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STUDIES ON THE ANT FAUNA OF MELANESIA III.
RHYTIDOPONERA IN WESTERN MELANESIA AND THE
MOLUCCAS. IV. THE TRIBE PONERINI

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CAMBRIDGE, MASS., U. S. A.

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III. *Rhytidoponera* in Western Melanesia and the Moluccas

IV. The Tribe Ponerini

By E. O. WILSON

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III. RHYTIDOPONERA IN WESTERN MELANESIA AND
THE MOLUCCAS

Rhytidoponera is a large genus almost entirely confined to Australia and Melanesia. Eleven species are known from western Melanesia, and several of these are among the most abundant and adaptable ants of the region. However, only two, *araneoides* and *nexa*, extend much beyond the limits of New Guinea, *nexa* occurring in addition on Waigeo and New Britain and *araneoides* ranging beyond to the Philippines and Solomons. No member of the genus is known from either the New Hebrides or Fiji Islands. New Caledonia harbors a distinctive endemic fauna of its own,² consisting of at least seven species, which are not closely allied to any of the western Melanesian species (with the possible exception of *R. inops*) but instead appear to represent stocks independently derived from the Australian fauna.

Two of the eleven known New Guinea species, *araneoides* and *purpurea*, have been recorded in addition from North Queensland. The remaining eight seem individually distinct from known Australian species, but have not otherwise diverged beyond the species or species-group level. Below are listed the New Guinea species, arranged into provisional species-groups and with new synonymy added.

Group of *R. araneoides* (Le Guillou)

araneoides (Le Guillou)

=*Ectatomma rugosa* Fr. Smith

=*Ectatomma* (*Rhytidoponera*) *froggatti* Forel

¹ Previous parts of this series appeared in the Bulletin of the Museum of Comparative Zoology, vol. 118, pp. 99-153, 1958.

² The New Caledonian *Rhytidoponera* are currently being revised by Dr. W. L. Brown as part of his larger study of the world Ectatommini.

- =*Rhytidoponera araneoides* var. *impressinodis* Stitz
- =*Rhytidoponera araneoides* var. *ceramensis* Viehmeyer

Group of *R. celtinodis* Wilson

celtinodis Wilson

Group of *R. inops* Emery

inops Emery

- =*Rhytidoponera striata* Donisthorpe

Group of *R. purpurea* Emery

aenescens Emery

purpurea Emery

Group of *R. strigosa* (Emery)

abdominalis Viehmeyer

laciniosa Viehmeyer

- =*Rhytidoponera laciniosa* subsp. *petiolata* Viehmeyer

nexa Stitz

- =*Rhytidoponera strigosa* var. *major* Stitz

- =*Rhytidoponera gagates* Donisthorpe

- =*Rhytidoponera gagates* subsp. *waigeuensis* Donisthorpe

rotundiceps Viehmeyer

strigosa (Emery)

- =*Rhytidoponera subcyanea* subsp. *intricata* Emery

- =*Rhytidoponera strigosa* var. *curvata* Stitz

- =*Rhytidoponera schlaginhaufeni* Viehmeyer

- =*Rhytidoponera nitens* Donisthorpe

subcyanea Emery

- =*Rhytidoponera subcyanea* subsp. *transversiruga* Emery

- =*Rhytidoponera subcyanea* var. *aruana* Karawajew

- =*Rhytidoponera wallacei* Donisthorpe

Key to the species, based on the worker caste

1. Petiolar node tapering dorsally to form a thin, emarginate, transverse crest; the posterior nodal face bearing a deep median longitudinal

- furrow along most of its length *celtinodis* Wilson
 Seen from the side the petiolar node is either evenly rounded above or else bears a broad flat dorsal face; the posterior nodal face lacking a median longitudinal furrow 2
2. Small species, head width measured across and including the eyes 1.47 mm or less; occipital border strongly concave when viewed in perfect full face *inops* Emery
 Medium to large species, head width exceeding 1.60 mm; occipital border straight or convex when viewed in full face 3
3. Almost the entire body surface emitting distinct metallescent reflections when viewed in sunlight or ordinary artificial light 4
 At the most the gaster emits feeble bluish reflections (occasional series of *strigosa*); usually the body completely lacks metallescent reflections of any sort 6
4. Body reflections aenescens (brassy) or subaenescens *aenescens* Emery
 Body reflections bluish or purplish 5
5. Striae of first gastric tergite transverse and nearly straight
 *subcyanea* Emery
 Striae of first gastric tergite mostly semicircular and concentrically arranged *purpurea* Emery
6. First gastric tergite very finely and densely striate, ten or more striae being included in a single 0.10 mm transect; in some series the striae are obsolescent in the central area of the tergite, being largely replaced there by fine shagreening *araneoides* (Le Guillou)
 Sculpturing of first gastric tergite different, consisting of striae, costulae, or rugae which are much coarser and more widely spaced than described above 7
7. Larger species, head width across and including eyes 2.14 mm or greater; if head width is less than 2.28 mm, then sculpturing of anterior third of pronotal dorsum (exclusive of collar) consists entirely of transversely oriented, non-reticulate costulae 8
 Smaller species, head width across and including eyes 2.10 mm or less; anterior third of pronotal dorsum always rugoreticulate, the rugae rarely showing a predominant transverse orientation 9
8. (Based on a single syntype). Head width 2.14 mm; anterior third of pronotal dorsum (exclusive of collar) covered by transverse, non-reticulate costulae, posterior two-thirds covered by narrowly arcuate, concentric, non-reticulate costulae with anterior apices (Torricelli Mts., N-E. New Guinea) *abdominalis* Viehmeyer
 (Based on numerous series from over entire range). Head width 2.28 mm or greater; most or all of pronotal dorsum covered by rugoreticulum, of which only a small part shows a transverse or arcuate orientation (widespread, Waigeo to New Britain) *neza* Stitz

9. Occipital region evenly rounded, completely lacking a torus or any other form of gibbosity; petiolar node seen from the side low and rounded, its anterior face much shorter than the anterior peduncle is wide
 *rotundiceps* Viehmeyer
- Occipital region bearing either a transverse torus or paired lateral gibbosities; petiolar node seen from the side relatively high and sub-rectangular in shape as in most other Papuan members of the genus, its posterior face as long as the anterior peduncle is wide, or longer 10
10. Sculpturing of first gastric tergite consisting of even, relatively unwavy striae distributed for the most part in concentric semicircles around a center located somewhere on the tergital midline . . . *strigosa* Emery
- Sculpturing of first gastric tergite consisting of very wavy striae, which are only occasionally distributed in semicircles as described above, and are more often either transversely oriented or uniformly reticulate in pattern *laciniosa* Viehmeyer

RHYTIDOPONERA ABDOMINALIS Viehmeyer, n. status

Rhytidoponera subcyanea subsp. *abdominalis* Viehmeyer, 1912, Abh. Zool.-anthrop.-ethn. Mus. Dresden, 14: 4, fig. 1, worker. Type locality: Torricelli Mts., N-E. New Guinea. (Syntype examined — Viehmeyer Coll., Dresden).

Through the courtesy of the officials of the Staatlichen Museum für Tierkunde, Dresden, I have been able to examine a syntype of this problematical form. In my present opinion *abdominalis* represents a distinct species morphologically intermediate between *strigosa* Emery and *nexa* Stitz. It differs from both of these species in the sculptural characters given in couplet 8 of the key, and as indicated in couplet 7 it is intermediate in size between them. Its gastric costulation is relatively widely spaced, closely resembling *nexa* as opposed to *strigosa*. Its petiolar node is much thicker than that of New Guinea mainland *nexa*, surpassing even that of most *strigosa*, but is not nearly so extreme as in the Waigeo variant of *nexa* (*q.v.*).¹

RHYTIDOPONERA AENESCENS Emery

Rhytidoponera aenescens Emery, 1900, Természetr. Füzt., 23: 312, worker.
 Type locality: Lemien, near Berlinhafen (= Aitape), N-E. New Guinea.

¹As a note to aid future comparisons, the outline of the node of the *abdominalis* type is almost identical to that of the larger of two *strigosa* workers from my accession no. 993, deposited in the MCZ.

Known from type material only. According to Emery in the original description, this species differs from the related *R. purpurea* Emery not only in color but also in minor details of body form and sculpturing. The head is said to be more rounded, the mesonotum less convex, the rugae of the head more reticulate and less longitudinally oriented, etc.

RHYTIDOPONERA ARANEOIDES (Le Guillou)

Ponera araneoides Le Guillou, 1842, Ann. Soc. Ent. Fr., 10: 317, worker.

Type locality: Solomon Islands. (Holotype examined—Paris Museum).

Ectatomma rugosa Fr. Smith, 1859, Jour. Linn. Soc. Zool., 3: 143-144, worker, male. Type locality: Aru. *Nec Ectatomma rugosa* Fr. Smith, 1865, *ibid.*, p. 71, worker. (Holotype examined—British Museum).

Ectatomma (Rhytidoponera) froggatti Forel, 1910, Rev. Suisse Zool., 18: 10, worker. Type locality: Solomon Islands. (Syntype examined—Forel Coll.). NEW SYNONYMY.

Rhytidoponera araneoides var. *impressinodis* Stitz, 1912, Sitzber. Ges. Naturf. Freunde Berlin, p. 498, fig. 2, worker. Type locality: Ceram. NEW SYNONYMY.

Rhytidoponera araneoides var. *ceramensis* Viehmeyer, 1914, Ent. Mitt., 3: 112, worker. Type locality: West Ceram. NEW SYNONYMY.

Rhytidoponera (Rhytidoponera) araneoides var. *froggatti*, Mann, 1919, Bull. Mus. Comp. Zool., 63: 286-288, male.

Material examined. MOLUCCAS: Ceram (D'Albertis). N-E. NEW GUINEA: Nadzab, Markham Valley (Wilson, nos. 1088, 1096, 1100); lower Busu River (Wilson, no. 952); Finschhafen (E. S. Ross). PAPUA: Karema, Brown River (Wilson, nos. 557, 564, 566, 591). ADMIRALTIES: Los Negros (G. E. Bohart). BOUGAINVILLE: Mosigeta (E. J. Ford, Jr.); Kihili, near Buin (Ford); Boku (Ford); Kokura, 690 m. (Ford). FLORIDA: Tulagi and Maliali (W. M. Mann). MALAITA: Auki, near Fourafi (Mann). I have also identified material of this species from Los Negros, Philippines (J. W. Chapman), comprising the westernmost record for the genus.

Taxonomic notes. Two worker characters, sculpturing of the first gastric tergite and shape of the petiolar node, show marked geographic variation. These are described separately below.

In eastern New Guinea, the first gastric tergite is covered by fine, dense, transverse striae, which tend to become obsolescent in the central portion of the tergite and are often replaced by

shagreening there. In the west, the single Ceram specimen examined differs only in that the striae tend to become obliquely oriented. The single Philippine series examined is essentially similar in sculpturing to those from New Guinea. The single Admiralties series differs in having the striae as well developed centrally as peripherally. The Solomons material (including the holotype of the species) has strongly developed, somewhat coarser transverse striae over the entire tergital surface.

The petiolar node of the Solomons series is somewhat thicker than that of New Guinea material, while material from the Admiralties is intermediate in this condition. The Ceram specimen has a node about as thick as in New Guinea material, but differs in that its anterior dorsal nodal border seen from a posterior oblique view is concave, instead of convex. The Philippine specimens have unusually thin nodes, which combined with very weak nodal sculpturing, strongly distinguishes them from the remainder of the *araneoides* material; future revisers may consider these differences of sufficient magnitude to warrant specific status for the Philippine population.

Ecological notes. At Nadzab *araneoides* was found to be very common in open, dry evergreen woodland. At Karema it appeared to be restricted to clearings in the rain forest, while at the Busu River it was encountered only in open "kunai" grassland well away from the rain forest. In the eastern Solomons, on the other hand, Mann (1919) seems to imply that *araneoides* is a rain forest dweller; he associates it with such normally deep-forest inhabitants as *Myopopone castanea* and *Rhopalothrix malua*. Future field workers should investigate this matter further to see whether *araneoides* really undergoes a change in habitat preference in the differing biotic-environmental conditions of the Solomons.

Two nests were found by the author in New Guinea. One was beneath a rotting log on the ground; galleries extended into both the wood of the log itself and into the soil underneath. Another nest was found in open soil in a forest clearing and was marked externally by a single vertical gallery approximately ten millimeters in diameter.

Workers were found foraging away from their nests during both the day and early night. In most cases they were on the

ground, but on one occasion a single worker was found on a tree trunk several feet from the ground, and on two occasions (at Nadzab) workers were found attending extrafloral nectaries of an undetermined herbaceous plant.

Workers are relatively docile and timid, tending to run and hide when the nest is disturbed, but are capable of delivering a painful sting when handled.

RHYTIDOPONERA CELTINODIS Wilson, n. sp.

Diagnosis. Evidently most closely related to the Papuan species *R. strigosa* Emery, but easily distinguished from this and all other known Papuan species by its dorsally acute, posteriorly furrowed petiolar node. Certain Australian species, including *R. aurata* (Roger), *R. nodifera* Emery, *R. punctigera* Crawley, *R. rufonigra* Clark, and *R. taurus* Forel, possess more or less similar features in the node, but differ from *celtinodis* in other details of node structure, in their greater total size, and in many details of body sculpturing.

Holotype worker. HW 1.51 mm, HL 1.79 mm, SL 2.04 mm, CI 84, SI 135, PW 1.11 mm, dorsal petiole width 0.52 mm. Mandibular dentition (apparently typical for the species) consists of a well developed apical tooth, followed serially by a smaller subapical tooth (the tip of which is 0.08 mm from that of the apical tooth), next by several denticles, then by a well developed tooth (the tip of which is 0.26 mm from that of the apical tooth), and finally by an even series of denticles, which occupy the basal 0.35 mm of the masticatory border. Eye in exact side view prominent but forming considerably less than a half-circle. Occipital torus weakly developed, consisting of nothing more than raised horizontal rugae that stand out above the surrounding cephalic rugoreticulum. Alitrunk very similar in form to that of *R. strigosa* Emery. Petiolar node seen directly from the side with feebly concave anterior border, strongly convex posterior border, and acute summit. Viewed anteroposteriorly the dorsal border is strongly emarginate, the lateral corners evenly rounded. Viewed from directly above, the transverse dorsal crest is seen to be as wide as the basal portion of the node. A broad longitudinal sulcus runs from the crest posteriorly for more than two-thirds the length of the posterior node face.

Sculpturing approximately as in *R. strigosa*: mandibles, scapes, and tibiae longitudinally striate; coxae and femora predominantly transversely striate; entire head, alitrunk, and petiolar node coarsely rugoreticulate. First gastric tergite covered by semicircular, concentrically arranged striae with a "center" at the midpoint of the posterior tergital margin. Second gastric tergite similarly sculptured, but the "center" of concentricity is located on the tergital midline a short distance anterior to the posterior tergital border, and the striae posterior to it are straight and longitudinally oriented. Succeeding gastric tergites covered mainly by fine, transverse striae, their surfaces feebly shining.

Pilosity similar to that of *strigosa*: consisting almost entirely of relatively abundant erect hairs distributed evenly over the body and appendages, somewhat longer than that of *strigosa*, the longest hairs on the anterior scape surface about 1.1 mm long, those on the dorsal alitruncal surface about 1.3 mm long. Pubescence as in *strigosa*, i.e. sparse and predominantly appressed.

Body and antennae concolorous medium reddish-brown, coxae brownish-yellow, remainder of the legs light to medium brownish-yellow.

Paratype workers. HW 1.49-1.58 mm, HL 1.79-1.86 mm, SL 1.96-2.17 mm, CI 83-85, SI 132-137, PW 1.11-1.16 mm.

Material examined. NETH. NEW GUINEA: Maffin Bay, holotype and three nidoparatype workers (Sept. 10, 1944; E. S. Ross), plus three additional paratype workers (July 1 and Sept. 14, 1944; Ross). The holotype and three paratypes have been returned to Dr. Ross for deposition in the collection of the California Academy of Sciences. The three remaining paratypes have been deposited in the Museum of Comparative Zoology.

RHYTIDOPONERA INOPS Emery

Rhytidoponera inops Emery, 1900, Természetr. Füz., 23: 312, worker. Type locality: N-E. New Guinea.

Rhytidoponera inops, Emery, 1912, Deutsch. Ent. Z., p. 80, worker.

Rhytidoponera (Chalcoponera) striata Donisthorpe, 1949, Ann. Mag. Nat. Hist., (12)1: 744-745, worker. Type locality: Maffin Bay, Neth. New Guinea. NEW SYNONYMY.

Material examined. NETH. NEW GUINEA: Maffin Bay (E. S. Ross). N-E. NEW GUINEA: Chimbu Valley, Bismarck Range, 1500-2300 m. (P. J. Darlington); Didiman Creek, Lae (Wilson, no. 980); Bolingbangeng (=Boingbongen), 900-1000 m. (Wilson, no. 728); Maroruo, 900 m. (Wilson, no. 729).

Taxonomic notes. The material studied varies considerably in size, coloration, and sculpturing. The Maffin Bay workers are smaller and more lightly colored than the other series. In the Chimbu Valley workers the pronotal sculpturing contains a greater preponderance of longitudinally oriented rugae and less of the irregular, reticulate pattern shown by the other series; in this respect it agrees more closely with the characterization of *inops* given in Emery's original description.

Ecological note. All of the author's collections consisted of stray workers found foraging during the day on the floor of second-growth rain forest.

RHYTIDOPONERA LACINIOSA Viehmeyer

Rhytidoponera laciniosa Viehmeyer, 1912, Abh. Zool.-anthrop.-ethn. Mus. Dresden, 14: 5, figs. 3, 3a, worker. Type locality: Torricelli Mts., N-E. New Guinea. (Syntype examined—Forel Coll.)

Rhytidoponera laciniosa subsp. *petiolata* Viehmeyer, 1912, *ibid.*, p. 5, fig. 4, worker. Type locality: Torricelli Mts., N-E. New Guinea. NEW SYNONYMY.

Material examined. N-E. NEW GUINEA: Torricelli Mts. (syntype); lower Busu River (Wilson, nos. 704, 872, 967, 988, 1002, 1007, 1008, 1026, 1031, 1044); Bolingbangeng to Nganduo, 900-1000 m. (Wilson, no. 731); Nganduo, 1000 m. (Wilson, no. 733); Zingzingu, 1100 m. (Wilson, nos. 761, 765, 766); Gemeheng, 1200-1300 m. (Wilson, nos. 778, 780, 782, 787, 788); Eba-baang, 1300-1400 m. (Wilson, no. 828); Finsehafen (N. G. L. Wagner).

Taxonomic notes. The sculpturing of the first gastric tergite is exceedingly variable in this species. It ranges from a coarse, irregular rugoreticulum to a pattern of concentric rugae with the center of concentricity located somewhere along the tergital midline. Most of the variation is encompassed by the series from a single locality, the lower Busu River.

Ecological notes. On the Huon Peninsula this species is abundant through a wide range of elevation. It occurs from lowland rain forest (Busu River) to clearings in true midmountain rain forest at more than 1000 meters elevation. However, it is not known to extend into the dry bottomland forests of the nearby Markham Valley.

Nesting habits are also quite variable. Colonies were found most commonly in and under very rotten "Passalus-stage" logs on the forest floor, and occasionally under loose bark on the upper surface of very large rotting logs. At the Busu River a small colony was found in large cavities of an old, hard polyphore fungus growing on top of a large log. Another Busu River colony occupied large cavities in the root-mass of an epiphytic fern growing on the trunk of a small tree a little more than a meter from the ground. Between Bolingbangeng and Nganduo, at 900-1000 m., a colony was nesting in the clayey soil of a vertical bank beside a native trail; a single large entrance gallery extended horizontally into the bank.

Colonies usually contain between 50 and 200 workers. Despite diligent searching, no queen or other recognizable female reproductive was ever uncovered. Males were collected in a nest at Gemeheng during mid-April, 1955.

At the Busu River, workers were often encountered foraging on the forest floor during the day. Near Zingzingu several individuals were found, along with workers of *Diacamma rugosa* (Le Guillou), on low herbaceous vegetation at the side of a native trail in open second-growth forest. They appeared to be attending extrafloral nectaries.

RHYTIDOPONERA NEXA Stitz, n. status

Rhytidoponera strigosa var. *nexa* Stitz, 1912, Sitzber. Ges. Naturf. Freunde Berlin, p. 500, fig. 4, worker. Type locality: New Guinea (Lauterbach leg.). (Syntypes examined — Zoologisches Museum, Berlin.)

Rhytidoponera strigosa var. *major* Stitz, 1912, *ibid.*, p. 501, worker. Type locality: New Guinea (Kaiserin-Augusta-Fluss Exped., Bürgers leg.). (Holotype examined — Zoologisches Museum, Berlin.) NEW SYNONYMY.

Rhytidoponera gagates Donisthorpe, 1941, Trans. Roy. Ent. Soc. London, 91(2): 51-52, worker. Type locality: Mt. Baduri, Japen I., Neth. New Guinea. NEW SYNONYMY.

Rhytidoponera gagates subsp. *waigeuensis* Donisthorpe, 1942, Ann. Mag. Nat. Hist., (11)9: 703, worker. Type locality: Camp Nok, 800 m., Waigeo. *Ibid.*, (11)10: 435, male, doubtfully associated. (Syntype examined — MCZ). NEW SYNONYMY.

Material examined. WAIGEO: (*waigeuensis* syntype). NETH. NEW GUINEA: Maffin Bay (E. S. Ross; 6 series). N-E. NEW GUINEA: Wewak (Toyohi Okada). PAPUA: Bisianumu, 500 m. (Wilson, nos. 617, 618, 659, 667). NEW BRITAIN: St. Paul's, Bainings Mts., Gazelle Pen., 350 m. (J. L. Gressitt).

Taxonomic notes. *R. nexa* can be easily distinguished from the sympatric *R. strigosa* and *R. laciniosa* by the characters given in couplet 7 of the key. The holotype of *strigosa* var. *major* is evidently conspecific with *nexa*. It differs from the *nexa* syntypes only in the possession of a slightly thicker petiolar node, which nevertheless falls within the extreme range of variation of series from Maffin Bay.

The Maffin Bay series are nearly or completely identical in external morphology with the *nexa* syntypes. The two forms described by Donisthorpe, *gagates* and *gagates* subsp. *waigeuensis*, are in my opinion nothing more than peripheral geographic variants of *nexa*. Equal or greater deviation from "typical" *nexa* is shown by the recently acquired series from Papua and New Britain. The total geographic variation, as it is now understood, is summarized in the sections to follow.

Waigeo

A syntype of *waigeuensis* Donisthorpe in the MCZ differs from "typical" *nexa* (*nexa* syntypes and Maffin Bay series) as follows:

- (1) The cephalic rugae tend less to form into a reticulum.
- (2) The sculpturing (striation) of the first two gastric tergites is stronger. On the second tergite, the center of concentricity of the striae is located approximately 0.40 mm anterior to the posterior tergital border and is enclosed by striae; in the *nexa* syntypes and Maffin Bay series the center of concentricity is approximately 0.25 mm anterior to the posterior border and is not enclosed posteriorly.

(3) The petiolar node is distinctly thicker and with more oblique anterior and posterior faces than in the *nexa* syntypes and Maffin Bay series. The surface formed jointly by the anterior node face and dorsal surface of the anterior peduncle is much less concave.

Japen Island

When Donisthorpe described *gagates* and *gagates* subsp. *waigeuensis* he was evidently unaware of the relationship of these forms to *nexa*, but in the description of *waigeuensis* he made the following note which suggests that at least in gastric sculpturing *gagates* is closer to the *nexa* types than to *waigeuensis*: "[in *waigeuensis*] the striae on the first two segments of the gaster are considerably more impressed and those on the post-petiole much more curved [than in *gagates*]."

New Britain

A single worker from the Bainings Mountains differs from the material described above in the following two characters:

(1) The center of concentricity of the striae of the second gastric tergite is located in the center of the tergite.

(2) The petiolar node is intermediate in thickness and shape between those of the *nexa* and *waigeuensis* types.

It is noteworthy that the petiolar node shape shows what may be a "central-peripheral" pattern of geographic variation. The form of the node tends to converge on Waigeo and New Britain, at the extreme opposite ends of the range of the species.

Bisianumu, Papua

Workers from this locality differ from the rest of the *nexa* series in the following characters:

(1) The circumocular rugae show a more regular concentric orientation.

(2) The anterior pronotal rugae show a more regular transverse orientation.

(3) Three of the four *Bisianumu* series are dark reddish-brown in color, while the fourth is a shade darker, or blackish-brown. *Nexa* series from other localities are almost all blackish-brown.

Ecological notes. At *Bisianumu*, workers were found during the day actively running over the floor of second-growth foothills rain forest.

A single male tentatively determined as this species was collected by J. L. Gressitt at St. Paul's, Baining Mts., New Britain on September 5, 1955.

RHYTIDOPONERA PURPUREA (Emery)

Ectatomma impressum var. *purpureum* Emery, 1887, Ann. Mus. Civ. Stor. Nat. Genova, (2)5: 444, worker, queen. Type locality: Hatam, Arfak Mts., Neth. New Guinea.

Rhytidoponera (*Chalcopynema*) *impressa* subsp. *purpurea*, Emery, 1910, Genera Insectorum, 118: 39.

Rhytidoponera (*Chalcopynema*) *impressa* var. *purpurea*, Viehmeyer, 1914, Deutsch. Ent. Z., p. 515.

Rhytidoponera purpurea, Brown, 1954, Breviora, Mus. Comp. Zool., no. 33: 7, worker, distrib.

Material examined. N-E. NEW GUINEA: Boana, Bunbok Valley, 1100 m. (Wilson, no. 1115); Nganduo, 1000 m. (Wilson, no. 735); Zingzingu, 1000 m. (Wilson, no. 768); Gemeheng, 1300 m. (Wilson, no. 786); Bulolo, 1025 m. (E. J. Ford, Jr.). This species also occurs on the Atherton Tableland of Queensland.

Taxonomic note. W. L. Brown (pers. commun.) has called my attention to the following differences between the North Queensland (Kuranda) and New Guinea samples. Workers of the two samples in the Museum of Comparative Zoology show approximately the same maximum size range, but those from Queensland average smaller. In living and freshly mounted specimens the metallic reflections of the head and alitrunk of the Queensland workers are predominantly reddish-purple, as opposed to bluish-purple in the New Guinea workers, and they are more extensive. These differences are relatively minor, however, and there seems to be no reason at present to dispute Brown's (1954) assignment of the Queensland series to *purpurea*.

Ecological notes. The author's New Guinea collections were all made in clearings and second-growth forest in the mountains of the Huon Peninsula. *R. purpurea* appears to be primarily arboreal in this area. At Nganduo a large colony was found nesting in the humus collected about the roots of an epiphytic fern lodged about two meters from the ground in the primary fork of a young tree. At Zingzingu and Boana, workers were found during the day foraging on the sides of trees. In North Queensland, on the other hand, Brown (1954) found this species nesting primarily in and under rotting logs on the ground in disturbed rain forest, although one nest-founding queen was discovered at the base of an epiphytic fern, well off the ground.

RHYTIDOPONERA ROTUNDICEPS Viehmeyer

Rhytidoponera (Rhytidoponera) rotundiceps Viehmeyer, 1913, Arch. Naturgesch., 79A(12): 28, fig. 2, worker. Type locality: Sattelberg, N-E. New Guinea.

Material examined. N-E. NEW GUINEA: Maroruo (near Sattelberg), 900 m. (Wilson, no. 729); Kua River Valley near Zengaru, 800 m. (Wilson, no. 796); Wamuki, 800 m. (Wilson, 850); Sambeang, 400 m. (Wilson, 864); Butala (Wilson, no. 867). All of the above localities, as well as the type locality Sattelberg, are within the adjacent watersheds of the Mongi and Mape Rivers on the Huon Peninsula. Butala is a coastal village at the mouth of the Mongi River.

Ecological note. All of the accessions listed above consisted of workers collected as strays on the floor of open, disturbed rain forest. Most were encountered during the day, but the collection at Maroruo was made during the early night.

RHYTIDOPONERA STRIGOSA (Emery)

Ectatomma araneoides var. *strigosum* Emery, 1887, Ann. Mus. Civ. Stor. Nat. Genova, (2)5: 444, worker. Type locality: Andai, near Manokwari, Neth. New Guinea. (Syntype examined—Emery Coll.) Viehmeyer, 1914, Deutsch. Ent. Z., p. 515, variability of worker petiole. Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)10: 437-438, male, doubtfully associated.

Rhytidoponera (Rhytidoponera) strigosa, Emery, 1910, Genera Insectorum, 118: 3.

Rhithidoponera [!] *subcyanea* subsp. *intricata* Emery, 1910, Nova Guinea, 5: 533, worker. Original localities: Manikion, Moaif, and Tawarin, Neth. New Guinea. (Syntype examined — Emery Coll.). NEW SYNONYMY.

Rhithidoponera strigosa var. *curvata* Stitz, 1912, Sitzber. Ges. Naturf. Freunde Berlin, p. 499, fig. 3, worker. Type locality: New Guinea (ex Kaiserin-Augusta-Fluss Exped.). (Syntypes examined — Zoologisches Museum, Berlin.) NEW SYNONYMY.

Rhithidoponera schlaginhaufeni Viehmeyer, 1912, Abh. Zool.-anthrop.-ethn. Mus. Dresden, 14: 4, fig. 2, worker. Type locality: Torricelli Mts., N-E. New Guinea. NEW SYNONYMY (provisional).

Rhithidoponera nitens Donisthorpe, 1949, Ann. Mag. Nat. Hist. (12)2: 403-405, worker, male. Type locality: Finschhafen, N-E. New Guinea (*nec* Maffin Bay, Neth. New Guinea, as stated in the original description; see discussion below). (Holotype examined — CAS.) NEW SYNONYMY.

Material examined. N-E. NEW GUINEA: Mt. Misim (H. Stevens); Bialowat (Stevens); lower Busu River (Wilson, nos. 708, 882, 951, 993, 1011); Bubia (Wilson, nos. 1067, 1074); Bandung, Bunbok Valley, 1300 m. (Wilson, no. 1124); Finschhafen (E. S. Ross); Sattelberg, 660 m. (Wilson, no. 772); Sattelberg-Maroruo, 900 m. (Wilson, no. 724); Maroruo, 900 m. (Wilson, no. 729); Bolingbangeng, 900-1000 m. (Wilson); Nganduo, 1300 m. (Wilson, no. 739); Yunzain-Joangeng, 1300 m. (Wilson, no. 741); Zingzingu, 1200 m. (Wilson, no. 761); Zengaru, 1600 m. (Wilson, no. 792); Kua River to Laulaunung, 1000-1300 m. (Wilson, no. 797); Tumnang, 1500 m. (Wilson, no. 801); Eba-baang, 1300-1400 m. (Wilson, no. 828); Wamuki, 800 m. (Wilson, no. 847); Butala (Wilson, no. 867). PAPUA: Dobodura (P. J. Darlington). *R. strigosa* is by far the most abundant member of the genus in the mountains of the Huon Peninsula.

Taxonomic notes. The material listed above shows notable variation in size, petiolar node shape, and sculpturing. Probably the most extensive variation is exhibited by the pattern of stria-tion on the second gastric tergite. At one extreme, there is on the tergital midline near the posterior border a center of concentricity around which a few semicircular striae are clustered; at several striae distance anterior to the center the striae flatten out, and cross the entire tergite transversely, showing only slight posterior curving. At the other extreme of variation, the center

of concentricity is located on the tergal midline a short distance behind the anterior tergal border; those striae located the farthest anterior to the center are nearly semicircular, those farther back curve posteriorly more sharply and form parabolas, while those at or very near the center itself run posteriorly in a nearly straight line parallel to the midline of the tergite and extend back all the way to the posterior tergal border. Various degrees of intermediacy between these two extreme patterns occur in the material studied.

Worker head width ranges from 1.54 mm (Busu River, acc. no. 951) to 2.10 mm (Busu River, acc. no. 993). The petiolar node varies slightly in thickness and in the sharpness of the dorsal truncation. Series from Sattelberg and Nganduo are exceptional in showing feeble bluish surface reflections on the gaster; these specimens are otherwise identical to completely non-metallescent *strigosa* from nearby localities. A single specimen from Dobodura deviates in having very coarse striae on the first gastric tergite and in the non-concentric pattern of these striae, which originate at the anterior tergal border and diverge obliquely from the midline.

More material and a careful analysis of variation is much needed in the case of *R. strigosa*. There is a chance that further study will reveal the presence of two or more sibling species which the author has here provisionally grouped under this single species.

A special note concerning the synonym *R. nitens* Donisthorpe is required here. The collection data cited by Donisthorpe for the type series ("Maffin Bay, Dutch New Guinea, May 5th and September, 1944. E. S. Ross Coll.") is evidently at least partly in error. Through the courtesy of Dr. Ross I have been able to examine the entire type series of *nitens*, and this has proved to consist of a specimen labeled as the holotype along with a conical worker paratype series from Finschhafen (May 10, 1944; E. S. Ross), as well as a single paratype male from Maffin Bay (September, 1944; Ross). Finschhafen must be considered the correct type locality. The holotype nest series falls well within my present conception of *R. strigosa*.

Ecological notes. On the Huon Peninsula this species is relatively abundant all the way from near sea level to 1500 meters.

Like the closely related *R. laciniosa*, it is primarily a rain forest dweller, although at the upper limits of its elevational range it occurs principally in clearings and open second-growth forest. Workers were commonly found foraging on the ground during the day, occasionally climbing onto rotting stumps and low herbaceous and shrubby vegetation. At Maroruo the foraging was found to extend into at least the early part of the night. The prey of *strigosa* workers generally consists of small insects; specific prey recorded at the Busu River included a moth larva, a meliponid bee, and a small scolytid beetle. The actual capture of the scolytid was observed. The *strigosa* worker seized this insect with its mandibles immediately upon making contact, lifted it from the ground, manipulated it for a moment with the help of its fore tarsi, and then carried it off homeward. The scolytid was too small to offer much resistance, and the ant made no attempt to use its sting.

Only a single nest of this species was found. This was near Zengaru, at the highest elevation recorded for *strigosa*. The nest was marked by a single large entrance gallery, about 7 cm. in diameter, leading horizontally into the clay embankment of a native trail in second-growth forest.

RHYTIDOPONERA SUBCYANEA Emery

Rhytidoponera subcyanea Emery, 1897, Ann. Mus. Civ. Stor. Nat. Genova, 38: 548, worker. Type locality: Moroka, Papua. (Syntype examined — Emery Coll.)

Rhytidoponera subcyanea subsp. *transversiruga* Emery, 1910, Nova Guinea, 5: 532-533, worker. Original localities: Cyclops Mts. and Manikion, Neth. New Guinea. (Syntype examined — Emery Coll.) NEW SYNONYMY (provisional).

Rhytidoponera subcyanea var. *aruana* Karawajew, 1925, Konowia, 4: 78, worker. Type locality: Kobror I., Aru Archipelago. NEW SYNONYMY (provisional).

Rhytidoponera wallacei Donisthorpe, 1932, Ann. Mag. Nat. Hist., (10)10: 474, worker. Type locality: Aru. NEW SYNONYMY (provisional).

A syntype of *transversiruga* in the Emery Collection differs from a syntype of *subcyanea* in the same collection in having the rugae of the occiput, alitrunk, and first gastric tergite more pronounced and tending less to form a reticulum. It may eventually prove to be a distinct species. According to the

original description, Karawajew's var. *aruana* differs from the "typical" *subcyanea* (as characterized by Emery; Karawajew did not have specimens at hand) only by minor sculptural and color characters. In his description of *wallacei*, Donisthorpe does not give any indication that he was aware of either *subcyanea* or *aruana*, and no characters are mentioned which can be used to separate his species from either of these two forms.

IV. THE TRIBE PONERINI¹

PONERA Latreille

The *tenuis* and *selenophora* groups, comprising nearly 50 per cent of all the Melanesian species of *Ponera*, have been dealt with in full in an earlier revision.² In the present paper attention is devoted to the other species of *Ponera*, with emphasis on those undescribed or inadequately treated in the previous literature.

The zoogeographic pattern shown by *Ponera* is similar to that described for *Leptogenys* in an earlier paper.³ Western Melanesia, and in particular New Guinea, contains a rich mixture of groups that are precinctive or at least Papuan-centered. The Fiji Islands contain five endemic species closely allied to common western Melanesian species, and their coverage here separate from the fauna of western Melanesia is principally a matter of taxonomic convenience rather than a real zoogeographic division. New Caledonia has two distinct endemic species, both closely allied to species occurring in North Queensland. Also occurring in Melanesia are two forms, *P. gleadowi* Forel and *P. perkinsi* Emery, which range widely through the Pacific region as tramp species. *P. perkinsi* is a member of the Papuan-based *biroi* group, being most closely allied to *biroi* itself, and may have its endemic

¹ Exclusive of *Myopias* (= *Trapeziopelta*), currently being revised by R. B. Willey and W. L. Brown. The ponerine genus *Pseudoponera* has been erroneously recorded from Melanesia by Donisthorpe; his *P. lubbocki* has recently been shown to be a synonym of *Leptogenys breviceps* Vlieh Meyer (Wilson, 1958, Bull. Mus. Comp. Zool. 118:116).

² Wilson, E. O. 1957. The *tenuis* and *selenophora* groups of the ant genus *Ponera*. Bull. Mus. Comp. Zool., 116: 355-386.

³ Bull. Mus. Comp. Zool., 118: 101-142, 1958.

center somewhere in Melanesia. The origin of *P. gleadowi* is unknown; there is no evidence to indicate that it is endemic to any part of its present range in the Pacific.

The Species of Western Melanesia and the Moluccas

Ponera in this region gives the impression of being at an early stage of evolutionary expansion, in that it consists almost entirely of groups of closely related species, several of which show exceptional amounts of intraspecific variation. Furthermore, the species groups themselves are poorly demarcated, with morphologically intermediate species such as *clavicornis*, *pruinosa*, and *papuana* making clean division difficult or impossible. Below is offered a tentative arrangement of species groups arrived at in the present study, along with a list of newly established synonymy at the species level.

Group of *P. biroi* Emery

biroi Emery
macradelphe Wilson
punctiventris Emery
sororcula Wilson

Group of *P. confinis* Roger

confinis Roger
pallidula Emery
 =*Ponera pallidula* var. *fuscula* Emery

Group of *P. gleadowi* Forel

gleadowi Forel
 =*Ponera gleadowi* r. *decipiens* Forel
 =*Ponera kalakauae* Forel
 =*Ponera mina* Wheeler
 =*Ponera mumfordi* Wheeler

Group of *P. papuana* Emery

papuana Emery

Group of *P. pruinosa* Emery

pruinosa Emery
 = *Ponera mocsaryi* Emery
sabronae Donisthorpe

Group of *P. selenophora* Emery

clavicornis Emery
elegantula Wilson
selenophora Emery
syscena Wilson
xenagos Wilson

Group of *P. tenella* Emery

tenella Emery

Group of *P. tenuis* Emery

huonica Wilson
petila Wilson
ratardorum Wilson
szaboi Wilson
szentivanyi Wilson
tenuis (Emery)

Incertae Sedis

emeryi Donisthorpe
pia Forel
siremps Forel

Species Newly Excluded from *Ponera*

anommata Donisthorpe (= *Cryptopone testacea* Emery)
bicolor Donisthorpe (= *Brachyponera croceicornis* Emery)
caeca Donisthorpe (= *Proceratium papuanum* Emery)

*Key to the species, based on the worker caste*¹

1. Eyes completely lacking; small light brownish to clear yellow species 2
Eyes present, although often containing only a single ommatidium and very inconspicuous; size and color varying among species 4
2. (Based on original description.) Antennal scapes reaching the occipital border; 3-4 irregularly shaped teeth present on the masticatory border of the mandible posterior to a set of 3-4 distinct, regularly shaped apical teeth (New Britain) *siremps* Forel
Antennal scapes failing to reach the occipital border at any point; masticatory border of mandible bearing only minute denticles behind the set of three apical teeth (species known only from Hawaii; possibly introduced by man from Melanesia) 3
3. Larger species, head width at least 0.44 mm; cephalic index at least 81; erect hairs numerous on scape, dorsum of alitrunk, and entire surfaces of first two gastric tergites *zwaluwenburgi* (Wheeler)
Smaller species, head width not exceeding 0.30 mm; cephalic index not more than 78; erect hairs absent from scapes, alitrunk dorsum, and all but the posterior strips of the first two gastric tergites
..... *swezeyi* (Wheeler) Poner 2
4. Showing the following combination of characters: relatively small species (HW 0.43-0.48 mm) with proportionately broad petiolar node, the dorsal width of which is at least 0.76X the pronotal width; genae coarsely punctate and completely opaque 5
Not showing all of the above characters; either well outside the given size range, or else the petiolar node is proportionately much narrower, or the genae are shallowly punctate and feebly shining, or a combination of these exceptions is shown 6
5. Dorsal surface of alitrunk covered by abundant, short, erect to oblique hairs; dorsal petiolar node width only about 0.77-0.78X the pronotal width *papuana* Emery
Dorsal surface of alitrunk completely devoid of standing pilosity; dorsal petiolar node width at least 0.83X the pronotal width
..... *clavicornis* Emery Poner 2
6. Smaller species, head width not exceeding 0.44 mm and usually much less 7
Larger species, head width never less than 0.49 mm and usually much more 13

¹ Exclusive of *P. emeryi* Donisthorpe and *P. pia* Forel, both of which are species *inquirendae* described from sexual forms. Included are two Hawaiian species, *P. swezeyi* (Wheeler) and *P. zwaluwenburgi* (Wheeler), which may have faunal origins in Melanesia.

7. Petiolar node short, its length (measured from the side) not exceeding 0.11 mm; seen from above, its dorsal surface more than three times broader than long; subpetiolar process lobose and projecting anteriorly *pallidula* Emery
 Petiolar node longer, its length at least 0.13 mm; seen from above, its dorsal surface not more than twice as broad as long; subpetiolar process angular or subangular and projecting posteriorly 8
8. Very small species, head width not exceeding 0.31 mm; petiolar node seen from directly above, so that the posterior face is level with the line of vision, forming distinctly more than a half-circle, its width 0.15 mm or less *szaboi* Wilson (Poncz)
 Larger species, head width never less than 0.32 mm and often as much as 0.38 mm; petiolar node seen from above varying among species, from distinctly more than semicircular to distinctly less, its width never less than 0.18 mm 9
9. Antennal club indistinctly 5-jointed; petiolar node seen from directly above forming distinctly less than a half-circle *ratardorum* Wilson (Poncz)
 Antennal club distinctly 4-jointed; petiolar node seen from directly above forming a half-circle or more 10
10. Smaller species, head width 0.34 mm or less; body color clear yellow to yellowish brown 11
 Larger species, head width 0.38 mm or more; body color varying among species, from light yellowish brown to dark brown 12
11. Lateral surfaces of alitrunk very feebly shagreened to smooth, and shining; petiolar node relatively low, its height (measured from the level of the lowermost point of the subpetiolar process to the level of the dorsal crest) only 0.25 mm, or about the same as the pronotal width *petila* Wilson (Poncz)
 Lateral surfaces of alitrunk all moderately shagreened, and opaque; petiolar node proportionately higher, and its height in the single type specimen that can be measured is 0.29 mm, or slightly more than the pronotal width, which is 0.27 mm *szentivanyi* Wilson (Poncz)
12. Petiolar node seen from directly above forming distinctly more than a half-circle; posterior apex of subpetiolar process sharply truncated; slightly smaller species, head width 0.40-0.41 mm; head dark brown, remainder of body medium brown *huonica* Wilson (Poncz)
 Petiolar node seen from directly above forming almost an exact half-circle; posterior apex of subpetiolar process not truncated, but forming a full right angle or acute angle; slightly larger species, head width 0.42-0.44 mm; entire body uniformly dark brown *tenuis* (Emery) (Poncz)
13. Showing the following combination of characters: dorsal petiolar node width at least 0.77X the pronotal width; seen from directly above,

- the dorsal surface of the node is crescentic or arcuate, the strongly convex anterior border curving back to meet the straight or concave posterior border, with the juncture of the two borders angulate or subangulate 14
- Showing one or both of the following opposing characters: the dorsal petiolar node is 0.72X the pronotal width or less; or the dorsal surface of the node seen from directly above is elliptical or lenticular, with the posterior border nearly as convex as the anterior, and the two borders merging laterally without any sign of an angle of juncture 17
14. Head more elongate (cephalic index 80), with relatively large eyes containing 11 or 12 ommatidia; alitrunk completely devoid of standing hairs *elegantula* Wilson *Ponera*
- Head proportionately shorter (cephalic index 86 or more), with smaller eyes containing only 3-5 indistinct ommatidia; alitrunk covered with abundant standing hairs 15
15. Smaller species, head width of unique type 0.52 mm; posterior face of petiolar node feebly but distinctly convex; anterior surface of scape bearing abundant erect hairs *syscena* Wilson *Ponera*
- Larger species, head width not less than 0.59 mm; posterior face of petiolar node either flat or feebly concave; anterior surface of scape with few or no standing hairs 16
16. Smaller species, head width 0.59-0.63 mm; basal half of masticatory border of mandible bearing two distinct teeth which are nearly as large as the three teeth of the apical half; posterior border of petiolar node seen from directly above distinctly concave *selenophora* Emery *Ponera*
- Larger species, head width 0.65-0.68 mm; basal half of masticatory border of mandible bearing only minute denticles which do not approach in size the three apical teeth; posterior border of petiolar node seen from directly above almost perfectly straight *xenagos* Wilson *Ponera*
17. Cephalic index 75 in single syntype measured; an exceptionally slender, blackish brown species of medium size for *Ponera* (head width 0.53 mm) *tenella* Emery
- Cephalic index never less than 78, ranging below 80 only in the species *sororecula* Wilson, which is slightly smaller than *tenella* (head width 0.44-0.52 mm) and yellowish brown in color 18
18. Body color blackish brown to jet black. Showing in addition the following combination of characters: medium to large in size, head width 0.53-0.88 mm; petiolar node seen from the front broadly ovate, seen from the side thin and tapering and more or less symmetrical; genae and thoracic dorsum shallowly punctate and feebly shining; eye containing at least five ommatidia 19

- Body color brownish yellow to medium brown. Not showing all of the above additional characters 20
19. Smaller species, head width 0.53-0.69 mm *pruinosa* Emery
Larger species, head width 0.73-0.88 mm *sabronae* Donisthorpe
20. Showing the following combination of characters: medium-sized, maximum head width range 0.44-0.62 mm; when head is viewed in full face and the scapes are aligned flat against the head and parallel to its long axis, the scapes surpass the occipital border by only their maximum width or less; color brownish yellow to light reddish brown ... 21
Not showing all of the above characters 22
21. Larger species, head width 0.55-0.62 mm; dorsal surface of head posterior to clypeus coarsely and densely punctate, and completely opaque *punctiventris* Emery
Smaller species, head width 0.46-0.52 mm; dorsal surface of head posterior to clypeus more finely punctate, and subopaque to feebly shining *sororcula* Wilson
22. Most of dorsal head surface posterior to clypeus coarsely punctate or shagreened, and opaque; petiolar node in side view subrectangular, its anterior and posterior borders nearly parallel 23
Most of dorsal head surface posterior to clypeus weakly sculptured and feebly shining; petiolar node in side view subtrapezoidal, tapering markedly toward the dorsal border 24
23. Eyes minute, containing only one to three ommatidia, their maximum length 0.03 mm or less; scape index 80-86; occipital margin seen in full face view strongly concave (New Guinea to Solomons) ... *biroi* Emery
Eyes larger, containing at least five or six ommatidia, their maximum length 0.04 mm or more; occipital margin seen in full face view feebly concave (widespread in Pacific region, known from New Caledonia, and possibly as tramp species or even endemic in western Melanesia) *perkinsi* Forel
24. Larger species, head width 0.64-0.66 mm. Showing in addition the following combination of characters: scapes slightly exceed occipital border when held flat against the head and aligned with the long axis of the head; entire alitruncal surface smooth and shining; body color light reddish brown *macradelphe* Wilson
Smaller species, head width not exceeding 0.52 mm. Not showing all of the additional characters listed above 25
25. Maximum eye length less than 0.03 mm; body color light yellowish brown, head occasionally approaching medium brown; petiolar node height 0.22-0.26 mm, rarely exceeding 0.25 mm *gleadowi* Forel
Maximum eye length exceeding 0.03 mm, if only by a very small amount; body color uniformly medium brown; petiolar node height 0.26-0.28 mm. *confinis* Roger

PONERA BIROI Emery

Ponera Birói Emery, 1900, Természetr. Füz., 23: 318, pl. 8, fig. 9, worker, queen. Type locality: Friedrich-Wilhelmshafen (= Madang), N-E. New Guinea. (Metatype examined — Hungarian National Museum).

Material examined. NETH. NEW GUINEA: Maffin Bay (E. S. Ross). N-E. NEW GUINEA: Bubia (Wilson, nos. 679, 689); lower Busu River (Wilson, nos. 964, 966, 1042); Sattelberg (metatype; L. Biró); valley of Kua River, near Zengaru, 800 m. (single dealate queen; Wilson, no. 795). NEW BRITAIN: St. Paul's, 350 m., Bainings Mts., Gazelle Pen. (J. L. Gressitt). SOLOMONS: Fulakora, Santa Isabel (W. M. Mann).

Taxonomic note. Workers from Maffin Bay (Neth. N. G.), New Britain, and the Solomons differ from those from N-E. New Guinea in having more weakly sculptured petiolar nodes. The nodes of the Maffin Bay workers are in addition thinner in side view and with slightly less convex anterior faces than in material from other localities.

Ecological notes. At Bubia and the Busu River, colonies of this species were found nesting in small "passalid-stage" logs on the rain forest floor. A colony collected entire at the Busu River contained a single nest queen, about 25 workers, and 20 to 30 larvae, all one-quarter to half grown. Occasional foraging workers were taken in the Busu River forest by knocking off material from the undersurface of small rotting logs.

PONERA CLAVICORNIS Emery

Ponera clavicornis Emery, 1900, Természetr. Füz., 23: 317, pl. 8, figs. 7, 8, worker. Type locality: Friedrich-Wilhelmshafen (= Madang), N-E. New Guinea. Wilson, 1957, Bull. Mus. Comp. Zool., 116: 377-379, worker, dist., ecology. (Syntype examined — Emery Coll.)

Selenopone clavicornis, Wheeler, 1933, Amer. Mus. Novitates, no. 672: 22.

PONERA CONFINIS Roger

Ponera confinis Roger, 1860, Berl. Ent. Z., 4: 284, worker. Type locality: Ceylon. Forel, 1901, Mitt. Zool. Mus. Berl., 2: 8, dist. Emery, 1911, Genera Insectorum, 118: 90, dist. Stitz, 1911, Sitzber. Ges. Nat. Freunde Berl., p. 356, dist.

Material examined. PAPUA: Karema (Wilson, no. 599); Bisianumu, 500 m. (Wilson, nos. 635, 642). NEW HEBRIDES: Ounua, Malekula (L. E. Cheesman). Emery (1911) records this species from India, Ceylon, Burma, and Sumatra. Forel (1901) found it in the Dahl collection from New Britain, and Stitz (1911) records it from N-E. New Guinea.

Taxonomic note. In the present study I have followed Emery's conception of this species, as indicated by determined series in his personal collection.

Ecological note. At Bisianumu two colonies of *confinis*, both containing less than 50 workers, were found nesting in small rotting logs on the rain forest floor. According to Forel (1901), Dahl collected this species in New Britain in both rain forest and a cultivated (cotton) field.

PONERA ELEGANTULA Wilson

Ponera elegantula Wilson, 1957, Bull. Mus. Comp. Zool., 116: 379-381, worker, queen. Type locality: Tumnang, 1500 m.; Huon Pen., N-E. New Guinea.

PONERA EMERYI Donisthorpe, emend.

Ponera emergi [!] Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)10: 443, male. Type locality: Camp Nok, 800 m., Waigeo.

The unique type of *emeryi* was not available during the course of the present study. Donisthorpe's brief description is virtually useless for comparative purposes, and in view of the fact that he commonly placed isolated males, as well as entire nest series, in the wrong genus and tribe, there can be no assurance that *emeryi* even belongs in *Ponera*.

PONERA GLEADOWI Forel

Ponera Gleadowi Forel, 1895, Mem. R. Accad. Sci. Bologna, (5)5: 292-293, nota, figs. 17a-c, worker. Original localities: Poona, Orissa, and Thana, India. Mann, 1919, Bull. Mus. Comp. Zool., 63: 294, dist. (Syntype examined — Emery Coll.).

Ponera kalakauae Forel, 1899, Fauna Hawaiiensis (Cambridge), pp. 116-117, worker, queen. Type locality: Lihue, Kauai, Hawaii. NEW SYNONYMY (provisional).

Ponera gleadowii r. *decipiens* Forel, 1899, *ibid.*, p. 118, worker. Type locality: Kauai (coast), Hawaii. NEW SYNONYMY (provisional).

Ponera mina Wheeler, 1927, Proc. Amer. Acad. Arts Sci., 62: 131-134, fig. 2, worker, queen, male. Type locality: Norfolk Island. (Syntypes examined — MCZ). NEW SYNONYMY (provisional).

Ponera mumfordi Wheeler, 1933, Bull. Bishop Mus., no. 114: 141-142, worker. Type locality: summit of Kohepu, Uapou, Marquesas. (Syntypes examined — MCZ.) NEW SYNONYMY (provisional).

Material examined. NETH. NEW GUINEA: Maffin Bay (winged queen, October, 1944; E. S. Ross). N-E. NEW GUINEA: Finschhafen (Ross). NEW HEBRIDES: Tanna (L. E. Cheesman). FIJI ISLANDS: Nadarivatu (W. M. Mann). NEW CALEDONIA: 11 km. southeast of La Foa (C. L. Remington); "S. E. New Caledonia" (N. L. H. Krauss); Ciu, 300 m. (Wilson, no. 297). Mann (1919) has recorded this species from Pamua, San Cristoval, Solomons.

Taxonomic notes. The status of the species of the *gleadowii* complex has been one of the most perplexing problems in the taxonomy of the Melanesian ant fauna. In analyzing this complex, I started with the working hypothesis that there are at least two species in the Indo-Australian area, the most divergent forms corresponding to *gleadowii* (with race *decipiens*) and *mumfordi*, respectively. Eighteen nest series from this area were studied, and the following characters were examined in detail: head shape, antennal length, mandible form, mandibular dentition, alitrunk form, petiole form, sculpturing, pilosity, and color. Particular attention was paid to petiole form, which has been utilized extensively by past authors and seemed to offer the most promising diagnostic variation. In none of the characters, or any combination of them, could a division be made. In particular, the *gleadowii* variant (represented by a worker from Colombo, Ceylon, compared with a *gleadowii* syntype) and *mumfordi* variant are connected by graded intermediate forms, with several New Caledonian series being the most centrally located. It was concluded that all of the study series are conspecific. This decision and the resultant synonymy should be considered provisional, however, until a more thorough study can be undertaken, utilizing longer series and additional characters. The fact that in the *gleadowii* group as a whole and in other groups of

Ponera such poorly understood characters as palpal segmentation and male ergatomorphism are occasionally of species-diagnostic value should be more than sufficient reason to use caution.

Ecological note. At Ciu, New Caledonia, a small colony of *gleadowi* was found nesting in a rotting log in moist subtropical evergreen forest.

PONERA HUONICA Wilson

Ponera huonica Wilson, 1957, Bull. Mus. Comp. Zool., 116: 365-367, fig. 2, worker, queen, male. Type locality: Ebabaang, Huon Pen., N-E, New Guinea.

PONERA MACRADELPHIE Wilson, n. sp.

Diagnosis. A member of the *biroi* group easily distinguished from other members of the group by the combination of large size, small, single-facet eyes, smooth and shining alitruncal dorsum, and light ferruginous color. Its closest affinities are to *punctiventris* Emery and *sororcula* Wilson.

Holotype worker. HW 0.65 mm, HL 0.80 mm, SL 0.59 mm, CI 81, SI 91, PW 0.52 mm, dorsal petiole width 0.36 mm, petiolar node length 0.24 mm, petiolar node height 0.40 mm. The apical quarter of the masticatory border of the mandible occupied by four teeth, the basalmost of which is very low and rounded and inconspicuous. The basal three-quarters of the border occupied by an even series of minute denticles. Eye small, consisting of a single ommatidium, located approximately 0.75 the distance from the lateral occipital border to the midpoint of the anterior clypeal border. Antenna lacking a well defined club, the terminal six segments gradually increasing in size distally. The median portion of the clypeus prominently raised, but lacking a distinct longitudinal carina. Anterior clypeal border in full-face view evenly convex, lacking any sign of a central projection or angulation. Head in full-face view distinctly narrowed anteriorly; posterior half of lateral cephalic borders convex, anterior half feebly but distinctly concave (in *punctiventris* and *sororcula* the entire lateral border is gently convex); posterior cephalic border moderately concave. Alitrunk in side view

flattened as a whole, the pronotum and mesonotum each individually very feebly convex, the dorsal propodeal border almost perfectly straight. The promesonotal suture and metanotal zone are each marked by very faint impressions. Petiolar node seen from the side gently tapering dorsally, with straight anterior and moderately convex posterior borders, and broadly and evenly rounded, strongly convex dorsal surface. Seen from directly above, so that the posterior face is exactly even with the line of vision, the dorsal surface of the node is roughly lenticular in shape, with moderately convex (and poorly demarcated) anterior border, broad, moderately convex lateral borders, and very feebly convex, nearly straight posterior border. Subpetiolar process lobose and directed anteriorly.

Frontal lobes, and frontal area as far as 0.12 mm posterior to the posteriormost tip of the frontal carinae, shagreened and subopaque. Remainder of head, including mandibles and clypeus, very feebly shagreened to perfectly smooth, and feebly to moderately shining. Entire dorsal surface of alitrunk very feebly shagreened to smooth, and moderately shining, except for limited areas in the upper posterior section of the mesepisternum and around the metapleural gland, which are more strongly shagreened and subopaque. All of petiolar node surface feebly shagreened to smooth, and moderately shining, except the ventral third of the lateral face, which is more strongly shagreened and subopaque. First gastric tergite densely punctate-shagreened, and almost entirely subopaque; second tergite more feebly punctate-shagreened, and feebly shining over most of its surface.

Oblique to erect pilosity of variable length abundant over all body and appendage surfaces, except anterior and posterior faces of petiolar node and anterior declivity of gaster, which are bare. All of body and appendages covered in addition by abundant, predominantly appressed pubescence.

Entire body light ferruginous, the gaster a shade darker and the appendages a shade lighter than the remainder of the body.

Worker paratypes. HW 0.64-0.66 mm, HL 0.82 mm, SL 0.59-0.60 mm, CI 78-80, SI 91-92, PW 0.52-0.54 mm, dorsal petiole width 0.37-0.38 mm, petiolar node length 0.25 mm.

Material examined. N-E. NEW GUINEA: Ebabaang, 1300-1400 m., Huon Pen., holotype and two paratype workers (Wilson, no. 839).

Ecological note. The three type workers were taken close together in thick leaf litter and humus on the floor of dense mid-mountain rain forest.

PONERA PALLIDULA Emery

Ponera pallidula Emery, 1900, Természetr. Fü., 23: 320-321, worker.

Type locality: Friedrich-Wilhelmshafen (= Madang), N-E. New Guinea. *Nec* Mann, 1919, Bull. Mus. Comp. Zool., 63: 295. *Nec* Wheeler, 1927, Proc. Amer. Acad. Arts Sci., 62: 129-130. (Syntypes examined — Hungarian National Museum).

Ponera pallidula var. *fuscula* Emery, 1902, Természetr. Fü., 25: 158, worker, queen. Type locality: Sattelberg, N-E. New Guinea. NEW SYNONYMY.

Material examined. N-E. NEW GUINEA: Madang (syntypes); lower Busu River (Wilson, nos. 884, 1052, 1058); Zing-zingu, 1000 m. (Wilson, no. 770). PAPUA: Bisianumu, 500 m. (Wilson).

Taxonomic notes. Workers collected by the author in eastern New Guinea appear to be identical to the *pallidula* syntypes except for their darker body color, and they therefore probably correspond to Emery's var. *fuscula*. The *pallidula* types are uniformly brownish yellow (Emery described them as "flavo-testacea" in 1900), whereas my own specimens have medium brown bodies and brownish yellow appendages. It should be mentioned that Emery's figure of the *pallidula* worker shows the petiolar node somewhat thicker than is actually the case.

Ecological note. At the Busu River workers of this species were collected in soil-litter berlesates from the floor of primary rain forest.

PONERA PAPUANA Emery

Ponera papuana Emery, 1900, Természetr. Fü., 23: 319, pl. 8, figs. 10, 11, worker, queen. Type locality (by present selection): Mt. Hansemann, N-E. New Guinea. *Nec* Mann, 1919, Bull. Mus. Comp. Zool., 63: 295. (Syntypes examined — Hungarian National Museum; MCZ; see below.)

The following re-description of this problematic species is based on two syntype workers from Mt. Hansemann loaned to the author by Dr. Elisabetha Bajári of the Hungarian National Museum. With Dr. Bajári's permission, one of these specimens has been selected as lectotype and returned to the Hungarian National Museum, while the other has been retained in the Museum of Comparative Zoology.

Lectotype worker. HW 0.47 mm, HL 0.58 mm, SL 0.44 mm, CI 81, SI 94, PW 0.38 mm, dorsal petiole width 0.29 mm, petiolar node height 0.15 mm. Mandibular dentition consisting of a single rather small apical tooth followed by an irregular series of teeth varying in size from nearly as large as the apical tooth to barely visible (at 50X) denticles. Eye small, inconspicuous, consisting of a single ommatidium located about 0.75X the distance from the lateral occipital border to the midpoint of the anterior genal border. Median portion of the clypeus elevated but not forming a distinct longitudinal carina. Viewed in full face, the anterior clypeal border is moderately and evenly convex. Head subrectangular, distinctly narrower anterior to the eyes than at the occipital zone, its sides moderately convex; viewed in full face the posterior border is shallowly but distinctly concave. In side view the dorsal surface of the alitrunk is almost perfectly flat, with only very faint, barely visible depressions marking the promesonotal and mesonotal-propodeal junctures. Promesonotal suture seen from above well marked, the metanotal area undifferentiated. Petiolar node seen in side view appearing to curve forward slightly as a whole, its posterior border moderately convex, its anterior border almost perfectly straight. Seen from directly above, the node is proportionately wide, its width 0.77X the pronotal width; its dorsal surface lenticular in shape, with broad, rounded lateral margins.

Mandibles sparsely and feebly punctate, their surfaces strongly shining. Clypeus somewhat more densely punctate, its surface feebly shining. Remainder of head finely and densely punctate, and completely opaque. Entire remainder of body somewhat less densely punctate than the head exclusive of the mandibles, and subopaque.

Clypeus bearing several long, erect hairs. Short erect or oblique hairs present on mandibles, frontal lobes, anterior gular

surface, entire dorsal alitruncal surface, and entire surfaces of gastric tergites. Standing pilosity absent from most of dorsal head surface and petiolar node. Entire body and appendages covered by abundant, oblique to appressed pubescence.

Body uniformly dark reddish brown, appendages yellowish brown. Emery describes the type series when relatively freshly collected as "picea vel (immatura) ferrugineo-testacea, mandibulis, funiculo, trochanteribus, tibiis, tarsis anoque dilutius rufescentibus."

Paratype worker. HW 0.47 mm, HL 0.56 mm, SL 0.46 mm, CI 84, SI 98, PW 0.38 mm, dorsal petiolar width 0.29 mm. This specimen is almost identical to the lectotype in other external characters.

PONERA PERKINSI Forel

Ponera perkinsi Forel, 1899, Fauna Hawaiiensis (Cambridge), p. 117, worker, queen, male. Type locality: Hawaiian Islands, in mountains, 650-1300 m. (Syntype examined — Emery Coll.).

Ponera Andrei Emery, 1900, Természetr. Füzet., 23: 318, nota, pl. 8, fig. 47, worker. Type locality: Nouméa, New Caledonia. (Holotype examined — Emery Coll.) NEW SYNONYMY.

The unique type of *P. andrei* was compared directly with a worker syntype of *P. perkinsi* in the Emery Collection and found to be nearly identical. *P. perkinsi* has not yet been recorded from northern and central Melanesia, although it has been recorded from New Caledonia and is widespread (as a tramp species?) in Polynesia. Some pains have been taken to diagnose it in the key because of the ease with which it can be confused with the closely related *P. biroi* Emery.

PONERA PETILA Wilson

Ponera petila Wilson, 1957, Bull. Mus. Comp. Zool., 116: 368, fig. 2, worker. Type locality: lower Busu River, Huon Pen., N-E. New Guinea.

PONERA PIA Forel

Ponera Pia Forel, 1901, Mitt. Zool. Mus. Berl., 2(1, b): 9, queen. Type locality: Ralum, New Britain.

PONERA PRUINOSA Emery

Ponera pruinosa Emery, 1900, Természetr. Fiz., 23: 319, pl. 8, figs. 13, 14, worker. Original localities: Tamara I., Huon Gulf, and Lemien, near Berlinhafen (= Aitape), N-E. New Guinea. Mann, 1919, Bull. Mus. Comp. Zool., 63: 294-295, queen, male, dist. (Syntype examined — Emery Coll.).

Ponera Mocsáryi Emery, 1900, *ibid.*, p. 320, pl. 8, figs. 15, 16, worker. Type locality: Tamara I., Huon Gulf, and Lemien, near Berlinhafen (= Aitape), N-E, New Guinea. NEW SYNONYMY (provisional).

Material examined. MOLUCCAS: Kalam I., Halmahera (C. S. Banks). NETH. NEW GUINEA: Maffin Bay (E. S. Ross). N-E. NEW GUINEA: Nadzab (Wilson, nos. 1088, 1091); Didiman Creek, Lae (Wilson, no. 717); Bubia (Wilson, nos. 678, 681, 688, 1063, 1068, 1081); lower Busu River (Wilson, nos. 877, 884, 899, 1008, 1013); Finschhafen (N. G. L. Wagner, and Wilson, no. 718); Nganduo, 1000 m. (Wilson, nos. 734, 737); Zingzingu, 1000 m. (Wilson, no. 769); Kua River Valley, near Zengaru, 800 m. (Wilson, no. 793); Gemeheng, 1200-1300 m. (Wilson, nos. 776, 786); Wamuki, 800 m. (Wilson, no. 861). PAPUA: Karema, Brown River (Wilson, no. 580); Bisianumu, 500 m. (Wilson, no. 657). SOLOMON ISLANDS: Malapaina, Three Sisters (W. M. Mann); Wainoni Bay, San Cristoval (Mann); Pawa, Ugi (Mann); Auki, Malaita (Mann); Fulakora, Santa Isabel (Mann). NEW HEBRIDES: Ratard Plantation, near Luganville, Espiritu Santo (Wilson, nos. 319, 332, 347); Vanua Lava, Banks Group (L. E. Cheesman); Ounua, Malekula (Cheesman). I have also seen series of *pruinosa* from Camp Lookout, Cuernos Mts., Negros Oriental, Philippines, collected by J. W. Chapman.

Taxonomic notes. Emery characterized *P. mocsaryi* as follows: "[*P. pruinosa* Emery] simillima sed minor, capite angustiore, minus confertim punctata et parcius pubescens, vix pruinosa, oculis minoribus, stemmatibus 8-10 compositis, clypei carina antice obtusa, tamen marginem anticum medio subangulatum productum fere attingente, antennis minus crassis, thorace paulo gracilore, squama petioli minus crassa, superne magis attenuata. Caeterum *P. pruinosa* similis. — L. $2\frac{2}{3}$ - $2\frac{3}{4}$ mm." Among the extensive New Guinea collections of *pruinosa* examined during the present study, occasional series show one or more of the

characters listed by Emery as distinguishing *mocsaryi*. At least one series (Kua Valley, accession no. 793) fits the description of *mocsaryi* in most of the characters, namely smaller size, proportionately smaller eyes, more slender body form, and less body pubescence. My first inclination was to treat this form as a distinct species, but examination of other series showed that it is connected to "typical" *pruinosa* by a gradient of intermediates. In addition to the *mocsaryi*-form trend, *pruinosa*, as broadly conceived at present, shows unusual variation in sculpturing (density of puncturation) and alitrunk form. In side view the alitrunk ranges from the "typical" *pruinosa* outline (as shown by the Emery Collection syntype), where the metanotal groove is deeply impressed and the mesonotum distinctly convex, to a much flattened dorsal outline of the sort exhibited by *P. papuana* Emery, where the metanotal groove is feebly impressed and the mesonotum almost flat. Future work may reveal that this exceptional variation encompasses two or more sibling species, but thus far I have been unsuccessful in detecting significant discontinuities in single characters or even consistent character combinations to mark species boundaries.

Ecological notes. *P. pruinosa* is among the most abundant and widespread of all Melanesian ants. Colonies have been taken over a wide elevational range, from near sea level to more than 1200 meters on the Huon Peninsula alone, and in a variety of forest types, from lowland and midmountain rain forest to dry, open riparian forest (at Nadzab). Colonies are generally small in size and nest almost exclusively in medium to large rotting logs. At Zingzingu, near the upper elevational limit of the species' distribution, a single colony (no. 769) was found nesting under a moss layer covering the base of a standing dead tree. Workers are commonly encountered foraging on the forest floor away from their nests, but even there usually remain hidden under covering objects such as pieces of rotting wood. The following note on predatory behavior was made at Bubia: when colonies of *Ponera pruinosa* and an undetermined species of termite nesting adjacently under the bark of a rotting log were exposed, the *Ponera* workers promptly attacked the termite colony and carried back to their own nest a quantity of the termite workers.

PONERA PUNCTIVENTRIS Emery

Ponera punctiventris Emery, 1902, Természetr. Füz., 25: 157-158, fig., worker. Type locality: Sattelberg, N-E. New Guinea. (Syntype examined — Emery Coll.)

Material examined. N-E. NEW GUINEA: Sattelberg (syntype); Nganduo, near Sattelberg, 1300 m. (Wilson, no. 739); Zingzingu, 1000 m. (Wilson, no. 771); Tumnamg, 1500-1600 m. (Wilson, nos. 812, 834).

Ecological note. A small colony of *punctiventris*, containing winged queens, was collected at Tumnamg during April 14-15, 1955 (acc. no. 812). It was nesting in the soil under a deep-set rock in midmountain rain forest.

PONERA RATARDORUM Wilson

Ponera ratardorum Wilson, 1957, Bull. Mus. Comp. Zool., 116: 369-370, figs. 1, 2, worker. Type locality: St. Paul's, Baining Mts., New Britain.

PONERA SABRONAE Donisthorpe

Ponera sabronae Donisthorpe, 1941, Ann Mag. Nat. Hist., (11)7: 130, worker, male. Type locality: Sabron, Cyclops Mts., Neth. New Guinea. (Syntype examined — MCZ.)

Material examined. NETH. NEW GUINEA: Sabron, Cyclops Mts. (syntype); Maffin Bay (E. S. Ross); Waghete, Tigi Lake, Wisselmeren, 1700 m. (J. L. Gressitt); Enarotadi, Wisselmeren, 1900 m. (Gressitt). N-E. NEW GUINEA: Joangeng, 1500 m. (Wilson, no. 745); Tumnamg, 1500 m. (Wilson, no. 798).

Taxonomic note. The only character I have been able to find that separates *sabronae* from the sympatric *pruinosa* is the larger size of the former. A discontinuity in the joint samples of the two species exists (see key) despite the great size variability of *pruinosa*.

Ecological notes. At Joangeng a colony of *sabronae* was found nesting under the moss layer covering the upper surface of a large rotting log. At Tumnamg stray workers were collected in leaf litter between the buttresses of a large tree at the edge of a clearing in mid-mountain rain forest.

PONERA SELENOPHORA Emery

- Ponera selenophora* Emery, 1900, Természetr. Füz., 23: 317, pl. 8, figs. 4, 6, worker. Type locality: Lemien, near Berlinhafen (= Aitape), N-E. New Guinea. Wilson, 1957, Bull. Mus. Comp. Zool., 116: 382-384, fig. 3, worker, dist., ecology. (Syntype examined — Emery Coll.)
Selenopone selenophora, Wheeler, 1933, Amer. Mus. Novitates, no. 672: 21.

PONERA SIREMPS Forel

- Ponera siremps* Forel, 1901, Mitt. Zool. Mus. Berl., 2 (1, b): 8, worker. Type locality: vicinity of Ralum, New Britain.

PONERA SORORCULA Wilson, n. sp.

- Ponera pallidula*, Mann, 1919, Bull. Mus. Comp. Zool., 63: 295. *Nec Ponera pallidula* Emery.

Diagnosis. A small, light-colored member of the *biroi* group with closest affinities to *punctiventris* Emery, from which it differs by its much smaller size, proportionately thinner and more flattened alitrunk, and feebler body sculpturing.

Holotype worker. HW 0.46 mm, HL 0.59 mm, SL 0.44 mm, CI 78, SI 96, PW 0.34 mm, dorsal petiole width 0.22 mm, petiolar node length 0.14 mm, petiolar node height 0.28 mm. Three apical teeth occupying about 0.6 of the masticatory border of the mandible, followed basally by an indeterminate number of serially arranged, minute denticles. Eye minute, consisting of a single ommatidium, located about 0.75X the distance from the lateral occipital border to the midpoint of the anterior genal border. Antenna lacking a differentiated club, the terminal six segments gradually increasing in size distally. Clypeus as described for *macradelphe* Wilson. Head seen in full face view slightly narrowed anteriorly, with moderately and evenly convex sides and moderately concave occipital border. Alitrunk as in *macradelphe*, except that the propodeal dorsum is feebly convex instead of straight in side view. Petiolar node in side view subrectangular, with straight anterior and feebly convex posterior faces and broad, feebly convex dorsal face. Seen from directly above, so that the posterior face is even with the line of vision, the anterior border of the node is strongly convex and merges into the nearly straight posterior border through an even curve. Subpetiolar process lobose and directed anteriorly.

Mandibles smooth and shining. Clypeus feebly shagreened and shining over most of its surface. Entire remainder of head densely but shallowly punctate, subopaque dorsally and feebly shining laterally. Entire dorsal and lateral alitruncal surfaces feebly shagreened to smooth, and feebly to moderately shining, except for a limited area around the metapleural gland and the dorsal section of the lateral propodeal face, which are more strongly shagreened and subopaque. All but the posterior face of the petiolar node feebly shagreened, and feebly shining to subopaque. Gastric tergites densely punctate-shagreened, and subopaque.

Mandibles, clypeus, occiput, entire dorsal surface of alitrunk, dorsal and upper lateral surfaces of petiolar node, and entire gastric tergital surfaces (except anterior declivity of first tergite) bearing numerous oblique and erect hairs of variable length. Appendages almost entirely bare of standing pilosity. All of body and appendages covered by dense, predominantly appressed pubescence.

Body and appendages light ferruginous, the gaster a shade darker than the remainder of the body.

Worker paratype variation. NEW GUINEA: HW 0.46-0.52 mm, HL 0.57-0.63 mm, SL 0.42-0.45 mm, CI 79-83, SI 87-95, PW 0.33-0.40 mm, dorsal petiole width 0.23-0.29 mm, petiolar node length 0.14-0.16 mm, petiolar node height 0.26-0.30 mm. SOLOMON ISLANDS: HW 0.44-0.45 mm, HL 0.59 mm, SL 0.43-0.45 mm, CI 75-76, SI 98-100, PW 0.35-0.37 mm, dorsal petiole width 0.24-0.25 mm. As the data above show, the Solomon Islands workers have slightly more slender heads and a correspondingly higher scape index than those from New Guinea, but they are within the range of variation of the New Guinea samples in other characters. The single series comprising the largest workers examined (Didiman Creek, acc. no. 694; HW 0.51-0.52 mm) is unusual in that the appendages, including the scapes, bear a few scattered, short, erect hairs; this may be nothing more than a simple allometric development.

Material examined. N-E. NEW GUINEA: Didiman Creek, Lae, holotype worker (Wilson, no. 700) and three paratype workers (Wilson, nos. 694, 700); Nadzab, a single paratype worker (Wilson, no. 1110). SOLOMON ISLANDS: Auki, Malaita, 6 paratype workers (W. M. Mann).

Ecological notes. At Didiman Creek stray workers were found foraging during the day in leaf litter at the border of disturbed lowland rain forest. At Nadzab a single worker was collected in leaf litter in open, dry riparian forest.

PONERA SWEZEYI (Wheeler)

Pseudocryptopone swezeyi Wheeler, 1933, Amer. Mus. Novitates, no. 672: 16-17, fig. 6, worker, queen. Type locality: vicinity of Honolulu, Hawaii. (Syntypes — MCZ.)

Ponera swezeyi, Wilson, 1957, Bull. Mus. Comp. Zool., 116: 370-371, worker.

This species is known at present only from material collected in the vicinity of Honolulu, but as I have shown elsewhere (Wilson, 1957) there is an excellent chance that it was introduced there from a *tenuis*-group "source area" in Melanesia or the East Indies.

PONERA SYSCENA Wilson

Ponera syscena Wilson, 1957, Bull. Mus. Comp. Zool., 116: 384-385, worker. Type locality: Yunzain-Joangeng, 1300 m., Huon Pen., N-E. New Guinea.

PONERA SZABOI Wilson

Ponera szaboi Wilson, 1957, Bull. Mus. Comp. Zool., 116: 371-372, worker. Nom. pro *Cryptopone moosáryi* Szabó, 1910, Rovartani Lap., 17: 186 (nec *Ponera mocsaryi* Emery, 1900).

Pseudocryptopone mocsaryi, Wheeler, 1933, Amer. Mus. Novitates, no. 672: 14.

PONERA SZENTIVANYI Wilson

Ponera szentivanyi Wilson, 1957, Bull. Mus. Comp. Zool., 116: 372-373, figs. 1, 2, worker. Type locality: Karema, Brown River, Papua.

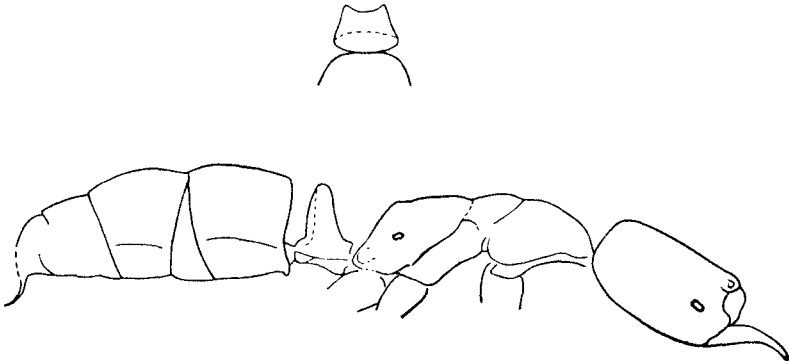
PONERA TENELLA Emery

(Text-figure)

Ponera tenella Emery, 1902, Természetr. Füzet., 25: 158-159, fig., worker, queen. Type locality: Sattelberg, N-E. New Guinea. (Syntype examined — Hungarian National Museum.)

The description below is based on a worker syntype loaned by Dr. E. Bajári of the Hungarian National Museum.

Syntype worker. HW 0.53 mm, HL 0.70 mm, SL 0.60 mm, CI 76, SI 113, PW 0.42 mm, dorsal petiole width 0.29 mm, petiolar node length 0.15 mm, petiolar node height 0.35 mm. Right mandible with three apical teeth occupying approximately one fourth of the masticatory border; posterior to these is an irregular series of teeth ranging in size from as large as the posterior two teeth of the apical set to barely visible denticles. Eye small but distinct, containing a single ommatidium, located approximately 0.8 the distance from the lateral occipital border to the



Ponera tenella Emery, syntype worker. Showing dorsal view of petiole and side view of entire body. Pilosity omitted.

midpoint of the anterior genal border. Clypeus bearing an indistinct median carina; its anterior border feebly and evenly convex when viewed in full face. Head when viewed in full face elongate and subrectangular, its sides moderately convex, its greatest width just anterior to the midline, its posterior border very feebly concave, almost straight. Alitrunk and petiole as shown in the accompanying text-figure.

Mandibles smooth and shining; clypeus shallowly punctate and feebly shining to subopaque; remainder of head finely and densely punctate, and completely opaque. Remainder of body feebly punctate to shagreened, and feebly shining to subopaque.

Scattered erect to oblique hairs present on clypeus, occipital region, thorax (but not propodeum), dorsal surface of petiolar node, and entire surfaces of gastric tergites. Standing pilosity completely lacking from appendages, except from funiculi and flexor surfaces of tibiae. Entire body, including appendages, covered by abundant appressed pubescence.

Body uniformly medium brown with reddish undertones; appendages brownish yellow. Some fading may have occurred in this specimen, since in the original description Emery gives the color as "fusca, mandibulis, antennis, pedibus anoque fulvis."

PONERA TENUIS (Emery)

- Cryptopone tenuis* Emery, 1900, Természetr. Füzet., 23: 321-322, pl. 8, figs. 21, 22, worker. Original localities: Tamara I., Huon Gulf, and Lemien, near Berlinhafen (= Aitape), N-E. New Guinea. (Syntype examined — Hungarian National Museum.)
- Pseudocryptopone tenuis*, Wheeler, 1933, Amer. Mus. Novitates, no. 672: 13-14.
- Ponera tenuis*, Wilson, 1957, Bull. Mus. Comp. Zool., 116: 373-375, fig. 2, worker, queen, dist., ecology.

PONERA XENAGOS Wilson

- Ponera xenagos* Wilson, 1957, Bull. Mus. Comp. Zool., 116: 385-386, worker.
Type locality: Tumnang, 1500 m., Huon Pen., N-E. New Guinea.

PONERA ZWALUWENBURGI (Wheeler)

- Pseudocryptopone zwaluwenburgi* Wheeler, 1933, Amer. Mus. Novitates, no. 672: 14-16, fig. 5, worker. Type locality: Oahu I., Hawaii.
- Ponera zwaluwenburgi*, Wilson, 1957, Bull. Mus. Comp. Zool., 116: 375-376, worker.

As in the case of the related species *swezeyi*, there is an excellent chance that *zwaluwenburgi* was introduced into the Hawaiian Islands by man, and that it originated somewhere in Melanesia or the East Indies, the present headquarters of the remainder of the *tenuis*-group species.

The Species of the Fiji Islands

The five known endemic species, all originally described by Mann in his 1921 monograph of the Fijian ant fauna,¹ bear close resemblance to western Melanesian species. If my present interpretation is correct, the Fiji Islands have been populated by three species stocks that are currently among the most widespread in western Melanesia: *biroi* Emery (New Guinea to Solomon Islands), *pruinosa* Emery (Philippines to New Hebrides), and *selenophora* Emery (New Guinea to New Hebrides). In the accompanying table are listed the Fijian species with their presumptive western Melanesian cognates.

Relationships of Fijian *Ponera*

ENDEMIC FIJIAN SPECIES	CLOSEST RELATED SPECIES IN WESTERN MELANESIA
<i>colaensis</i> Mann	<i>selenophora</i> Emery
<i>eutrepta</i> Wilson (nom. nov. pro <i>rugosa</i> Mann)	<i>biroi</i> Emery
<i>monticola</i> Mann	<i>pruinosa</i> Emery
<i>turaga</i> Mann	<i>biroi</i> Emery
<i>vitiensis</i> Mann	<i>pruinosa</i> Emery

*Key to the species, based on the worker caste*²

1. Petiolar node with distinctly marginate sides. Showing in addition the following combination of sculptural characters: head densely punctate and completely opaque, the alitruncal dorsum sparsely and evenly punctate and mostly shining *colaensis* Mann
Petiolar node not marginate, its sides broadly and evenly rounded; not showing all of the above sculptural characters 2
2. Head coarsely and densely punctate and completely opaque 3
Head smooth to moderately punctate and shining over a large part of its surface 4
3. Larger species, head width of single syntype examined 1.09 mm; body color light reddish brown *turaga* Mann

¹ Mann, W. M., 1921, The ants of the Fiji Islands, Bull. Mus. Comp. Zool. Harv., 64: 401-499. Mann does not mention the presence of *P. gleadowi* Forel, but I have seen a worker of this tramp species collected by him at Nadarivatu (MCZ).

² Exclusive of the probably introduced *P. gleadowi* Forel.

- Smaller species, head width in several nest series examined not greater than 0.91 mm; body color blackish brown *eutrepta* Wilson
4. Eyes containing only a single ommatidium; larger species, head width not less than 0.73 mm; body color light brownish yellow
 *vitiensis* Mann
- Eyes containing 3-4 ommatidia; smaller species, head width not more than 0.63 mm; body color blackish brown *monticola* Mann

PONERA EUTREPTA Wilson, nom. nov.

Ponera biroi subsp. *rugosa* Mann, 1921, Bull. Mus. Comp. Zool., 64: 415, worker. Type locality: Nadarivatu, Viti Levu, Fiji Islands. *Nec Ponera rugosa* Le Guillou, 1841. (Syntypes examined—MCZ.)

This form seems sufficiently distinct from *biroi* Emery to deserve recognition as a full species. It differs from *biroi* primarily in its larger size, head width varying 0.77-0.91 mm as opposed to 0.64-0.69 mm in *biroi* in the moderate sample examined.¹ Of special interest is the extraordinary variability shown by *eutrepta* in several characters that are only weakly variable in the western Melanesian members of the *biroi* group, namely in total size, in scape index (ranging from 82 to 93 in only four nest series), and in petiole form. Additional collections of *eutrepta* were recently made by the author at Nadala, near the type locality of Nadarivatu, all from rotting logs on the floor of disturbed rain forest (Wilson, nos. 14, 28, 31).

The Species of New Caledonia

PONERA CALEDONICA Wilson

Ponera caledonica Wilson, 1957, Bull. Mus. Comp. Zool., 116: 361-364, fig. 2, worker, queen. Type locality: Ciu, near Mt. Canala, 300 m., New Caledonia.

This species is a member of the *Ponera tenuis* group and is most closely related to *P. exedra* Wilson of southeastern Australia.

¹ A tendency toward larger size is also exhibited by the Fijian species *turaga* and *vitiensis*, *turaga* reaching the exceptional size for *Ponera* of HW 1.09 mm. It is possible that these species and *eutrepta* tend to replace, ecologically, some of the larger ponerines missing from the Fijian fauna, e.g. *Brachyponera*, *Mesoponera*, and *Trachymesopus*.

PONERA ELLIPTICA Forel, n. status

Ponera truncata var. *elliptica* Forel, 1900, Ann. Soc. Ent. Belg., 44: 62, worker, queen. Type locality: none cited, probably in Australia. (Syn-type examined — Forel Coll.)

Ponera truncata subsp. *elliptica*, Emery, 1914, Nova Caledonia, 1: 397.

Ponera trigona subsp. *convexiuscula*, Emery, *ibid.*, p. 398. ?*Nec P. trigona* subsp. *convexiuscula* Forel, 1900.

Material examined. QUEENSLAND: Mt. Spurgeon, 1100-1600 m. (P. J. Darlington); Malanda (W. L. Brown); Kondalilla National Park, Blackall Range (Brown); Tamborine Mt. (Brown). NEW CALEDONIA: Chapeau Gendarme (Wilson, nos. 65-C, 68, 74, 78, 80, 96); Mt. Mou, 180 m. to summit ridge at 1200 m. (Wilson, nos. 106, 113, 138, 139); Ciu, 300 m (Wilson, nos. 242, 243, 267, 292, 310).

Taxonomic notes. *P. elliptica* is treated here provisionally as a separate species in the absence of definitive information concerning the identity of Frederick Smith's original *Ponera truncata*. Workers from New Caledonia are smaller and more variable in size than those from Queensland. In addition their petiolar nodes in side view are thinner and less symmetrical, showing a very slight anterior curvature absent in Queensland series. *P. elliptica* is very close to *P. pruinosa* Emery and *P. sabronae* Donisthorpe of western Melanesia, being separable only by subtle characters in size, sculpturing, and alitrunk and petiole form.

The New Caledonian population of *elliptica* is very plastic, showing variation in total size, eye size, body form, and sculpturing paralleling that already described for *pruinosa*. It is probable that the specimens referred to by Emery (1914) as *trigona* subsp. *convexiuscula* are nothing more than small *elliptica*, which in fact tend to resemble *convexiuscula* superficially.

Ecological notes. Like its Papuan equivalent *P. pruinosa*, *P. elliptica* is an exceptionally abundant and adaptable ant within its range. It was found to be among the more common ant species in most of the localities in southern and eastern New Caledonia visited by the author in 1954-55, extending from dry, semideciduous lowland forest at Chapeau Gendarme to the cool, wet cloud forest on the summit ridge of Mt. Mou. As in *pruinosa*, colonies are generally small. At Chapeau Gendarme they were found nesting exclusively in large rotting logs, while in the moister

forests of Mt. Mou and Ciu they occurred mostly in the soil beneath rocks. On several occasions, at Chapeau Gendarme and Ciu, solitary workers were found foraging during the day on the forest floor.

PONERA GLEADOWI Forel
(See p. 328)

PONERA PERKINSI Forel
(See p. 334)

BRACHYPONERA Emery, n. status

Euponera (*Brachyponera*) Emery, 1901, Ann. Soc. Ent. Belg., 45: 43.
Generitype: *Ponera sennaarensis* Mayr.

The four subgenera of *Euponera*, viz. *Euponera sensu stricto*, *Brachyponera*, *Mesoponera*, and *Trachymesopus*, seem sufficiently well marked and segregated from each other to deserve provisional generic status. There is even some evidence to suggest that they may be more closely related to other ponerine genera than to each other, as shown for instance in the close link between *Trachymesopus* and *Cryptopone* to be described in a later section.

Brachyponera appears to be a fairly recent invader from the Indo-Malayan Region. It is represented in Melanesia by two poorly differentiated species, only one of which (*croceicornis*) ranges as far east as the Solomon Islands.

*Key to the species, based on the worker caste*¹

1. Sides of the pronotum finely and obliquely striate (Moluccas)
..... *atrata* Karawajew
- Sides of the pronotum finely punctate 2
2. Upper quarter of metapleuron coarsely and transversely striate (character applicable to Papuan samples only); body color dark reddish brown (Neth. New Guinea) *arcuata* Karawajew
- Upper quarter of metapleuron smooth; body color deep blackish brown (New Guinea to Solomon Islands and Queensland)
..... *croceicornis* Emery

¹ Not including *Euponera* (*Brachyponera*) *niger* Donisthorpe, which has recently been shown to be a synonym of *Leptogenys breviceps* Vlehmeyer; see Wilson, 1958, Bull. Mus. Comp. Zool. 118: 116.

BRACHYPONERA ARCUATA Karawajew, n. status

Euponera (*Brachyponera*) *luteipes* var. *arcuata* Karawajew, 1925, Konowia, 4: 125, figs. 3-C, 4, worker, queen, male. Type locality: Tjibodas, Java. Santschi, 1928, Tijdschr. Ent., 71: 124; types restricted to worker and queen, male separated and described as *Leptogenys karawaiewi* Santschi.

I have applied this name provisionally to a single series from Doormanpad, Netherlands New Guinea, collected by W. C. van Heurn (MCZ). This series appears to be conspecific with various Indo-Malayan collections that have been determined as *arcuata* by B. Finzi, W. L. Brown, and others, and seem to fit Karawajew's description well enough. Another Karawajew variety, *B. luteipes* var. *continentalis*, is a possible junior synonym.

In addition to the sculptural and color characters given in the key, the following differences between *arcuata* and *croceicornis* (with *luteipes*) have been noted. (1) In *arcuata* the propodeum is less compressed laterally and its dorsal face is more concave. (2) *Arcuata* is slightly larger in size: the pronotal width of five workers from Doormanpad ranges 0.64-0.67 mm, while that of numerous *croceicornis* workers from New Guinea never measured more than 0.62 mm.

BRACHYPONERA ATRATA Karawajew

Euponera (*Brachyponera*) *atrata* Karawajew, 1925, Konowia, 4: 126-127, worker. Original localities: Amboina and Boeton. Karawajew, 1926, Treubia, 8: 418, queen. Known only from Karawajew's Moluccan type series.

BRACHYPONERA CROCEICORNIS Emery, n. status

Euponera (*Brachyponera*) *luteipes* var. *croceicornis* Emery, 1900, Természetr. Füzet., 23: 315, worker, queen. Type locality: German New Guinea (L. Biró). (Syntype examined — Emery Coll.)

Euponera (*Brachyponera*) *luteipes* subsp. *inops* Forel, 1910, Rev. Suisse Zool., 18: 17, worker. Type locality: Kuranda, Queensland. (Syntype examined — Emery Coll.) NEW SYNONYMY.

Euponera (*Brachyponera*) *luteipes*, Karawajew, 1925, Konowia, 4: 124, fig. 3b, worker, nec *B. luteipes* Mayr.

Ponera bicolor Donisthorpe, 1949, Ann. Mag. Nat. Hist., (12)1: 492, worker. Type locality: Maffin Bay, Neth. New Guinea. (Holotype examined — CAS.) Nec *Ponera bicolor* Guérin, 1845. NEW SYNONYMY.

Material examined. NETH. NEW GUINEA: Maffin Bay (E. S. Ross). N-E. NEW GUINEA: Nadzab (Wilson, nos. 1092, 1111); Buba (Wilson, nos. 676, 683, 1072); lower Busu River (Wilson, nos. 924, 978, 1003, 1024, 1030, 1063); Finsch Harbor (N. G. L. Wagner); Nganduo, 1000 m. (Wilson, no. 733); Nganduo-Yunzain, 1300-1500 m. (Wilson); Joangeng, 1500 m. (Wilson, no. 746); Zingzingu, 1000 m. (Wilson, no. 770); Tumngang, 1500 m. (Wilson, no. 798). PAPUA: Kini-Kini Hill, Port Moresby, 250 m. (Wilson, no. 524); Karema, Brown R. (Wilson, nos. 538, 579); Bisianumu, 500 m. (Wilson, no. 617). SOLOMON ISLANDS: Fulakora, Santa Isabel (W. M. Mann). I have also examined material from northern Queensland.

Taxonomic notes. *B. croceicornis* has been raised to species level provisionally, subject to a more thorough analysis of the related Indo-Malayan forms. The relation of *croceicornis* to *luteipes* is in particular need of further examination, and any such study must start with a re-examination of Mayr's types of *luteipes*, which originated from the Nicobar Islands. At present it is safe to say only that the widespread Indo-Malayan form to which the name *luteipes* has been conventionally applied by past authors differs from *croceicornis* in having the propodeum less compressed laterally and in minor, possibly overlapping characters in sculpturing and pilosity.

On New Guinea, *croceicornis* shows considerable non-geographic variation in the outline of the propodeum, the dorsal border of which when seen in side view is usually feebly concave, but occasionally straight and in one series examined feebly convex. There is also much variation in the abundance of body pilosity, with a marked secondary effect on the degree of cuticular shininess in reflected light.

Ecological notes. This species is one of the most abundant and wide-ranging ants in New Guinea, occurring from sea level to at least 1500 meters on the Huon Peninsula alone, and in a wide variety of major habitats, from dry semi-deciduous woods (near Port Moresby) to primary lowland rain forest (Busu River). Colonies nest in small "passalid-stage" logs on the forest floor and usually contain a single dealate queen and less than 100 workers. Workers forage singly on the ground during the day, and are so abundant in this situation that strays can usually

be turned up within an hour in most localities by persistent leaf-litter collecting. At Nadzab a worker was found carrying a small, recently killed spider in its mandibles.

MESOPONERA Emery, n. status

Euponera (*Mesoponera*) Emery, 1901, Ann. Soc. Ent. Belg., 45: 43. Genetype: *Ponera caffraria* Fr. Smith.

This genus shows a zoogeographic pattern almost identical with that already described for *Brachyponera*. Only two species are known from Melanesia. Both are limited to the western archipelagoes and have primarily Indo-Malayan affinities.

MESOPONERA MANNI Viehmeyer

Euponera (*Mesoponera*) *papuana*, Mann, 1919, Bull. Mus. Comp. Zool., 63: 290-291, fig. 8, worker. *Nec. Euponera papuana* Viehmeyer, 1914. Original localities: Wai-ai, San Cristoval, and Fulakora, Santa Isabel, Solomon Islands.

Euponera (*Mesoponera*) *manni* Viehmeyer, 1924, Ent. Mitt., 13: 228, nom. pro *Euponera* (*Mesoponera*) *papuana*, Mann, 1919. (Syntype examined — MCZ.)

Euponera (*Mesoponera*) *robiginosa* Donisthorpe, 1941, Ann. Mag. Nat. Hist., (11)7: 131, worker. Type locality: Sabron, Cyclops Mts., Neth. New Guinea. NEW SYNONYMY (provisional).

Material examined. N-E. NEW GUINEA: Bandong, Bunbok Valley, 1300 m. (Wilson, no. 1124). SOLOMON ISLANDS: Fulakora, Santa Isabel (syntype).

Taxonomic notes. This form is closely related to, and possibly conspecific with, the Indo-Malayan species *M. rubra* (Fr. Smith). More material from over the ranges of both species is needed before their relationship can be exactly determined. *M. manni* differs from the sympatric *M. papuana* as follows. (1) The petiolar node of *manni* resembles that of *melanaria* and *australis* as opposed to that of *papuana* (see also under *papuana*). (2) *Manni* differs from *papuana*, and also *melanaria* and *australis*, by its notably smaller eye size (eye length 0.13 mm as opposed to 0.15 mm). *M. rubra*, however, has an almost exactly intermediate eye size. (3) The body color of *manni* is light to medium

reddish brown, that of *papuana* and *melanaria* always blackish brown. *Australis* is usually blackish brown but occasional specimens are as light as *manni*.

Ecological notes. Mann collected the type workers from a colony nesting in a rotting log in lowland rain forest. My Bandong, New Guinea specimens were found under a rock in a partial clearing in midmountain rain forest.

MESOPONERA PAPUANA Viehmeyer

Euponera (*Mesoponera*) *papuana* Viehmeyer, 1914, Zool. Jahrb. Syst., 37: 608-609, worker. Type locality: Wareo, N-E. New Guinea.

Euponera (*Mesoponera*) *melanaria* subsp. *papuana* Viehmeyer, 1924, Ent. Mitt., 13: 228.

Euponera (*Mesoponera*) *pulchella* Donisthorpe, 1941, Ann. Mag. Nat. Hist., (11)7: 133, worker, queen. Type locality: Mt. Lina, 1100 m., Cyclops Mts., Neth. New Guinea. NEW SYNONYMY (provisional).

Euponera (*Mesoponera*) *viehmeyeri* Donisthorpe, 1948, Ann. Mag. Nat. Hist., (12)1: 132, worker. Type locality: Maffin Bay, Neth. New Guinea. NEW SYNONYMY (provisional).

Material examined. NETH. NEW GUINEA: Maffin Bay (E. S. Ross). N-E. NEW GUINEA: lower Busu River (Wilson, acc. nos. 892, 994).

Taxonomic notes. The taxonomy of *M. papuana* and its Indo-Australian relatives, comprising the *melanaria* group, has been notoriously confused in the past, due to reliance placed by older workers on inadequate series and their consistent employment of morphological characters that appear now to be of little or no diagnostic value. In the case of Donisthorpe's species of *Mesoponera*, their status can be settled finally only by consulting type material.

During the present study I have had the opportunity to examine an unusually large number of series belonging to the *melanaria* group, including *melanaria* Emery mostly from Ceylon, *rubra* (Fr. Smith) from Java, *papuana* Viehmeyer from New Guinea, and *australis* Forel from Queensland. The sample is still quite small, and the taxonomy of the group cannot yet be considered stable, but it is at least possible now to indicate some characters of probable diagnostic value.

It should first be noted that within the *melanaria* group, *melanaria* and *australis* are more closely related to each other than to any other species. Apparently the only discontinuous character that can be used to separate them, and therefore serve as an excuse to recognize them as distinct species, is the following. In *australis* the pronotum always bears two or more erect hairs set in distinct pits; usually there are two such hairs, symmetrically situated. In *melanaria*, the pronotum is invariably bare of pits and standing hairs.

Papuana, although occupying a geographically intermediate range between those of the closely related *melanaria* and *australis*, has morphological characters that set it off from both of these forms:

(1) In *papuana*, the median portion of the dorsal petiolar border appears slightly indented when the petiole is viewed frontally. Seen from directly above, the dorsal border appears indented in an anterior direction at its midpoint. In *melanaria* and *australis*, the dorsal petiolar border forms an even, continuously convex curve when the petiole is viewed frontally; when viewed from directly above, the border does not appear indented medially.

(2) In *papuana* there are invariably one or two coarse, standing hairs present on the first gastric tergite, and usually three or more on the second gastric tergite. In *melanaria* and *australis* the first tergite is always bare, while the second is either bare or has at most one or two standing hairs.

A special note is required here concerning the provisional synonymy of Donisthorpe's two forms *viehmeyeri* and *pulchella*. A worker from the type locality of *viehmeyeri* compared with a syntype of *viehmeyeri* by Dr. E. S. Ross agrees with my conception of *papuana*. The original description of *pulchella* does not depart from *papuana* in any detail. Further, Donisthorpe gives no indication in the descriptions of either form that he was aware of Viehmeyer's prior name, and he takes no account of the better known, closely related *australis*.

Ecological note. A colony of *papuana* collected entire at the Busu River consisted of a single dealate queen, 8-10 workers, and a small quantity of brood in all stages of development. The ants were nesting in a small section of rotting tree branch buried

in the soil beneath a larger, more recently fallen rotting log. In another section of the Busu Forest workers were observed foraging during the day in thin leaf litter accumulated between the buttresses of a large tree.

TRACHYMESOPUS Emery, n. status

Euponera (*Trachymesopus*) Emery, 1911, *Genera Insectorum*, 118: 84.

Generitype: *Formica stigma* Fabricius.

As Wheeler showed in his 1933 revision of *Cryptopone*,¹ this genus is more closely related to *Trachymesopus* than to *Ponera*, the genus with which it had been associated and often confused in the past. The connection is so close, in fact, as to render the generic integrity of *Trachymesopus* debatable. In the present study I have had the opportunity of examining a large percentage of the described species of *Cryptopone* and *Trachymesopus*, including the type species of both genera. Within the limits of this sample I have been able to separate the two genera by means of the following worker characters:

(1) In *Trachymesopus* secondary spurs are well developed on the middle and hind tibiae, being at least one-third as long as the primary, pectinate spurs. In *Cryptopone* secondary spurs are completely lacking, or at least are not visible in magnifications up to 90 \times .

(2) The mandibles of *Trachymesopus* are broader, and the masticatory borders tend to be more nearly parallel (opposable) with one another.

(3) Compound eyes are nearly always present in *Trachymesopus*, even though greatly reduced in size in some species; the apparent eyeless exception is the Palaearctic species *T. ochracea* (Mayr). In contrast, all of the species of *Cryptopone* are completely eyeless.

Due to our incomplete knowledge of the smaller species, no attempt will be made here to key the Melanesian *Trachymesopus*. *T. sheldoni* is known solely from the holotype worker, while *T. darwini* is apparently represented in collections only by winged queens taken at lights.

¹ Wheeler, W. M. 1933. Three obscure genera of ponerine ants. *Amer. Mus. Novitates*, no. 672: 1-23.

TRACHYMESOPUS DARWINI (Forel)

Belonopelta Darwinii Forel, 1893, Ann. Soc. Ent. Belg., 37: 460-461, queen.

Type locality: Darwin, N. T., Australia.

Material examined. NETH. NEW GUINEA: Maffin Bay, winged queens, July 8, 1944 (E. S. Ross). N-E. NEW GUINEA: lower Busu River, winged queens, May 16, 1955 (Wilson, no. 1112). NEW HEBRIDES: Ratard Plantation, Luganville, Espiritu Santo, winged queen, January 7-13, 1955 (Wilson).

Taxonomic note. The Melanesian series cited above, consisting of winged queens taken at light, all appear to be conspecific, but assignment to Forel's Australian-based *darwinii* is quite tentative. Both *darwinii* and its better known Indo-Malayan variety *indica* Forel appear to be known only from the queen caste, and there is little hope of correctly assigning these forms with respect to the remainder of *Trachymesopus* until additional material, including definitely associated workers, is made available.

TRACHYMESOPUS CRASSICORNIS (Emery)

Belonopelta crassicornis Emery, 1897, Ann. Mus. Stor. Nat. Genova, 18: 553-554, queen. Type locality: Moroka, 1300 m., Papua. (Holotype examined — Emery Coll.)

Euponera (Trachymesopus) crassicornis, Emery, 1911, Genera Insectorum, 118: 86.

Material examined. N-E. NEW GUINEA: Joangeng, 1500 m., Huon Pen. (Wilson, no. 747). PAPUA: (holotype). SOLOMON ISLANDS: Boku, Bougainville, dealate queen, June 4, 1956 (E. J. Ford, Jr.).

Taxonomic notes. The holotype queen, kindly loaned to the author by Dott. Delfa Guiglia, is labeled as follows: "Belonopelta crassicornis — typus — Moroka, 1300 m., N. Guinea S. E. — Loria, VII-IX, '93." This is in contradiction with the type locality cited in the original description, which is Kapa-Kapa. Moroka has been provisionally accepted here as the correct type locality.

The queen collected by the author at Joangeng appears to differ from the holotype only in its somewhat smaller size; its head width is 0.98 mm as opposed to 1.03 mm in the holotype. The queen from Boku, Bougainville, is intermediate in size (head width 1.00 mm) but differs from the New Guinea specimens

in its slightly narrower petiolar node and concave anterior node face. This individual may be referable to the related *T. sheldoni*, at present known only from a single worker from San Cristoval (*q. v.*).

Ecological note. At Joangeng a small colony of *crassicornis*, consisting of a single dealate queen and an undetermined number of workers and males, was found during April 7-8, 1955, in a "passalid-stage" log in second-growth midmountain rain forest.

TRACHYMESOPUS ROTUNDICEPS Emery

Euponera (Trachymesopus) rotundiceps Emery, 1914, Nova Caledonia, 1: 397, queen. Type locality: Mt. Canala, 700 m., New Caledonia.

Material examined. NEW CALEDONIA: Mt. Mou (Wilson, no. 105). I have also seen material of this species collected in Queensland, at Malanda (W. L. Brown), Lake Barrine (P. J. Darlington), and in the Paluma Range, near Townsville (E. O. Wilson).

Taxonomic note. Workers from Malanda, Queensland, differ from New Caledonian *rotundiceps* in their smaller size, proportionately smaller eyes, and less compressed propodeum, but overall seem close enough to be conspecific.

Ecological note. At Mt. Mou stray workers of this species were found in cavities in moss-covered bark lying on top of a large, moist, rotting log.

TRACHYMESOPUS SHELDONI Mann

Euponera (Trachymesopus) sheldoni Mann, 1919, Bull. Mus. Comp. Zool., 63: 292, worker. Type locality: Wainoni Bay, San Cristoval, Solomon Islands.

At my request Dr. M. R. Smith has compared the holotype of *sheldoni*, on deposit in the U. S. National Museum, with a verified *crassicornis* worker from Joangeng, New Guinea. He is of the opinion that *sheldoni* is specifically distinct from *crassicornis*, differing principally in the seven characters listed below (*in litt.*).

(1) *Crassicornis* is larger and stouter.

(2) The head of *sheldoni* is proportionately longer and with more nearly parallel sides.

(3) The antennal scape of *sheldoni* is not so slender at the base nor so abruptly enlarged at the apex as in *crassicornis*.

(4) *Crassicornis* has the base of the propodeum more compressed.

(5) The petiolar node of *crassicornis* is broader dorsally in proportion to its (antero-posterior) length. *Sheldoni* has what appears to be an impressed area extending from the posterior surface of the node dorsally to the dorsal border.

(6) The cephalic and pronotal sculpturing of *crassicornis* is much coarser.

(7) The body color of *sheldoni* is yellowish ("callow-like"), as opposed to medium brown in *crassicornis*.

TRACHYMESOPUS STIGMA (Fabricius)

Formica stigma Fabricius, 1804, Syst. Piez., p. 400, queen. Type locality: "America meridionali."

Ponera quadridentata Fr. Smith, 1859, Jour. Linn. Soc. Zool., 3: 143, queen. Type locality: Aru. NEW SYNONYMY.

Pachycondyla (Pseudoponera) stigma var. *quadridentata*, Emery, 1900, Természetr. Füzet., 23: 314-315, worker, queen.

Euponera (Trachymesopus) stigma var. *quadridentata*, Emery, 1911, Genera Insectorum, 118: 85. Karawajew, 1925, Konowia, 4: 127, ecology.

Euponera (Trachymesopus) nixonii Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)10: 441, queen. Type locality: Camp Nok, 800 m., Waigeo. *Ibid.*, (11)14: 299, worker. (Holotype examined — see below.) NEW SYNONYMY.

Euponera (Trachymesopus) brunneus Donisthorpe, 1947, Ann. Mag. Nat. Hist., (11)14: 300-301, worker, queen. Type locality: Maffin Bay, Neth. New Guinea. (Paratypes examined — CAS.) NEW SYNONYMY.

Euponera (Trachymesopus) sexdentatus Donisthorpe, 1949, Ann. Mag. Nat. Hist., (12)1: 746, worker. Type locality: Maffin Bay, Neth. New Guinea. (Holotype examined — CAS.) NEW SYNONYMY.

Material examined. NETH. NEW GUINEA: Maffin Bay (numerous series; E. S. Ross). N-E. NEW GUINEA: Nadzab (Wilson, no. 1101); lower Busu River (Wilson, no. 1013). PAPUA: Karema, Brown R. (Wilson, no. 566); Bisianumu, 500 m. (Wilson, no. 643). SOLOMON ISLANDS: Tulagi, Florida (W. M. Mann); Ugi (Mann); Fulakora, Santa Isabel (Mann); Rubiana Lagoon, New Georgia (Mann); Pamua and

Wai-ai, San Cristoval (Mann). FIJI ISLANDS: Lasema, Vanua Levu (Mann). I have also seen material of this species from China (vicinity of Amoy), Philippines, and Samoa.

Taxonomic notes. I have compared series of all three castes of Pacific *stigma* (= var. *quadridentata*) against those from the Neotropical Region and am unable to find any satisfactory separatory characters. *Stigma*, as now broadly conceived to include *quadridentata*, occupies a vast range. In the New World it occurs from southern Florida through the Antilles and Central America to as far south as the upper Amazon Valley. In the Old World it occurs from southern China to Samoa. In both hemispheres it has been collected from the interior of relatively undisturbed native forests, where it lives in apparent compatibility with local endemic ant faunas of the most diverse kinds. The center of origin of *stigma* is unknown, but the New World tropics seem the most likely possibility, since the most closely related species occur there.

Types of *T. brunneus* Donisthorpe and *T. sexdentatus* Donisthorpe examined by me appear identical with Papuan *stigma*. Dr. G. E. J. Nixon has compared the holotype of *T. nixonii* Donisthorpe, on deposit in the British Museum (Natural History), with *stigma* workers from Bisianumu, Papua, and finds them to be nearly or entirely identical (Nixon, *in litt.*).

Ecological notes. On New Guinea this species is found in both primary and disturbed rain forests. It appears to nest exclusively under the bark of large "Zoraptera-stage" or "passalid-stage" logs, often in company with *Myopopone castanea* (Fr. Smith).¹ Workers forage singly and may range over as much as eight meters distance through the subcortical spaces of the log. Colonies are apparently often diffuse in structure. At Karema, for instance, an isolated group of about ten workers were found clustered around several larvae; intensive search in the immediate vicinity failed to turn up a queen or additional brood. Colonies may apparently be founded by lone dealate queens. At Bisianumu several such queens were found scattered over a large rotting log, apparently in the act of searching for suitable nesting sites.

¹ Karawajew (1925) found a colony under similar conditions on Wammar, Aru, nesting in "Gängen in einem faulen liegenden Baumstamm, im Urwald."

CRYPTOPONE Emery

List of the species of Melanesia and the Moluccas, with new synonymy

butteli Forel

fusciceps Emery

=*Cryptopone mayri* var. *fuscior* Mann

=*Cryptopone mayri* var. *minor* Mann

motschulskyi Donisthorpe

testacea Emery

=*Cryptopone mayri* Mann

=*Cryptopone emeryi* Donisthorpe

=*Ponera anommata* Donisthorpe

At least two of the Melanesian *Cryptopone* (*butteli*, *testacea*) also occur widely through the Indo-Malayan Region and Micronesia. *C. motschulskyi*, the only species restricted to New Guinea and Waigeo, is the largest member of the genus, falling well within the lower size limit of *Trachymesopus*. In eastern New Guinea at least, it appears to replace *Trachymesopus* ecologically.

Key to the species, based on the worker caste

1. Mandibles 5-toothed 2
Mandibles 6-toothed 3
2. Head length almost exactly equal to head width; when scapes are laid against the head and aligned with the long axis of the head, and when the head is viewed in perfect full face, the tips of the scapes just reach the occipital border *butteli* Forel
Head length exceeding 1.1 X the head width; when scapes are aligned and viewed as described above, their tips fail to reach the occipital border by about their maximum width *fusciceps* Emery
3. Smaller species, head width never exceeding 0.59 mm and usually much less (single queen available, from Ceylon, is medium yellowish brown and small, the head width across and including eyes 0.64 mm) *testacea* Emery
Larger species, head width at east 0.64 mm and usually much more (queen dark brown and large, head width at least 0.88 mm) *motschulskyi* Donisthorpe

CRYPTOPONE BUTTELI Forel

Cryptopone butteli Forel, 1913, Zool. Jahrb. Syst., 36: 9-10, fig. C, worker.

Original localities: Beras Tagi, 1450 m., Sumatra, and Buitenzorg, Java.

Wheeler, 1933, Amer. Mus. Novitates, no. 672: 9-11, fig. 3, queen, male.

Material examined. N-E. NEW GUINEA: lower Busu River (Wilson, nos. 962, 984, 998, 999, 1058); Joangeng, 1500 m. (Wilson, no. 746); Zingzingu, 1000 m. (Wilson, no. 768); Ebabaang, 1300-1400 m. (Wilson, no. 836). NEW BRITAIN: St. Paul's, 350 m., Baining Mts., Gazelle Pen (J. L. Gressitt).

Ecological notes. On the Huon Peninsula *butteli* occurs in rain forest through a wide range of elevation. Colonies are relatively small, containing probably less than 30 adult members, and are found nesting both in rotting logs and in the soil beneath rocks. This was one of the few ant species found nesting under rocks in primary lowland rain forest at the Busu River. Workers were encountered on several occasions foraging singly in humus and (at higher elevations) under moss beds covering the ground. They are very timid and sluggish in their movements. Winged males were taken in a nest at the Busu River on May 10, 1955.

CRYPTOPONE FUSCICEPS Emery

Cryptopone fusciceps Emery, 1900, Természetr. Füz., 23: 321, pl. 8, figs. 19, 20, worker, queen. Type locality: Lemien, near Berlinhafen (= Aitape), N-E. New Guinea. (Syntype examined — Emery Coll.)

Cryptopone mayri var. *fuscior* Mann, 1919, Bull. Mus. Comp. Zool., 63: 294, worker. Type locality: Fulakora, Santa Isabel, Solomon Islands. (Syntype examined — MCZ.) NEW SYNONYMY.

Cryptopone mayri var. *minor* Mann, 1919, *ibid.*, p. 294, in key. Objective synonym of *C. mayri* var. *fuscior* Mann. NEW SYNONYMY.

Cryptopone fuscior, Wheeler, 1933, Amer. Mus. Novitates, no. 672: 8, fig. 2, worker.

Material examined. N-E. NEW GUINEA: Lemien (syntype); Mt. Hanseemann, near Madang (L. Biró); lower Busu River (Wilson, nos. 939, 954, 961, 1033); Gemeheng, 1300 m. (Wilson, no. 786); Ebabaang, 1300-1400 m. (Wilson, nos. 824, 828). SOLOMON ISLANDS: Fulakora, Santa Isabel (*fuscior* syntype).

Taxonomic notes. The material cited above shows significant variation in size (HW 0.41-0.47 mm), in thickness of the petiolar

node, and in conformation of the anterior node face (feebly concave to plane). Head color varies from distinctly darker than that of the alitrunk to nearly equal to it in shade. Montane series (Mt. Hansemann, Gemeheng, Ebabaang) average slightly larger in size than lowland series.

It should be noted here that all of the *fusciceps* workers examined by the author, including a syntype from the Emery Collection, are completely eyeless, conforming to the rest of the genus and contrary to the statement of Emery in the original description.

Ecological notes. All of the author's accessions consisted of workers foraging singly in leaf litter and rotting logs in rain forest.

CRYPTOPONE MOTSCHULSKYI Donisthorpe

Cryptopone motschulskyi Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)9: 167, queen. Type locality: Camp Nok, 800 m., Waigeo. (Syntype examined by G. E. J. Nixon — BMNH.)

Material examined. N-E. NEW GUINEA: lower Busu River (Wilson, acc. nos. 877, 895, 932, 943, 1021, 1046, 1063); Bubia (Wilson, nos. 681, 683, 1063, 1075). PAPUA: Bisianumu, 500 m. (Wilson, nos. 604, 619, 623, 644, 668).

Ecological notes. This species is apparently limited to lowland and foothills rain forest where in eastern New Guinea at least it is quite abundant. It nests almost exclusively in rotting logs on the forest floor. Colonies and stray workers have been found in logs from approximately ten centimeters to more than a meter in diameter and in all stages of decomposition from "Zoraptera-stage" to "passalid-stage." On a single occasion individuals were found in preformed cavities in a polypore fungus growing on top of a large rotting log. The workers are exceptionally large for *Cryptopone* and in general appearance and behavior closely resemble *Trachymesopus*. It was evident that at the several localities where *motschulskyi* was encountered, this species had almost entirely replaced *Trachymesopus* in the available nest sites in rotting logs, a habitat where *Trachymesopus* is prominent in many other parts of the world.

CRYPTOPONE TESTACEA Emery

- Cryptopone testacea* Emery, 1893, Ann. Soc. Ent. Fr., pp. 240-241, pl. 6, figs. 3, 4, worker. Type locality: Nawalapitya, Ceylon. *Nec ?Amblyopone testacea* Motschulsky, 1863, Bull. Soc. Nat. Moscou, 36: 15, queen. (Syntype examined — Emery Coll.)
- Cryptopone mayri* Mann, 1919, Bull. Mus. Comp. Zool., 63: 293, worker, queen. Type locality: Fulakora, Santa Isabel, Solomon Islands. Wheeler, 1933, Amer. Mus. Novitates, no. 672: 7-8, fig. 1, worker. (Syntype examined — MCZ.) NEW SYNONYMY.
- Cryptopone sarawakana* Wheeler, 1933, *ibid.*, pp. 11-12, fig. 4, worker, male. Type locality: Mt. Poi, Sarawak. (Syntype examined — MCZ.) NEW SYNONYMY.
- Cryptopone emeryi* Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)9: 168, nota, nom. pro *C. testacea* Emery, 1893. Objective synonym of *C. testacea* Emery. NEW SYNONYMY.
- Ponera anommata* Donisthorpe, 1947, Ann. Mag. Nat. Hist., (11)14: 301-302, worker, male. Type locality: Maffin Bay, Neth. New Guinea. (Holotype examined — CAS.) NEW SYNONYMY.

Material examined. NETH. NEW GUINEA: Maffin Bay (E. S. Ross). N-E. NEW GUINEA: lower Busu River (Wilson, no. 977). SOLOMON ISLANDS: Pawa, Ugi; Pamua, San Cristoval (*mayri* syntypes). This species is widely distributed from Ceylon to the Solomon Islands and Micronesia.

Taxonomic notes. As previously pointed out by Wheeler (1933) and Donisthorpe (1943), the dimensions given by Motschulsky for the *Amblyopone testacea* type queen, namely, total length 2 lines (= 4.2 mm), head width 0.4 lines (= 0.85 mm, roughly), would seem too large for this specimen to be conspecific with the worker series identified as *testacea* by Emery in 1893. I have since collected Emery's *testacea* in Ceylon,¹ and can definitely confirm this size disparity. The single queen in this series yields the following measurements: total length measured in a direct line from the tip of the mandibles to the tip of the gaster, 2.8 mm; total length derived as the sum of the individual lengths of the head, alitrunk, pedicel, and gaster, 3.7 mm; head width across and including eyes, 0.65 mm. There is an excellent possibility that Motschulsky's queen is really a

¹ Gilimale, 16-20 km. northeast of Ratnapura, Ceylon; July 18-21, 1955; workers, winged queen, male (Wilson, no. 1309).

Trachymesopus, such as *T. indica* Emery or *T. rufotestacea* (Donisthorpe).¹ But in any case, it is probably not a *Cryptopone* and is almost certainly not the species described by Emery as *Cryptopone testacea*. Accordingly, it is proposed that *Amblyopone testacea* Motschulsky be left for the time being as a *nomen dubium*, and Emery's 1893 description be accepted as the original one for *Cryptopone testacea*.

Syntypes of *mayri* Mann and *sarawakana* Wheeler have been compared directly with a syntype of *testacea* and appear to be conspecific. It should be noted that minor differences between these series in head and petiolar node shape have been exaggerated in Wheeler's figures, and that Wheeler miscounted the number of mandibular teeth in the *mayri* types.

Ecological note. At the Busu River, New Guinea, and Gilimale, Ceylon, small colonies of *testacea* were found nesting in large, rotting, "passalid-stage" logs on the floor of lowland rain forests.

BOTHROPONERA Mayr

Bothroponera Mayr, 1862, Verh. Zool.-bot. Ges. Wien, 12: 717. Generitype:

Ponera pumicosa Roger.

Pseudoneoponera Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)10: 439.

Generitype: *Pseudoneoponera verecundae* Donisthorpe. (Monobasic.)

NEW SYNONYMY.

During a recent visit to the British Museum (Natural History) I had the opportunity of examining the unique male type of *Pseudoneoponera verecundae* Donisthorpe in some detail. This specimen is almost certainly a *Bothroponera*, resembling definitely associated males of other species of that genus in most major features of external morphology. The character emphasized by Donisthorpe in erecting his new genus (and new section, Exeuponerinae),² the retractibility of the male genitalia, is shared by at least some of the species of *Bothroponera*. The type of *verecundae* is extremely close to two isolated Bornean males tentatively determined as *Bothroponera tridentata* (Fr. Smith)

¹ *Cryptopone rufotestaceus* Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)10: 197-199, queen. Type locality: Tenmalai, Travancore, India. *Ad Trachymesopus*. NEW COMBINATION. A syntype queen in the MCZ is unquestionably a *Trachymesopus*. The relationship of *rufotestaceus* to *indica* and other Indo-Malayan forms has not been investigated.

² Ponerini Forel = Exeuponerinae Donisthorpe. NEW SYNONYMY.

in the Museum of Comparative Zoology collection, but of course its relationship to this species and to the two worker-based Papuan species of *Bothroponera* (*incisa* and *obesa*) cannot be settled until worker-male associations are made.

BOTHROPONERA INCISA Emery

Pachycondyla (*Bothroponera*) *incisa* Emery, 1910, Nova Guinea, 5 (zool.): 533, fig. 1, worker. Type locality: Manokwari, Neth. New Guinea.

BOTHROPONERA OBESA Emery

Ponera (*Bothroponera*) *obesa* Emery, 1897, Ann. Mus. Stor. Nat. Genova, 38: 551, worker. Type locality: Ighibirei, New Guinea.

BOTHROPONERA SOLITARIA (Fr. Smith)

Ponera solitaria Fr. Smith, 1860, Jour. Linn. Soc. Zool., 5: 103, male. Type locality: Batjan. *Nec Ponera solitaria* Fr. Smith, 1873.
Pachycondyla (*Bothroponera*) *solitaria*, Donisthorpe, 1932, Ann. Mag. Nat. Hist., (10)10: 461.

BOTHROPONERA VERECUNDAE (Donisthorpe), n. comb.

Pseudoneoponera verecundae Donisthorpe, 1943, Ann. Mag. Nat. Hist., (11)10: 439, male. Type locality: Camp Nok, 800 m., Waigeu.

ECTOMOMYRMEX Mayr

*Key to the species, based on the worker caste*¹

1. Posterior face of the petiolar node completely covered by coarse, straight, evenly spaced longitudinal striae; first and second gastric tergites covered by similar striae; sculpturing of the frontal area of the head consisting of dense longitudinal rugae that give way posteriorly to a section of transverse rugae occupying the central portion of the occipital zone *striatulus* Karawajew
- Posterior face of the petiolar node sculptured otherwise: either the striae are oblique and converge dorsally toward the midline, or transverse, or sparse and irregularly oriented; remainder of body not showing all of the additional sculptural characters described above

¹ Exclusive of *vermiculatus* (Emery), known only from Tenimbar.

2. Striation of first gastric tergite concentric-semicircular and always strongly developed 3
 Striation of first gastric tergite straight and longitudinal and often only feebly developed 4
3. Striation of second gastric tergite concentric-semicircular; "center" of concentricity of striae of first gastric tergite located posterior to the midpoint of the dorsal tergal midline *aciculatus* Emery
 Striation of second gastric tergite straight and longitudinal; "center" of concentricity of striae of first gastric tergite located anterior to the midpoint of the dorsal tergal midline *scobinus* Wilson
4. Striae of dorsal surface of first gastric tergite very fine and much obscured by prominent, broad, shallow, contiguous punctures that fill the interspaces 5
 Striae of dorsal surface of first gastric tergite strongly developed and not obscured by the interspace punctures, which are fine and scattered 6
5. Striation of posterior face of petiolar node transverse (Solomon Islands) *aequalis* Mann
 Striation of posterior face of petiolar node oblique and converging dorsally toward the midline (Neth. New Guinea) *simillimus* (Donisthorpe)
6. Striation of posterior surface of petiolar node predominantly transverse; entire second gastric tergal surface covered by striae *acutus* Emery
 Striation of posterior surface of petiolar node predominantly oblique and converging dorsally toward the midline; only the posterior half of the second gastric tergite striate, the remainder smooth *exaratus* Emery

ECTOMOMYRMEX ACICULATUS Emery

Pachycondyla (*Ectomomyrmex*) *aciculata* Emery, 1902, Természetr. Füzet., 25: 157, worker. Original localities: Simbang and Sattelberg, N-E. New Guinea. (Syntype examined — Emery Coll.)

Material examined. N-E. NEW GUINEA: lower Busu River (Wilson, nos. 704, 1008, 1036).

Ecological notes. Workers of this species were encountered commonly in the Busu Forest, where they were foraging during the day on the forest floor, moving through and under loose leaf litter. Two individuals were found carrying prey, in one case a small, newly-molted millipede and in the other a small ground-dwelling spider.

ECTOMOMYRMEX ACUTUS Emery

Pachycondyla (*Ectomomyrmex*) *acuta* Emery, 1900, Természetr. Füzet., 23: 314, worker. Type locality: Tamara I., Huon Gulf, N-E. New Guinea.

Ponera (*Ectomomyrmex*) *Dahlii* Forel, 1901, Mitt. Zool. Mus. Berlin, 2(1, b): 9, worker. Type locality: Kabakaul, New Britain. NEW SYNONYMY (provisional).

Ectomomyrmex exarata, Mann, 1919, Bull. Mus. Comp. Zool., 63: 288-289, worker. *Nec exarata* Emery, 1902.

Material examined. SOLOMON ISLANDS: Fulakora, Santa Isabel (W. M. Mann).

ECTOMOMYRMEX AEQUALIS Mann, n. status

Ectomomyrmex exarata subsp. *aequalis* Mann, 1919, Bull. Mus. Comp. Zool., 63: 289, Fig. 7, worker. Type locality: Auki, Malaita, Solomon Islands (by present selection). (Syntypes examined — MCZ.)

Material examined. SOLOMON ISLANDS: Auki, Malaita; Tulagi, Florida (syntypes).

ECTOMOMYRMEX EXARATUS Emery

Pachycondyla (*Ectomomyrmex*) *exarata* Emery, 1902, Természetr. Füzet., 25: 156-157, worker. Original localities: Simbang, Sattelberg, and Mt. Oertzen, N-E. New Guinea. (Syntype examined — Emery Coll.)

Material examined. N-E. NEW GUINEA: lower Busu River (Wilson, no. 1052); Bubia (Wilson, no. 681).

Taxonomic note. The Busu River and Bubia specimens differ from a worker syntype in the Emery Collection only in their somewhat smaller size.

Ecological note. Both the Busu River and Bubia collections consisted of workers found foraging during the day on the rain forest floor.

ECTOMOMYRMEX INSULANUS (Mayr)

Ponera insulana Mayr, 1876, Jour. Mus. Godeffroy, 12: 87, worker. Type locality: Samoa.

Pachycondyla (*Ectomomyrmex*) *insulana*, Emery, 1901, Ann. Soc. Ent. Belg., 45: 46.

Mention is made here of this Samoan species because of its unusual extralimital distribution with respect to the rest of the

genus and the possibility that it or a related species may eventually be discovered within Melanesia. Judging from Mayr's description, *insulanus* should be distinguishable from the known Melanesian species by its very light, non-striate gastric sculpturing: "abdomen haud dense punctatum et modice nitens, segmento primo fortius punctato et minus nitente."

ECTOMOMYRMEX SCOBINUS Wilson, nom. nov.

Bothroponera striata Donisthorpe, 1949, Ann. Mag. Nat. Hist., (12)1: 489, worker. Type locality: Maffin Bay, Neth. New Guinea. (Syntype examined — CAS.) *Nec Pachycondyla (Ectomomyrmex) striata* Karawajew, 1927.

Known from type material only.

ECTOMOMYRMEX SIMILLIMUS (Donisthorpe), n. comb.

Bothroponera simillima Donisthorpe, 1949, Ann. Mag. Nat. Hist., (12)1: 490, worker, queen. Type locality: Maffin Bay, Neth. New Guinea. (Syntype examined — CAS.)

Material examined. NETH. NEW GUINEA: Maffin Bay (syntype). N-E. NEW GUINEA: lower Busu River (Wilson, no. 878).

Ecological note. My accession no. 878 consists of a stray dealate queen collected from the floor of primary lowland rain forest.

ECTOMOMYRMEX STRIATULUS Karawajew

Pachycondyla (Ectomomyrmex) striata Karawajew, 1927, Mém. Acad. Sci. Ukraine (Sci. Phys. Math.), 7: 5, worker. Type locality; Amboina. *Nec Pachycondyla striata* Fr. Smith, 1858.

Pachycondyla (Ectomomyrmex) striatula Karawajew, 1935, Treubia, 15: 70, nom. pro. *P. striata* Karawajew.

Material examined. N-E. NEW GUINEA: Wamuki, 800 m., Huon Pen. (Wilson, nos. 851, 857); Didiman Creek, Lae (Wilson, no. 694). PAPUA: Karema, Brown R. (Wilson, nos. 532, 566).

Ecological notes. Three colonies of this species were found, two at Wamuki and one at Karema. All were small, comprising less than 100 workers, and were nesting in small rotting logs on the ground. A single dealate queen was collected with the Karema

colony. As in most or all other species of *Ectomomyrmex*, the workers curl up into a pupa-like position and feign death for a moment when disturbed. Unlike the workers of *Bothroponera*, they do not emit strings of bubbles from the tip of the gaster as a defense response.

ECTOMOMYRMEX VERMICULATUS (Emery)

Pachycondyla (*Bothroponera*) *vermiculata* Emery, 1897, Ann. Mus. Stor. Nat. Genova, (2)18: 552, nota, queen. Type locality: Tenimbar.

Pachycondyla (*Ectomomyrmex*) *vermiculata*, Emery, 1911, Genera Insectorum, 118: 79.

The only truly diagnostic feature given by Emery in the original description is the sculpturing of the first gastric tergite, which is said to consist of longitudinal striae finer than those on the head. Two of the other known Melanesian *Ectomomyrmex*, *aequalis* Mann and *simillimus* (Donisthorpe), can be said to possess this character, but in these the cephalic sculpturing is really a dense, fine rugoreticulum, and the striae of the first gastric tergite are much obscured by a dense puncturation, neither of which particulars are mentioned by Emery with reference to *vermiculatus*.

DIACAMMA Mayr

*Key to the species, based on the worker caste*¹

1. Humeri distinctly angulate *purpureum* (Fr. Smith)
Humeri evenly rounded 2
2. First gastric tergite smooth; dorsal surface of head either smooth or at most feebly striate *bispinosum* (Le Guillou)
First gastric tergite and dorsal surface of head moderately to coarsely striate *rugosum* (Le Guillou)

DIACAMMA BISPINOSUM (Le Guillou)

Ponera bispinosa La Guillou, 1841, Ann. Soc. Ent. Fr., 10: 317, worker.
Type locality: Ternate.

Diacamma bispinosum, Emery, 1887, Ann. Mus. Stor. Nat. Genova, 4: 441.
Idem, 1897, Rend. Accad. Sci. Bologna, p. 152, fig. 1, worker.

¹ Exclusive of *D. cupreum* (Fr. Smith), known certainly only from the type collection from Netherlands New Guinea.

Diacamma bispinosa var. *subsulcata* Emery, 1897, *ibid.*, p. 152, worker.

Type locality: Halmahera. NEW SYNONYMY (provisional).

Diacamma rugosum subsp. *buruensis* Karawajew, 1925, *Konowia*, 4: 117-118, worker. Type locality: Tifu, Buru. *Idem*, 1935, *Treubia*, 15: 70, worker. NEW SYNONYMY (provisional).

Known only from the Moluccas.

The author was unable to locate the type of *bispinosum* during a visit to the Muséum National d'Histoire Naturelle, Paris, in 1955, and it may no longer be in existence. In the key I have followed the diagnosis of the species given by Emery in his 1897 revision of *Diacamma*. Emery's var. *subsulcata* is based on workers differing from the typical form only in possessing feeble striae on the dorsal surface of the head. Karawajew described his form *buruensis* with reference to *D. rugosum* alone, apparently unaware of the existence of *bispinosum*; his description fits the latter species well in diagnostic sculptural characters.

DIACAMMA CUPREUM (Fr. Smith)

Ponera cuprea Fr. Smith, 1860, *Jour. Linn. Soc. Zool.*, 5: 104-105, worker.

Type locality: Dory (= Manokwari), Neth. New Guinea.

Diacamma rugosum var. *cuprea*, Emery, 1897, *Rend. Accad. Sci. Bologna*, p. 160, worker.

Diacamma cupreum, Donisthorpe, 1932, *Ann. Mag. Nat. Hist.*, (10)10: 462, worker.

Emery (1897) considered this form a trivial variant of *Diacamma rugosum*, differing from the typical form only in minor sculptural characters. However, Donisthorpe (1932) states that the type of *cupreum* is quite different from that of *sculpturatum* (an undoubted synonymy of *rugosum*): "In my opinion this species has nothing to do with *sculpturatum*, which is a much larger insect; the striae on the mesonotum [propodeum?—E. O. W.] are quite different and the gaster much smoother."

DIACAMMA PURPUREUM (Fr. Smith)

Ponera purpurea Fr. Smith, 1863, *Jour. Linn. Soc. Zool.*, 7: 18, worker.

Type locality: Halmahera.

Diacamma rugosum var. *purpureum*, Emery, 1887, *Ann. Mus. Stor. Nat. Genova*, (2)5: 439.

Diacamma purpureum, Emery, 1897, Mem. R. Accad. Sci. Bologna, p. 152, worker, distribution.

Known only from Halmahera, Moluccas.

DIACAMMA RUGOSUM (Le Guillou)

- Ponera rugosum* Le Guillou, 1841, Ann. Soc. Ent. Fr., 10: 318, worker. Type locality: Borneo. Emery, 1897, Mem. R. Accad. Sci. Bologna, p. 153, figs. 2-15, worker. (Holotype examined — Paris Museum.)
- Ponera sculpturata* Fr. Smith, 1859, Jour. Linn. Soc. Zool., pp. 142-143, worker. Type locality: Aru. (Holotype examined — Oxford University Museum.) NEW SYNONYMY.
- Diacamma rugosum* subsp. *sculpturatum*, Emery, 1897, *op. cit.*, p. 159, worker. Karawajew, 1926, Treubia, 8: 417, fig. 1, male. Donisthorpe, 1932, Ann. Mag. Nat. Hist., (10)10: 454. Karawajew, 1935, Treubia, 15: 65, worker, male.
- Ponera vagans* Fr. Smith, 1960, Jour. Linn. Soc. Zool., 5: 103-104, worker. Type locality: Batjan. NEW SYNONYMY (provisional).
- Diacamma rugosum* var. *vagans*, Mayr, 1867, Tijdschr. Ent., 10: 55.
- Diacamma rugosum sculptum* var. *vagans*, Emery, 1897, *op. cit.*, p. 165.
- Ponera striata* Fr. Smith, 1860, *op. cit.*, p. 104, worker. Type locality: Batjan. Viehmeyer, 1912, Abh. Zool.-anthrop.-ethn. Mus. Dresden. 14: 6, note on type workers. NEW SYNONYMY (provisional).
- Diacamma rugosum* subsp. *striatum*, Donisthorpe, 1932, *op. cit.*, pp. 461-462. 1941, Trans. Roy. Ent. Soc. London, 91: 52, worker.
- Ponera tortuolosa* Fr. Smith, 1863, Jour. Linn. Soc. Zool., 7: 18, worker, queen. Original localities: Ceram, Buru. Nec *P. tortuolosum* Fr. Smith, 1858. (See *Diacamma rugosa* subsp. *smithi* Donisthorpe.)
- Diacamma rugosum* subsp. *tortuolosum*, Emery, 1897, *op. cit.*, p. 160.
- Diacamma rugosum sculpturatum* var. *divergens* Emery, 1897, *op. cit.*, p. 160, worker. Original localities: Halmahera, New Guinea. (Syntype examined — Emery Coll.) NEW SYNONYMY.
- Diacamma rugosum* subsp. *geminatum* Emery, 1897, *op. cit.*, p. 161, fig. 6, worker. Type locality: Halmahera. NEW SYNONYMY (provisional).
- Diacamma vagans* var. *papuanum* Stitz, 1911, Sitzber. Ges. Naturf. Freunde Berlin, p. 354, fig. 5, worker. Original localities: Mawa River, Neth. New Guinea; N-E. New Guinea. NEW SYNONYMY (provisional).
- Diacamma vagans* var. *frontalis* Stitz, 1911, *op. cit.*, p. 355, worker. Type locality: New Guinea. NEW SYNONYMY (provisional).
- Diacamma rugosum sculpturatum* var. *macreta* Viehmeyer, 1912, Abh. Zool.-anthrop.-ethn. Mus. Dresden, 14: 6, worker. Type locality Torricelli Mts., 640 m., N-E. New Guinea. NEW SYNONYMY (provisional).

Diacamma bispinosum var. *saussurei* Forel, 1922, Rev. Suisse Zool., 30: 89, worker. Type locality: Halmahera. NEW SYNONYMY (provisional).

Diacamma rugosum sculpturatum var. *pulchellum* Santschi, 1932, Mém. Mus. Nat. Hist. Belg. (hors ser.), 4(5): 12-13, fig. 1, worker. Type locality: Lomire, Neth. New Guinea. NEW SYNONYMY (provisional).

Diacamma rugosum geometricum, Karawajew, 1935, Treubia, 15: 62, worker.

Diacamma rugosum sculpturatum var. *papuana* Karawajew, 1935, *ibid.*, p. 67, worker. Type locality: New Guinea. *Nec Diacamma papuana* Stitz, 1911.

Diacamma rugosum subsp. *japensis* Donisthorpe, 1941, Trans. Roy. Ent. Soc. London, 91: 52, worker. Type locality: Mt. Baduri, 300 m., Japen I., Neth. New Guinea. NEW SYNONYMY (provisional).

Diacamma rugosa subsp. *smithi* Donisthorpe, 1943, Proc. Roy. Ent. Soc. London, (B)12: 115. Nom. pro *Ponera tortuolosa* Fr. Smith, 1863, *nec Ponera tortuolosa* Fr. Smith, 1858. NEW SYNONYMY (provisional).

Material examined. NETH. NEW GUINEA: Maffin Bay (6 nest series, E. S. Ross); Hollandia, 100 m. (J. L. Gressitt). N-E. NEW GUINEA: Nadzab (Wilson, nos. 1098, 1107); Lae (N. L. H. Krauss); Didiman Creek, Lae (Wilson, no. 692); Bubia (Wilson, nos. 681, 1069); lower Busu River (Wilson, nos. 992, 1008, 1020); Boana, 930 m., Bunbok Valley (Wilson, no. 1123); Goroka, 1550 m. (Gressitt); Kumur, 1000 m., upper Jimmi Valley (Gressitt); Sattelberg-Maroruo, 800-900 m. (Wilson, no. 724); Bolingbangeng-Nganduo, 900-1000 m. (Wilson, no. 731); Zingzingu, 1100 m. (Wilson, no. 766); Gemeheng, 1200-1300 m. (Wilson, no. 780); Sambeang, 400 m. (Wilson, no. 864). PAPUA: Mafulu, 1200 m. (L. E. Cheesman); Karema, Brown R. (Wilson, no. 553); Bisianumu, 500 m. (Wilson, nos. 618, 659, 669). ARU: (*sculpturatum* holotype).

Taxonomic notes. The unique worker type of *Ponera rugosa* Le Guillou was examined during a recent visit to the Muséum National d'Histoire Naturelle, Paris, and compared directly with a series from the lower Busu River, New Guinea (acc. no. 1020). The two are nearly identical, differing only in certain details of sculpturing that are undoubtedly part of the normal infra-specific variation; e.g., the type has 22 longitudinal striae between the compound eyes as opposed to 20 in the Busu River series. The Busu River series also compared closely with the worker type of *Ponera sculpturata* Fr. Smith in the Oxford University Museum.

In the author's opinion all of the Melanesian material cited in the preceding section, plus a large amount of additional Indo-Malayan material currently arranged under various varietal names of *rugosum* in the Museum of Comparative Zoology, belong to the single species *rugosum*. All of the Papuan-Moluccan forms listed in the synonymy are based on what appear to be nothing more than morphic or continuous variants, mostly in body sculpturing and size and form of the petiolar spines. Nevertheless, except in the two cases (*sculpturatum*, *divergens*) where I have seen type material, I have qualified the synonymy as provisional, since the existence of the closely related species *bispinosum* (Le Guillou) and *purpureum* (Fr. Smith) in the Moluccas suggests the possibility of the existence in New Guinea of still other sibling species that may fortuitously fit the types of one or more of the described forms.

A detailed description of variation in the Papuan-Moluccan population will not be attempted here. For an account of the extreme range of variation, particularly in body sculpturing, the reader is referred to Emery's detailed 1897 revision of *Diacamma* and subsequent descriptions of infraspecific forms by various authors.

Ecological notes. In New Guinea *rugosum* is abundant in both primary and second-growth rain forest over a wide range of elevation. At Nadzab a small colony, consisting of 20 to 25 workers and a quantity of brood in all stages of development from small larva to pupa, was found nesting in a shallow hollow in the side of a tree trunk about two meters from the ground. The ants had completely roofed over the hollow with a thin layer of vegetable debris and soil. At Didiman Creek another small colony was found nesting in a crack in a tree trunk at a point, about two meters from the ground, where the trunk had been snapped but not completely severed. The crevice, which ran horizontally into the fallen upper part of the trunk, had been filled in with vegetable debris and soil by the ants.

Workers of *rugosum* were commonly encountered during the day foraging singly on low vegetation and the trunks of trees. They were occasionally collected from as high as six meters in the tops of small, C-stratum trees but were never found in the

tops of recently felled, large, A-stratum trees. At the same time they were seldom encountered on the ground. The following prey record was made at the Busu River: a worker was collected as it was running up a tree trunk with a scolytid beetle in its mandibles. At Zingzingu workers were observed seemingly in the act of attending extrafloral nectaries on low herbaceous vegetation.