsequent loan of specimens. I also wish to thank Mr J. Horne for his appreciation, interest and efforts in the collection and study of the species named after him and to gratefully

acknowledge the loan of specimens from Dr R. W. Hornabrook, Institute of Human Biology, Goroka, Papua New Guinea; Mrs P. Vaurie, American Museum, New York, U.S.A.; Dr B. Gray, formerly Forestry Department, Bulolo, Papua New Guinea and Mr. G. Holloway, the Australian Museum, Sydney, Australia. Specimens belonging to the British Museum (in part), Leiden Museum and Bogor Museum were sent on loan by the Bishop Museum. Finally, my grateful appreciation to the former Chief Entomologist, Mr T. V. Bourke, for his review of and suggestions on this paper.

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LIST OF TERMS

a. aed.	apex of aedeagus	fun.	funicle
a. cn.	apex of centerpiece	gp.	gland projection of spermatheca
aed.	aedeagus	la.	lower arm of tegmen
ant. f.	anteocular fovea	no.	node
arm. in.	armature of internal sac	r. teg.	ring of tegmen
as.	apex of spermatheca	sc. sp.	sclerite of spiculum gastrale
a. sp.	apex of spiculum gastrale	sg.	spermathecal gland
b. o.	basal orifice	sh. b. o.	shoulders of basal orifice
cl.	club	sp.	spiculum gastrale
cn.	centerpiece	teg.	tegmen
COxl	procoxal cavity	u. a.	upper arm of tegmen
dp.	duct projection of spermatheca	w. b. o.	wings of basal orifice
fl.	flagellum		