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ANTS OF KRAKATAU AND  
OTHER ISLANDS IN THE  
SUNDA STRAIT

BY

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## ANTS OF KRAKATAU AND OTHER ISLANDS IN THE SUNDA STRAIT.

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Dr. K. W. DAMMERMAN of the Buitenzorg Museum has sent me for identification a collection of ants of peculiar interest, because they were taken during 1919-'21 on Krakatau and adjacent islands, which suffered so severely in the terrible volcanic eruption of 1883. During that catastrophe Krakatau, Verlaten and Lang Islands had their fauna and flora completely destroyed and even Sebesi, at a distance of 15 km. seems to have retained little if any part of its original biota <sup>1)</sup>. Within more recent years a study of the plants and animals that are gradually repeopling the islands has attracted a number of enthusiastic Dutch biologists. A full and interesting description of their labors and of the present fauna and flora have been published by W. DOCTERS VAN LEEUWEN and DAMMERMAN <sup>2)</sup>, so that I need not dwell on this aspect of the subject. Through the latter's courtesy, I reproduce his outline map of Sunda Strait, indicating for the specimens recorded in the following pages the localities and their distances from the shores of Java and Sumatra. Fifteen years ago JACOBSON <sup>3)</sup> collected the ants on Krakatau, Verlaten and Lang Islands and the specimens were described by FOREL in a short paper published in 1909 <sup>4)</sup>. I have included these records in my list and have appended a few general remarks suggested by a study of the materials collected by Dr. DAMMERMAN and a perusal of his valuable paper.

### Taxonomic Notes and Descriptions.

#### FAMILY FORMICIDAE.

#### Subfamily Dorylinae.

(1). *Dorylus (Dichthadia) laevigatus* F. SMITH. — Numerous workers from Sebesi, April 1921 (K. W. DAMMERMAN).

<sup>1)</sup> For a very brief account, with maps, of Krakatau before and since the eruption, see Grabau's Comprehensive Geology, 1920, Vol. I, pp. 137—140.

<sup>2)</sup> W. DOCTERS VAN LEEUWEN, The Flora and the Fauna of the Islands of the Krakatau-Group in 1919. Ann. Jard. Bot. Buitenzorg 31, 1921, pp. 103—140, 6 pls.; K. W. DAMMERMAN, The Fauna of Krakatau, Verlaten Island and Sebesy. Treubia, 3, 1922, pp. 61—112, 1 map.

<sup>3)</sup> E. JACOBSON, De nieuwe fauna van Krakatau. Jaarb. Topograph. Dienst 1908, Batavia, 1909.

<sup>4)</sup> A. FOREL, Ameisen aus Java und Krakatau beobachtet und gesammelt von Herrn E. JACOBSON. Notes Leyden Mus. 31, 1909, pp. 221—232.

## Subfamily Ponerinae.

(2). *Rhopalopone dammermani* sp. nov.

*Worker.* Length 2.3 mm.

Head nearly one third longer than broad, a little broader behind than in front with feebly convex sides and feebly and broadly excavated posterior border, the posterior corners rather acute. Eyes present but very small, consisting of some 7 or 8 facets, situated just in front of the median transverse diameter of the head. Mandibles rather convex and deflected, with straight, very minutely and unevenly denticulate apical borders, the external borders sinuate at the middle. Clypeus convex in the middle, its anterior border depressed, entire and broadly rounded, very feebly produced in the middle. Frontal carinae very short. Antennal scapes somewhat curved, nearly reaching the posterior corners of the head; second funicular joint longer than broad, almost as long as the two succeeding joints together, joints 3-8 subequal, slightly broader than long, two basal joints of club longer than broad, together shorter than the terminal joint. Thorax as long as the head including the mandibles, broadest in front, where it is, however, somewhat narrower than the head. Promesonotal suture indistinct, meso-epinotal suture obsolete. The upper surface in profile is nearly straight, with very feeble mesoepinotal impressed. Epinotum with subequal base and declivity, the latter sloping, laterally marginate, with a small, sharp tooth on each side above. Petiole from above transverse but less than one and one half times as broad as long, rounded in front and above, straight behind, with a distinct anteroventral tooth and a small tooth on each side of its anterior dorsal surface. Postpetiole as long as broad, slightly broader behind than in front and only one third again as broad as the petiole. First gastric segment convex, narrower and shorter than the postpetiole. Legs moderately long, hind coxae with long, slender, rather blunt spines.

Mandibles shining, sparsely and coarsely punctate. Clypeus smooth and shining in the middle, laterally somewhat irregularly rugose. Head subopaque, covered with elongate foveolae so close together that the raised areas between them form indistinctly longitudinal rugae. These areas in certain lights seem to be longitudinally striolate. Thorax somewhat more shining than the head, but with similar sculpture, though the foveolae are somewhat coarser. There is a small, smooth, shining area in the middle of the base of the epinotum. The pleurae appear to be more coarsely longitudinally rugulose, the epinotal declivity scarcely more shining than the thoracic dorsum. Petiole and postpetiole somewhat more shining than the thorax, covered with coarse and more widely spaced foveolae, gaster very shining, with still sparser foveolae, most numerous near its anterior border. Legs and scapes rather shining, covered with minute piligerous punctures.

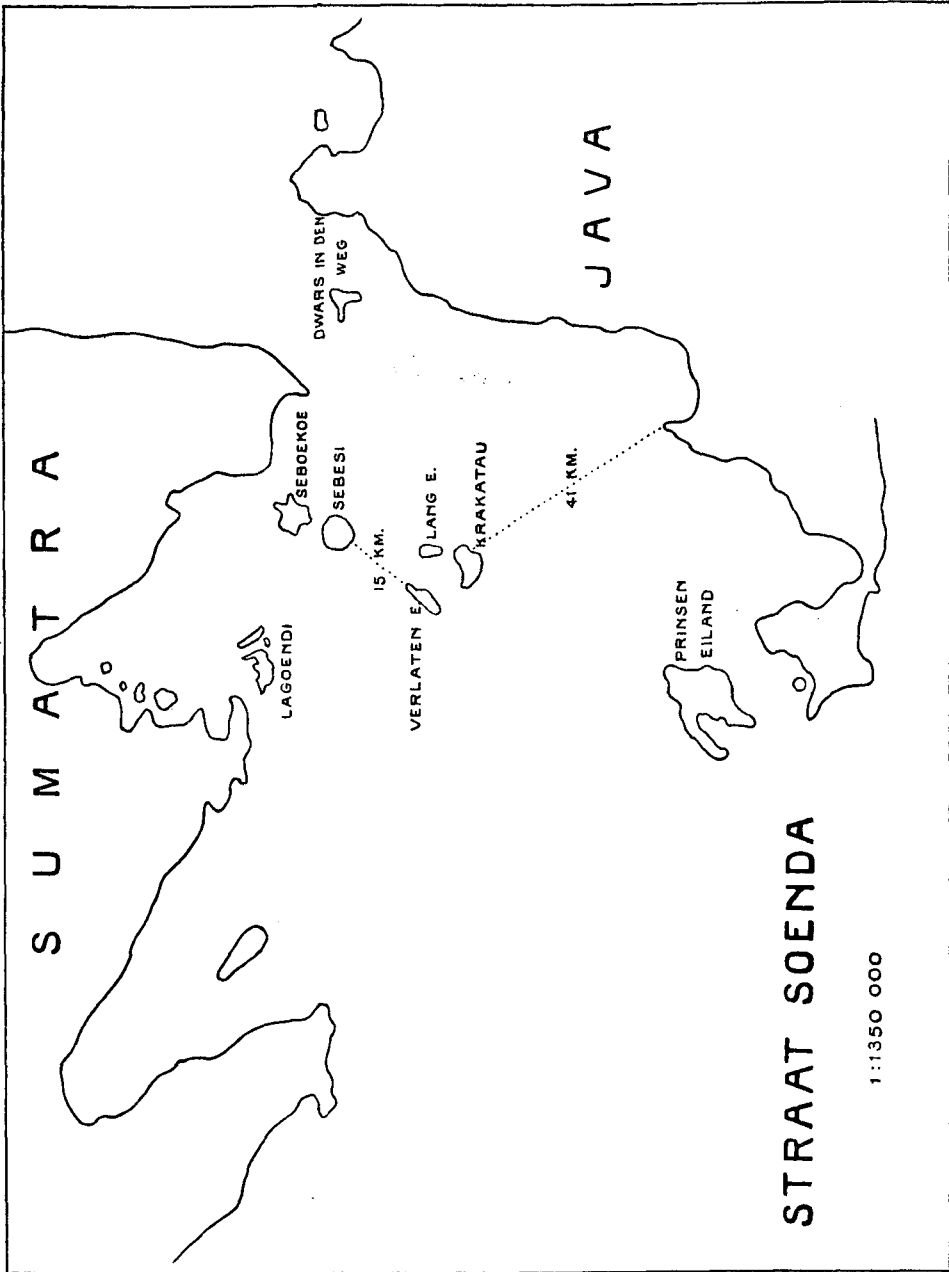
Hairs grayish, delicate, uneven, erect on the body, somewhat shorter, more abundant and more reclinate on the appendages.

Black; clypeus red; mandibles, antennae and legs yellowish brown.

A single specimen from Sebesi, Sept. 29, 1920 (DAMMERMAN).

This species seems to be most closely related to *Rh. malaënsis* MANN from the British Solomon Islands, but is somewhat smaller, darker, and has the epinotum dentate on the sides. The workers of the six known East Indian and Papuan species of *Rhopalopone* may be separated by means of the following table:

- |    |  |                      |
|----|--|----------------------|
| 1. | Body ferruginous or reddish yellow. . . . .  | 2.                   |
|    | Body fuscous or black . . . . .  | 3.                   |
| 2. | Larger (2.7-2.8 mm.); epinotum not smooth and shining above; petiole foveolate, or coarsely punctate (Borneo). . . . . | <i>diehli</i> FOREL. |



Map of Sunda Strait, with the Krakatau Islands.

- Smaller (1.75 mm.); epinotum smooth and shining above and behind; petiole not punctate (New Guinea) . . . . . *epinotalis* EMERY.
3. Head nearly as broad as long; antennal scapes surpassing the posterior corners of the head. Length at least 3 mm. (3—3.6 mm.) (New Guinea). . . . . *major* EMERY.
- Head  $\frac{1}{4}$  to  $\frac{1}{3}$  longer than broad; antennal scapes not reaching the posterior corners of head. Length less than 3 mm. . . . . 4.
4. Eyes absent; mandibles edentulous; promesonotum with a shining median line (New Guinea) . . . . . *cribrata* EMERY.
- Eyes present; mandibles minutely denticulate; promesonotum without a shining median line . . . . . 5.
5. Dark fuscous; epinotum edentate, without a small shining area at the base; petiole more than twice as broad as long, postpetiole twice as broad as the petiole. Length 2 mm. (Solomon Islands). . . . . *malaënsis* MANN.
- Black; epinotum dentate, with small shining area at base; petiole less than twice as broad as long; postpetiole less than twice as broad as petiole. Length 2.3 mm. (Sebesi Island) *dammermani* sp. nov.

(3). *Odontoponera transversa* F. SMITH. — Three workers from Krakatau, Oct. 23, 1921 and a single worker from Sebesi (DAMMERMAN).

(4). *Diacamma rugosum* LE GUILL. subsp. *geometricum* F. SMITH var. *anceps* EMERY. — Four workers from Sebesi, Oct. 1921 (DAMMERMAN).

(5). *Euponera (Mesoponera) rubra* F. SMITH var. *javana* FOREL. — Five workers from Sebesi, Apr. and Oct. 26, 1921 (DAMMERMAN).

(6). *Euponera (Brachyponera) luteipes* MAYR. — Numerous workers, males and deälated females from Krakatau, Apr. 1920, Verlaten I., Apr. 1920 and Oct. 24, 1921, Prinsen I., Jan. 20—21, 1922 and Sebesi, Sept. 29, 1920, Apr. 1921, Jan. 25, 1922 (DAMMERMAN).

(7). *Ponera confinis* ROGER var. *javana* FOREL. — Many workers and deälated females from Krakatau, Dec. 1919, Apr. 1920, Verlaten I., Oct. 24, 1921, and Sebesi, Jan. 25 and Oct. 26, 1921 (DAMMERMAN).

The workers agree closely with a cotype of this variety in my collection. The female is very similar, but the head and abdomen are rather dark brown; the eyes are large and fully twice as long as their distance from the anterior corners of the head; the epinotal declivity is more abrupt and the petiole is somewhat thinner in profile than in the worker. The pubescence, especially on the abdomen, is longer, denser and more conspicuous.

(8). *Anochetus punctiventris* MAYR. subsp. *taylori* FOREL. — Three workers from Prinsen I., Jan. 20, 1922 (DAMMERMAN).

(9). *Anochetus graeffei* MAYR. — A single worker from Sebesi, Sept. 1920 (DAMMERMAN).

(10). *Odontomachus haematoda* L. — Three workers and a male from Krakatau, Dec. 1919 and four workers from Sebesi, Sept. 29, 1920 (DAMMERMAN).

The specimens represent a rather small form, the workers measuring somewhat less than 9 mm. and resembling the neotropical subsp. *insularis* GUÉRIN. The male has colorless wings and the proportions of the antennal scapes and first funicular joint are those of true *haematoda*.

(11). *Odontomachus haematoda* L. var. *fuscipennis* FOREL. — One female from Sebesi, Apr. 1921 (DAMMERMAN).

#### Subfamily Pseudomyrminae.

(12). *Tetraoponera rufonigra* JERDON. — Two workers from Krakatau, Dec. 1919 and a dealated female from Verlaten I., Dec. 1919. This species was previously taken by JACOBSON on Krakatau (1908).

(13). *Tetraoponera nigra* F. SMITH subsp. *thagatensis* FOREL. — Recorded by JACOBSON from Krakatau and Lang I. (1908).

(14). *Tetraoponera siggii* FOREL. — One dealated female taken on Krakatau, Sept. 1920 and a worker from the same island, Oct. 23, 1921 (DAMMERMAN). Previously recorded by JACOBSON (1908) from Krakatau and Lang I.

#### Subfamily Myrmicinae.

(15). *Pheidole megacephala* FABR. — Two soldiers and four workers from Verlaten I., Dec. 1919 and Oct. 24, 1921 (DAMMERMAN).

(16). *Pheidole plagiaria* F. SMITH. — Two workers from Sebesi, May 25 and Oct. 26, 1921 (DAMMERMAN).

(17). ***Pheidole miseranda* sp. nov.**

*Soldier.* Length 2.2 mm.

Allied to *Ph. capellinii* Emery. Head very large, slightly longer than broad, with well-developed anterior angles, slightly narrowed at the occipital lobes, the sides evenly convex, the posterior border deeply and angularly excised, the occipital region distinctly impressed in the middle, with the occipital groove deep and broad only behind. In profile the head is somewhat less compressed behind than in front. Gular teeth well-developed, acute. There are no scrobes, but only shallow impressions for the antennae. Eyes moderately large, feebly convex, just in front of the median third of the sides. Mandibles large and convex, with two large apical and two smaller basal teeth. Clypeus short laterally, sharply carinate in the middle, its anterior border scarcely sinuate. Frontal area subtriangular, distinct, impressed, with a median carinula. Frontal carinae short, somewhat diverging behind, scarcely longer than half the antennal scapes, which reach only a little beyond the middle of the sides of the head. The scapes are slender, curved but terete at the base; the club is about as long as the remainder of the funiculus; joints 2-7 of the latter small and subequal, nearly as long as broad. Thorax small,

much shorter than the head and not half as broad; the pro- and mesonotum in profile together form a very convex hemispherical mass, the pronotum with very pronounced, projecting humeri (as in *capellinii*), the mesonotum short, abrupt, in profile slightly angular, distinctly carinate on each side, descending to the deep mesoëpinotal constriction. Epinotum small, much lower than the promesonotum, as long as high, about two-thirds as broad as the pronotum through the humeri, the base and declivity subequal, the former horizontal, the latter steep, not concave, the spines only about half as long as the base, suberect, somewhat longer than broad at their bases and rather acute. Petiole narrow, pedunculate, the node produced into a bluntly conical point above, which is turned slightly forward so that the anterior slope of the petiole is decidedly concave. Postpetiole nearly half again as broad as the petiolar node and nearly twice as broad as long, broadest in front where its corners are slightly produced and bluntly angulate. Gaster broadly elliptical, much smaller than the head. Legs moderately long and robust.

Mandibles very smooth and shining, sparsely punctate at the base externally strongly striate. Clypeus finely longitudinally rugulose, most distinctly on the sides. Head subopaque, the occiput more shining; the whole dorsal surface finely and densely punctate and rather regularly and finely longitudinally rugose, the rugae being fainter on the antennal impressions. On the extreme occipital lobes the rugae die out and are replaced by a few coarse longitudinal foveolae. Thorax, petiole and postpetiole subopaque, very densely, finely and evenly punctate. Gaster smooth and shining, with scattered piligerous punctures, but the basal third of the first segment is subopaque and densely punctate.

Hairs yellow, rather coarse and uneven, scattered, short on the head, more erect and longer on the thorax and especially on the gaster, very short and oblique on the appendages. Pubescence imperceptible.

Rather deep ferruginous; borders of mandibles blackish; posterior three fourths of head, except the frontal region, anterior half of pronotum above, upper surface of epinotum, pedicel and gaster, except the base of the first segment, darker, castaneous. Legs and antennae a little paler than the ground color of the body; middle portions of femora infuscated.

Described from a single specimen taken on Krakatau, Dec. 1919 (DAMMERMAN).

Although this species seems to be allied to EMERY'S *Ph. capellinii* from Java, it differs in its much smaller size, much shorter frontal carinae, larger eyes, conical petiolar node, more trapezoidal postpetiole, darker color, etc.

(18). ***Pheidole dammermani* sp. nov.**

*Soldier.* Length 1.8 mm.

Head shaped somewhat like that of *Ph. megacephala* FABR., slightly longer than broad, with rounded sides and rather deeply and angularly excised posterior border, not broader behind than in front, convex in the frontal region, with a small but distinct impression in the region of the rather deep occipital groove. Eyes small and rather flat, just in front of the anterior third of the head. Mandibles convex, with two blunt apical teeth and a blunt basal tooth. Clypeus rather flat, with a median tubercle behind, its anterior border emarginate in the middle and on each side so that it appears bluntly bidentate. Frontal area impressed, semicircular, striated; frontal carinae slightly longer than the scapes, nearly straight, diverging behind and bordering flattened spaces for the accommodation of the antennae. Scapes slender, terete, slightly curved at the base and less than half as long as the head; joints 2—8 of the funiculus very small, broader than long; club very nearly as long as the remainder of the funiculus, the two basal joints longer than broad, together shorter than the terminal joint. Thorax through the pronotum about half as broad as the head, the pronotum very broad, transverse, with projecting rounded humeri. Mesonotum rapidly sloping, without transverse swelling or sulcus, merely continuing the outline of the pronotum. Epinotum small, cuboidal, much lower than the

promesonotum, with subequal base and declivity, longitudinally concave in the middle, the spines reduced to acute triangular, rather erect teeth, which are as broad at the base as long and much shorter than their distance apart. Petiole from above parallel-sided, less than twice as long as broad, its node compressed anteroposteriorly, with rounded, entire superior border. Postpetiole transverse, convex, fully half again as broad as the petiole, nearly twice as broad as long, with bluntly rounded anterior angles. Gaster broadly elliptical, somewhat flattened, its anterior border slightly truncated. Legs moderately long, the femora and tibiae somewhat thickened in the middle.

Shining; mandibles with a few small, scattered punctures, the bases slightly striated externally. Clypeus smooth and shining in the middle, the sides longitudinally rugulose. Head covered with sharp longitudinal rugae which are rather far apart, diverge very slightly behind and disappear on the posterior border and corners where there are a few large, scattered and rather shallow punctures. The interrugal spaces are very indistinctly and superficially reticulate. Thorax smooth and shining, except the mesopleurae and epinotum which are superficially punctate or reticulate, without being opaque. Pedicel and gaster smooth and shining.

Hairs yellowish, erect, sparse, of uneven length, most numerous on the head and gaster, very short, fine and rather oblique on the appendages.

Brownish yellow, gaster and in some specimens the postpetiole and petiolar node fuscous; mandibles red, their borders and that of the clypeus darker; antennae and legs yellow.

*Worker.* Length 1.2 mm.

Head subrectangular, scarcely longer than broad, with rounded posterior corners and sides and straight posterior border. Eyes small and rather flat, just in front of the middle of the head. Mandibles with several indistinct denticles. Clypeus moderately convex, ecarinate, its anterior border straight and entire in the middle, very feebly sinuate on each side. Frontal area distinct, like that of the soldier, but not striated; frontal groove lacking; frontal carinae very short. Antennal scapes extending somewhat beyond the posterior corners of the head. Pro- and mesonotum together forming a single hemispherical mass, the former without prominent humeri. Epinotum like that of the soldier, but the teeth are very small and erect. Petiole like that of the soldier; postpetiole small, transversely elliptical, scarcely broader than the petiole. Gaster and legs resembling those of the soldier but the femora and tibiae less thickened.

Head smooth and shining, with a few longitudinal rugae on the cheeks. Sculpture of the remainder of the body as in the soldier, except that the puncturation of the mesopleurae and epinotum is more pronounced, so that these parts are somewhat opaque.

Pilosity as in the soldier but less abundant.

Yellowish brown; anterior portions of head, mandibles, thorax behind the pronotum, petiole and postpetiole paler and more yellowish; gaster castaneous; appendages yellow.

Described from four soldiers and a worker taken on Sebesi, Jan. 25 and 26, 1921 by Dr. DAMMERMAN. He has also sent me two soldiers and five workers taken on Klein Kombuis Island in the Java Sea (Nov. 11, 1920).

This minute species is unlike any Pheidole of which I have seen specimens or descriptions. It somewhat resembles *Ph. sauteri* WHEELER of Formosa, but is decidedly smaller and has a very different sculpture. It is not related to other small East Indian species such as the one described above, *parva* MAYR, *mus* FOREL, *tanjongensis* FOREL, *buttcli* FOREL, *simoni* EMERY, etc.

(19). *Crematogaster ferrarii* EMERY. — Two workers from Krakatau. Dec. 1919; one worker from Verlaten I., Oct. 24, 1921 (DAMMERMAN).



The two workers from Krakatau are very small ( 2 mm.), the one from Verlaten I. nearly 3 mm. The type from Siboga, Sumatra, according to EMERY, measured  $3 \frac{1}{3}$  mm. In other respects the specimens taken by Dr. DAMMERMAN agree perfectly with EMERY's description and his figure of the petiole and postpetiole.

(20). *Crematogaster dohrni* MAYR subsp. *artifex* MAYR. — Recorded from Krakatau by JACOBSON (1908).

(21). *Crematogaster dohrni* MAYR subsp. *rogenhoferi* MAYR var. *fabricans* FOREL. — Numerous workers, males and winged females from Krakatau, Dec. 1919 and Sept. 1920 (DAMMERMAN).

The workers agree with FOREL's description of the types from the crater of Mt. Oenganran, Java, but there is some variation in coloration and cephalic sculpture, certain specimens being darker, others having the head more opaque.

The females measure 7—8 mm. and are colored like the workers, with whitish wings, colorless veins and pterostigma. The sculpture of the head is scarcely finer than in the typical *rogenhoferi*. The males do not exceed 3 mm. and are sordid yellow, with the gaster brownish, the head dark brown behind, the antennae and legs whitish like the wings.

(22). *Crematogaster (Physocrema) deformis* F. SMITH. — Seven workers from Krakatau, Sept. 1920 (DAMMERMAN).

(23). *Monomorium minutum* MAYR subsp. *lilioukalau* FOREL var. *javanum* FOREL. — Recorded from Krakatau by JACOBSON (1908).

(24). *Monomorium pharaonis* L. — A single worker from Krakatau, Sept. 1920; three workers from Verlaten I., Oct. 24, 1921; three workers from Sebesi Oct. 28, 1921 and two from Prinsen I., Jan. 20, 1922 (DAMMERMAN).

(25). *Aneleus similis* MAYR. — Two workers from Prinsen I., Jan. 20, 1922 (DAMMERMAN).

(26). *Aneleus pygmaeus* EMERY var. *simalurensis* FOREL. — Numerous soldiers, workers and males from Sebesi, May and Oct. 26, 1921 (DAMMERMAN).

*Male* (undescribed). Length: 4.5—5 mm.

Head through the eyes broader than long, short and rounded behind, the cheeks short, the eyes and ocelli large and convex. Mandibles well-developed, 5-toothed, the apical tooth long and curved. Clypeus very convex in the middle, its anterior border entire in middle, sinuate on each side. Frontal groove broad and distinct. Antennal scapes stout and short, barely twice as long as broad, funiculi long, first joint small, nearly twice as broad as long, remaining joints rather long, cylindrical, the second distinctly longer than the third, Mesonotum large, convex, somewhat overarching the small pronotum, smooth and rounded, without Mayrian furrows, about two-thirds longer than broad. Scutellum convex, projecting. Epinotum shaped somewhat like that of the soldier but more sloping and with the teeth much stouter and blunter. Petiole and postpetiole also similar but the node of the former less compressed anteroposteriorly, the latter nearly half again as broad as the petiole. Gaster with well-developed cerci

and large exerted genitalia, the outer appendages of which are straight, with rather slender, pointed tips, the median appendages with short acute lateral and long blade-shaped internal rami. Legs slender. Wing venation as in *Pheidologeton* and *Oligomyrmex*, with closed submarginal cell and a small discoidal cell.

Shining; head more opaque, densely and indistinctly punctate. Mesonotum coarsely punctate. Epinotum obscurely and finely punctate-rugulose.

Hairs yellowish, abundant but rather short on the head, thorax and gaster; pubescence on the appendages, gaster, gula and pleurae longer and more abundant than in the soldier.

Black or dark brown; mandibles, antennae and legs pale brown; genitalia sordid whitish brown. Wings distinctly infuscated, with dark brown veins and stigma.

Numerous soldiers, workers and males from Sebesi (DAMMERMAN).

Although a dozen species of *Aneleus* have been described from the Indomalayan and Ethiopian regions, the male of the genus has not been seen heretofore. As EMERY surmised, it closely resembles the male of *Oligomyrmex*. The discoidal cell of the wings is as in that genus and proportionally smaller than in *Pheidologeton*.

(27). *Myrmecina nesaea* sp. nov.

*Female* (deälated). Length 2.2 mm.

Head as broad as long and as broad in front as behind, with convex sides and posterior corners and broadly concave posterior border. Eyes rather large and moderately convex, about one fifth as long as the sides of the head and situated a little in front of its median transverse diameter. Mandibles with rather oblique apical borders bearing two small acute terminal and four or five indistinct basal denticles. Clypeus short, rather flat, without carinae, but somewhat elevated on the sides and behind, its anterior border transverse, sinuate on each side, with a very small median denticle. Frontal area distinct, short and transverse, crescentic; frontal groove lacking; frontal carinae short, subparallel, widely separated. Antennal scapes scarcely reaching the posterior corners of the head; joints 2-7 of the funiculus very transverse, more than twice as broad as long; two basal joints of club not longer than broad, together much shorter than the swollen terminal joint. Thorax short and convex, slightly narrower than the head. Epinotum without any traces of small basal teeth, the spines short, acute, a little longer than broad at their bases. Petiole square, as broad as long; postpetiole a little broader, broader than long, more rounded anteriorly and on the sides. Gaster subcircular, convex, its anterior border somewhat truncated. Legs moderately long, the femora and tibiae only slightly thickened, the former curved at their bases.

Smooth and shining; mandibles with a few small, scattered piligerous punctures. Head very finely and densely punctate but shining; pronotum and pleurae irregularly and rather coarsely punctate-rugose; mesonotum smooth and shining in front, the posterior half with four strong longitudinal rugae converging to the scutellum, which bears six somewhat finer rugae. Sculpture of the petiole and postpetiole similar to that of the scutellum. Gaster, legs and antennal scapes very smooth and shining, with numerous very fine piligerous punctures.

Pilosity white, suberect, rather long and fine, of uneven length, conspicuous and abundant on the body and scapes, shorter and somewhat more reclinate on the legs.

Black, with a reddish tinge; mandibles, clypeus, cheeks, tip of gaster, antennae and legs, including the coxae, red.

A single specimen from Sebesi, Oct. 26, 1921 (DAMMERMAN).

This may be the hitherto unknown female of *M. semipolita* FÖREL, described from Buitenzorg, but judging from FÖREL's description the sculpture of the head and thorax is different and the pilosity is certainly longer.

(28). *Dilobocondyla sebesiana* sp. nov.

*Female* (deälated). Length nearly 6.5 mm.

Head almost square, very slightly longer than broad and slightly broader behind than in front, with acutely pointed posterior corners and broadly excised posterior border. Mandibles large and convex, with three large apical and a few indistinct basal teeth. Clypeus rather flat, with a median carina and an abbreviated costa on each side, the anterior border distinctly notched in the middle and sinuate on each side. Frontal area triangular, longer than broad; frontal carinae rapidly diverging behind, extending nearly to the posterior fourth of the head, forming the inner borders of distinct but not very deep scrobes for the antennal scapes. Eyes moderately large and convex, in front of the median transverse diameter of the head. Antennae short, scapes slightly curved, reaching nearly to the posterior third of the head; funicular joints 2-7 broader than long, joint 8 as long as broad, 9-11 longer than and forming a rather distinct club. Thorax evenly convex above, narrower than the head, broader in front than behind, humeral angles obtuse. Epinotum rounded and convex, without distinct base and declivity, the metasterna prominent, rounded. Petiole cylindrical, from above oblong, nearly two and one-half times as long as broad, with parallel sides, in profile slightly arcuate, without a node, its ventral border at the anterior end with a well-developed, anteriorly directed tooth. Postpetiole broader than the petiole, longer than broad, broader and higher behind than in front, with a small, acute anteroventral tooth. Gaster broadly and regularly elliptical, not larger than the head, formed very largely by the first segment. Femora strongly and abruptly incrassate beyond their basal third, which is slender. Tibiae only slightly thickened, tarsi slender.

Shining; mandibles strongly striate; surface of clypeus uneven, indistinctly longitudinally rugose on the sides. Head coarsely and rather loosely rugose, the rugae on the upper surface longitudinal, diverging behind, on the sides and behind more reticulate, the interrugal spaces rather smooth on the front, vaguely and finely punctate. Sculpture of thorax and petiole similar to that of the head, the rugae on the mesonotum and scutellum longitudinal, on the pronotum, pleurae, petiole and postpetiole reticulate, on the postpetiole feebler than on the thorax. Gaster subopaque, finely and densely reticulate, the base of the first segment sharply longitudinally rugulose or striate. Coxae finely reticulate, remainder of legs shining.

Body and appendages covered with moderately abundant, stiff, rather obtuse, yellow hairs.

Ferruginous, gaster paler and more yellowish; antennal funiculi, mandibular teeth and wing insertions black; legs yellowish, except the tarsi, the knees of the fore pair and the knees and tibiae of the middle and hind pairs, which are ferruginous.

A single specimen from Sebesi. (DAMMERMAN).

All the species of *Dilobocondyla* seem to be rare and very local ants and are therefore known mostly from single specimens. Like the species of the allied genus *Podomyrma* they nest as rather small colonies in the wood of living trees. The following table will facilitate the identification of the workers and females. It includes also two hitherto unknown Javan and Philippine species, descriptions of which follow the table.

- |   |    |
|---|----|
| 1. Frontal carinae not continued to the posterior corners of the head, antennal scrobes only moderately deep: . . . . . | 2. |
| Frontal carinae sharp, continued to the posterior corners of the head, scrobes deeper . . . . .                         | 5. |

2. Body brownish black, petiole not twice as long as broad. Worker 4.5 mm. (Borneo) . . . . . *borneensis* WHEELER.  
 Body ferruginous or yellowish brown, petiole longer . . . . . 3.
3. Thorax and pedicel opaque. Worker 4.5 mm. (Java) *karnyi* sp. nov.  
 Thorax and pedicel shining . . . . . 4.
4. Frontal carinae nearly reaching the posterior corners of the head.  
 Worker 3.5 mm. (Ceylon) . . . . . *escherichi* FOREL.  
 Frontal carinae nearly reaching the posterior fourth of the head. Female  
 6.5 mm. (Sebesi I., Sumatra) . . . . . *sebesiana* sp. nov.
5. Large species, worker 9.6 mm. (Simalur I., Sumatra) *simalurana* FOREL.  
 Much smaller species, worker not exceeding 6 mm. . . . . 6.
6. At least the head black . . . . . 7.  
 Head ferruginous or brown, like the remainder of the body . . . 8.
7. Whole body black; gaster opaque. Female 4.75 mm. (Celebes) . . .  
 . . . . . *selebensis* EMERY.  
 Head and gaster black, gaster smooth and shining. Worker 5.8 mm.  
 (Tonkin). . . . . *fouqueti* SANTSCHI.
8. External borders of mandibles slightly sinuate, mesoëpinotal constriction  
 distinct, pronotum decidedly broader than long. Worker aver-  
 ages 4 mm. . . . . 9.  
 External borders of mandible not sinuate, mesoëpinotal constriction very  
 feeble, pronotum nearly as long as broad. Worker not exceeding  
 3.25 mm. (Philippines). . . . . *chapmani* sp. nov.
9. Mandibles with 5 distinct teeth; gaster longitudinally striate. Worker  
 4.5 mm. (New Guinea). . . . . *cataulacoidea* STITZ.  
 Mandibles with only the two apical teeth distinct; gaster striate only  
 at base. . . . . 10.
10. Thirteen strong rugae between frontal carinae; posterior corners of  
 head directed backward. Worker about 4.5 mm. (New Guinea)  
 . . . . . var. *concolor* VIEHMEYER.  
 Fifteen to seventeen strong rugae between frontal carinae; head shorter,  
 its posterior corners directed obliquely outward; sculpture feebler,  
 petiole longer, gaster blackish brown. Worker 3.25—3.75 mm.  
 (Singapore) . . . . . var. *fulva* VIEHMEYER.

(29). ***Dilobocondyla karnyi* sp. nov.**

*Worker.* Length 4.5 mm.

Head slightly longer than broad, a little broader behind than in front, with straight cheeks, acutely dentate posterior corners and broadly and not very deeply excised posterior border. Eyes moderately large and convex, just in front of the middle of the sides. Mandibles distinctly 6-toothed, but the teeth are narrow and crowded. Clypeus rather flat, with a delicate median and two lateral ridges, the anterior border nearly straight, feebly emarginate in the middle. Frontal area distinct, triangular, slightly longer than broad. Frontal carinae diverging behind, extending only to the posterior fourth of the head. Antennae slender, somewhat curved at the base, their tips reaching only one third the distance from the posterior orbit to the posterior corner of the head.

Thorax broad through the pronotum which is convex and rounded above and separated anteriorly from the neck by a sharp transverse carina and truncated surface. Mesoëpino-otal region distinctly and broadly constricted both dorsally and laterally, the epinotum with long convex base and very short, abrupt, concave declivity, the metasternal angles lamellate and rounded. Petiole of the usual cylindrical shape, more than twice as long as broad, distinctly arcuate in profile, with a strong anteroventral tooth. Postpetiole highest behind, from above a little longer than broad, broader behind than in front, less than half again as broad as the petiole, its sides rather rounded. Gaster subcircular, rather convex above, somewhat smaller than the head. Femora and tibiae incrassated as in the preceding and following species.

Head, legs and truncated anterior surface of pronotum shining, remainder of body opaque. Mandibles sharply striate; clypeal surface rather uneven, indistinctly striolate. Head covered with reticulate rugae, which have rather uniform meshes and a distinct longitudinal trend only on the front. The interrugal spaces are shining and superficially punctate or uneven. The surface of the thorax, pedicel and gaster is opaque, without discernible finer sculpture, except the gaster, which is very finely reticulate and has sharp radiating striae at the base. There is no sculpture on the mesopleurae and epinotal declivity which are merely opaque, but the remainder of the thorax is coarsely and loosely reticulate-rugose, the rugae being distinctly blunter than on the head, somewhat longitudinal on the pro- and mesonotum and transverse on the base of the epinotum. The rugae on the petiole and postpetiole are similar, but longitudinal, more numerous on the latter. Knees and tibiae finely reticulate, especially on their extensor surfaces.

Pilosity as in *sebesiana*, but longer, somewhat more abundant and softer.

Ferruginous, head and mandibles a little paler, vertex, thoracic rugae and posterior portions of gastric segments fuscous. The borders of the latter are paler and have a golden yellow reflection. Scapes, basal funicular joint and tip of terminal joint yellow, remainder of funiculi dark brown. Legs yellow, knees, bases of femora, tibiae and metatarsi dark brown.

A single specimen taken by Dr. KARNY at Depok, Java „on trees among dead leaves” and sent me by Dr. DAMMERMAN.

(30). *Dilobocondyla chapmani* sp. nov.

*Worker.* Length 3.2—3.5 mm.

Head very slightly longer than broad, somewhat broader behind than in front, with acute projecting posterior corners and moderately large, rather convex eyes, placed just in front of the middle of the sides. Mandibles with two large apical and three or four smaller and more indistinct basal teeth, the external borders convex, not sinuate. Clypeus convex behind in the middle, flattened in front, its anterior border straight and uneven, but entire. Frontal area distinct, triangular, longer than broad, frontal carinae very strong, diverging behind, reaching the posterior corners of the head and forming the inner borders of deep scrobes for the antennae. The curvature of the frontal carinae is much like that of *cataulacoidea* STITZ. Antennae short, scapes curved at the base, their tips reaching only one third the distance between the eyes and the posterior corners of the head; joints 2—8 of the funiculi distinctly broader than long, two basal joints of club subequal, longer than broad, together equal to the terminal joint, the whole club being about as long as the remainder of the funiculus. Thorax shaped very much as in *cataulacoidea* but without traces of the promesonotal and mesoëpino-otal sutures and with only a very faint impression in the mesoëpino-otal region, so that the dorsal outline is nearly straight and uninterrupted in profile. The epinotum has a subequal base and declivity, meeting at a rounded angle. The pronotum from above is nearly as long as broad (broader in *cataulacoidea*) and the humeral angles are small and rather acute, Metasternal angles prominent, lamellate and rounded. Petiole cylindrical, from above parallel-sided,

twice as long as broad, in profile arcuate and furnished with a pronounced anteroventral tooth, which is directed forward. Postpetiole about half again as broad as the petiole, slightly longer than broad, a little broader behind than in front, with a distinct bluntly angular node, so that the height of the segment in the middle is equal to its length. Its anteroventral border bears a small acute tooth. Gaster nearly circular, somewhat lenticular, smaller than the head. Femora much thickened beyond their basal halves, tibiae less incrassated.

Shining; gaster opaque; mandibles sharply longitudinally striate; head strongly rugose, longitudinally on the front, reticulately on the occipital region. The rugae between the frontal carinae number about 17 and are strong and regular, sometimes bifurcating posteriorly. The spaces between them are densely punctate or reticulate. Scrobes densely punctate; rugae on the cheeks and sides of head finer than on the front and though longitudinal connected by cross rugules. Thorax densely and vermiculately rugulose on the pro- and mesonotum, more loosely and coarsely on the base of the epinotum, the declivity of the latter smooth and shining. Petiole and postpetiole reticulate-rugose, the rugae distinctly longitudinal. Gaster very densely and finely punctate, its extreme base with fine radiating striae. Femora smooth and shining, knees and tibiae subopaque, finely and densely reticulate, smoother on their flexor surfaces.

Hairs white, erect, short, obtuse, rather uniformly distributed over the body, scapes and legs, as long on the appendages as on the body.

Ferruginous; anterior portion of head, clypeus, scapes, mandibles and segments of gaster beyond the first, yellow. Mandibular teeth black; funiculi, except the basal oint, dark brown; legs somewhat paler brown, the middle portions of the femora and tibiae more reddish.

Described from three specimens taken by Dr. J. W. CHAPMAN at Dumaguete, Negros Oriental, Philippines. They were nesting in the branch of a living tree.

This form is very close to STITZ's *cataulacoidea* and the two varieties *fulva* and *concolor* described by VIEHMEYER, but it is certainly distinct in many details of structure. The external borders of the mandibles of *chapmani* are not sinuate, it has a distinct frontal area, a longer pronotum, more nearly straight dorsal thoracic profile, more angular epinotum and postpetiole and there are numerous differences in sculpture. Perhaps additional material may show that the form from the Philippines is to be regarded as a subspecies of *cataulacoidea*.

(31). *Triglyphothrix lanuginosa* MAYR. — Two workers from Prinsen I. Jan. 21, 1922 (DAMMERMAN).

(32). *Tetramorium guineëense* FABR. — Four workers from Sebesi, Oct. 26, 1921 (DAMMERMAN).

(33). *Tetramorium pacificum* MAYR. — Two workers from Krakatau, May and Sept. 1920 and one from Sebesi, Oct. 26, 1921 (DAMMERMAN). Previously recorded from Krakatau by JACOBSON (1908).

(34). *Tetramorium simillimum* F. SMITH. — Two females from Sebesi, Oct. 28, 1921 (DAMMERMAN).

#### Subfamily Dolichoderinae.

(35). *Dolichoderus (Hypoclinea) bituberculatus* MAYR. — Two workers from Prinsen I., Jan. 21, 1922 and two males from Sebesi, May 1921 (DAMMERMAN).

(36). *Iridomyrmex krakatauae* sp. nov.

*Worker.* Length nearly 1.5 mm.

Head distinctly longer than broad, slightly broader behind than in front, with very feebly convex sides, rounded posterior corners and nearly straight posterior border. Mandibles small and narrow, their apical borders with numerous small, crowded denticles. Clypeus convex behind in the middle, depressed anteriorly and laterally, the anterior border nearly straight, not emarginate. Frontal area and groove lacking, frontal carinae parallel, somewhat further apart than their distance from the lateral borders of the head. Eyes moderately large, flat, their posterior orbits at the median transverse diameter of the head. Antennae slender, scapes reaching nearly to the posterior corners of the head; second funicular joint as long as broad, joints 4 and 5 longer than broad, remaining joints lacking. Thorax rather long, in profile with feeble mesoëpinotal impression. Pronotum from above one and two-thirds times as broad as long; mesonotum horizontal, slightly longer than broad and slightly broader in front than behind. Epinotum sloping, with indistinct subequal base and declivity, the former scarcely convex, rising very little above the feeble mesoëpinotal depression. Petiole lacking and gaster somewhat deflective.

Mandibles and clypeus very smooth and shining, the former with minute scattered punctures. Remainder of body somewhat shining, very finely, densely and superficially punctate.

Without pilosity, except for a row of hairs on the clypeus. Whole body pruinose with fine adherent whitish pubescence, which is longest on the gaster but nowhere completely concealing the surface.

Black, the head and thorax with faint metallic green reflections. Mandibles brown, basal three-fifths of antennal scapes, tarsi and tips of tibiae pale yellow or whitish.

A single specimen taken by Dr. DAMMERMAN on Krakatau, Sept. 1920.

I describe this form reluctantly because the specimen is imperfect, but it seems to be quite distinct from any of the known East Indian *Iridomyrmex*, in its small size, the shape of the head and thorax, and in having white bases to the antennal scapes.

(37). *Technomyrmex* sp.

A single deälated female from Krakatau, April 1920 (DAMMERMAN). It is evidently allied to *T. modiglianii* EMERY but cannot be described as a distinct form without further material.

(38). *Bothriomyrmex wroughtoni* FOREL var. *javanus* FOREL.

A single deälated female from Krakatau, April 1920 (DAMMERMAN). This species was previously recorded by JACOBSON (1908) from both Krakatau and Lang Island.

## Subfamily Formicinae.

(39). *Prenolepis (Paratrechina) longicornis* LATR. — A single worker from Verlaten I., Oct. 24, 1921 (DAMMERMAN). Previously recorded by JACOBSON (1908) from Krakatau.

(40). *Prenolepis (Nylanderia) emarginata* FOREL. — Two workers taken on Krakatau, April 1920 (DAMMERMAN).

This species was described from Bandar Baroe, Sumatra (3500 ft.), where it was taken by VON BUTTEL-REEPEN. My specimens have a peculiar metallic blue spot on the epinotal declivity, visible only in certain lights. This spot may have been overlooked by FOREL.

(41). *Prenolepis (Nylanderia) taylora* FOREL.—Four workers from Verlaten I., Oct. 24, 1921 (DAMMERMAN). Two deälated females taken on Krakatau, April 1920, evidently belong to the same species.

(42). *Prenolepis (Nylanderia)* sp.

A single, minute yellow male, scarcely more than 1 mm. long, which I am unable to identify, taken on Krakatau, Dec. 1919 (DAMMERMAN).

(43). *Plagiolepis (Anoplolepis) longipes* JERDON.—A deälated female from Krakatau, April 1920 and a winged specimen of the same phase from Sebesi, April 1921 (DAMMERMAN). Previously recorded by JACOBSON (1908) from Krakatau, Lang and Verlaten Islands. According to DAMMERMAN, this ant, known as the "gramang", is extremely abundant on Sebesi.

(44). *Oecophylla smaragdina* FABR.—Three workers from Krakatau, Sept. 1920, and a deälated female from Verlaten I., Dec. 1919 (DAMMERMAN). Previously recorded by JACOBSON (1908) from Krakatau and Lang I.

(45). *Camponotus (Myrmoturba) maculatus* FABR. subsp. *irritans* F. SMITH.—Numerous workers and females and a male from Krakatau, Dec. 1919, Prinsen Island, Jan. 20, 1922 and Sebesi, April 1921 (DAMMERMAN). Previously recorded by JACOBSON (1908) from Krakatau.

(46). *Camponotus (Myrmoturba) maculatus* FABR. subsp. *cleon* FOREL.—A winged female from Krakatau, Dec. 1919 and five winged females from Sebesi, April 1921 (DAMMERMAN), agree well with FOREL's description of specimens from Berastagi, Sumatra (4500 ft.) taken by VON BUTTEL-REEPEN.

(47). *Camponotus (Myrmamblys) bedoti* EMERY.—A minor worker from Krakatau, Dec. 1919 and one from Sebesi, April 1921 (DAMMERMAN). Previously recorded by JACOBSON (1908) from the former island.

(48). *Camponotus (Colobopsis) vitreus* F. SMITH subsp. *angustatus* MAYR.—A minor worker from Krakatau, Nov. 1920 and one from Prinsen I., Jan. 21, 1921 (DAMMERMAN). Previously recorded by JACOBSON (1908) from Krakatau.

(49). *Polyrhachis (Myrma) mayri* ROGER.—One worker from Sebesi, April 1921 (DAMMERMAN). Recorded by JACOBSON (1908) from Krakatau.

(50). *Polyrhachis (Myrma) proxima* ROGER.—One worker from Krakatau, Dec. 1919 (DAMMERMAN). Recorded by JACOBSON (1908) from the same island.

(51). *Polyrhachis (Myrma) villipes* SMITH var. *noesaënsis* FOREL.—A single worker from Sebesi, April 25, 1921 (DAMMERMAN).



(52). *Polyrhachis (Myrma) vindex* F. SMITH (= *orsyllus* F. SMITH). — A worker from Krakatau, Nov. 1920 and a dealated female from Sebesi, April 1921 (DAMMERMAN). Previously recorded from Krakatau by JACOBSON (1908).

(53). *Polyrhachis (Chariomyrma) modiglianii* EMERY. — A couple of workers from Sebesi, April 1921 (DAMMERMAN).

(54). *Polyrhachis (Myrmhopla) armata* LE GUILL. — Numerous workers and winged females from Sebesi, April 1921 (DAMMERMAN).

(55). *Polyrhachis (Myrmhopla) abdominalis* F. SMITH. — Six workers from Krakatau, Oct. 23, 1921 and a worker from Sebesi, April 1921 (DAMMERMAN).

(56). *Polyrhachis (Myrmhopla) argentea* MAYR. — A single worker from Krakatau, Dec. 1919 (DAMMERMAN).

(57). *Polyrhachis (Myrmhopla) dives* F. SMITH. — Several workers and winged females from Verlaten Island, April 1920 and a worker from Sebesi, April 1921 (DAMMERMAN). JACOBSON had previously (1908) recorded this ant from Krakatau and Verlaten I.

(58). *Polyrhachis (Myrmhopla) bicolor* F. SMITH. — Recorded by JACOBSON (1908) from Krakatau and Lang I.

(59). *Polyrhachis (Cyrtomyrma) rastellata* F. SMITH. — Recorded by JACOBSON (1908) from Lang Island.

(60). *Echinopla sucki* FOREL. — A single worker from Krakatau, Dec. 1919 (DAMMERMAN).

#### General remarks.

A list of the species recorded in the foregoing pages with their distribution among the five islands (K=Krakatau, V=Verlaten, L=Lang, S=Sebesi, P=Prinsen I.) gives the following table:

<i>Dorylus laevigatus</i>	—	—	—	S	—
<i>Rhopalopone dammermani</i>	—	—	—	S	—
<i>Odontoponera transversa</i>	K	—	—	S	—
<i>Diacamma anceps</i>	—	—	—	S	—
<i>Euponera javana</i>	—	—	—	S	—
<i>Euponera luteipes</i>	K	V	—	S	P
<i>Ponera javana</i>	K	V	—	S	—
<i>Anochetus taylori</i>	—	—	—	—	P

<i>Anochetus graeffei</i>	—	—	—	S	—
<i>Odontomachus haematoda</i>	K	—	—	S	—
<i>Odontomachus fuscipennis</i>	—	—	—	S	—
<i>Tetraponera rufonigra</i>	K	V	—	—	—
<i>Tetraponera thagatensis</i>	K	—	L	—	—
<i>Tetraponera siggii</i>	K	—	L	—	—
<i>Pheidole megacephala</i>	—	V	—	—	—
<i>Pheidole plagiaria</i>	—	—	—	S	—
<i>Pheidole miseranda</i>	K	—	—	—	—
<i>Pheidole dammermani</i>	—	—	—	S	—
<i>Crematogaster ferrarii</i>	K	V	—	—	—
<i>Crematogaster artifex</i>	K	—	—	—	—
<i>Crematogaster fabricans</i>	K	—	—	—	—
<i>Crematogaster deformis</i>	K	—	—	—	—
<i>Monomorium javanum</i>	K	—	—	—	—
<i>Monomorium pharaonis</i>	K	V	—	S	P
<i>Aneleus similis</i>	—	—	—	—	P
<i>Aneleus simalurensis</i>	—	—	—	S	—
<i>Myrmecina nesaea</i>	—	—	—	S	—
<i>Dilobocondyla sebesiana</i>	—	—	—	S	—
<i>Triglyphothrix lanuginosa</i>	—	—	—	—	P
<i>Tetramorium guineense</i>	—	—	—	S	—
<i>Tetramorium pacificum</i>	K	—	—	S	—
<i>Dolichoderus bituberculatus</i>	—	—	—	S	P
<i>Iridomyrmex krakatauae</i>	K	—	—	—	—
<i>Technomyrmex</i> sp.	K	—	—	—	—
<i>Bothriomyrmex javanus</i>	K	—	L	—	—
<i>Prenolepis longicornis</i>	K	V	—	—	—
<i>Prenolepis emarginata</i>	K	—	—	—	—
<i>Prenolepis taylori</i>	K	V	—	—	—
<i>Prenolepis</i> sp.	K	—	—	—	—
<i>Plagiolepis longipes</i>	K	V	L	S	—
<i>Oecophylla smaragdina</i>	K	V	L	—	—
<i>Camponotus irritans</i>	K	—	—	S	P
<i>Camponotus cleon</i>	K	—	—	S	—
<i>Camponotus bedoti</i>	K	—	—	S	—
<i>Camponotus angustatus</i>	K	—	—	—	P
<i>Polyrhachis mayri</i>	K	—	—	S	—
<i>Polyrhachis proxima</i>	K	—	—	—	—
<i>Polyrhachis noesaënsis</i>	—	—	—	S	—
<i>Polyrhachis vindex</i>	K	—	—	S	—
<i>Polyrhachis modiglianii</i>	—	—	—	S	—
<i>Polyrhachis armata</i>	K	—	—	S	—
<i>Polyrhachis abdominalis</i>	K	—	—	S	—

Polyrhachis argentea	K	—	—	—	—	
Polyrhachis dives	K	V	—	S	—	
Polyrhachis bicolor	K	—	L	—	—	
Polyrhachis rastellata	—	—	L	—	—	
Echinopla sucki	K	—	—	—	—	
	Total	37	11	7	30	8
JACOBSON'S List of 1908		20	2	7		

A comparison of this list with JACOBSON'S shows that Dr. DAMMERMAN has nearly doubled the number of forms from Krakatau and has much more than doubled that known from Verlaten I. He did not collect on Lang I. so that JACOBSON'S records of 1908 have undergone no increase. The number of forms from Sebesi is considerably less than that of Krakatau. DAMMERMAN undoubtedly employed more refined methods of collecting than JACOBSON, so that the increase in the number of forms from Krakatau and Verlaten may not be due entirely to more recent arrivals on the islands. He says: "The total amount of animals found on Krakatau in 1920—1921 is nearly three times that which has been found in 1908. JACOBSON recorded from Krakatau 196 species, from Verlaten I. only 29. I found on Krakatau 573 species; on Verlaten I. 325. As already mentioned this increase of species may be accounted for not only by the lapse of 13 years between the two investigations, but having occasion to visit the islands so often, I could collect many animals which were certainly already on the islands in 1908 and escaped JACOBSON'S notice because his time was so limited. Besides I used two methods of collecting, viz. trapping by light and sifting, which apparently JACOBSON could not practise during his short visit. With the light trap several species of moths were caught; by the second method I got many beetles, the total of Coleoptera from Krakatau, which was 23 in 1908, being brought up to 115, of which number nearly half was collected by sifting. Certainly a great part of the increase of species is due to these methods and the time for research being so much longer, but there are doubtless many species or even groups of animals found in 1920—1921 which probably invaded the islands after 1908".

Most of the ants in the Krakatau group are common species of wide distribution in the Indomalayan or even in the Neotropical Region. They are obviously hardy forms which can manage to survive almost anywhere in warm countries. Two species, however, *Pheidole miseranda* and *Iridomyrmex krakatauae* are described as new, but they are small forms which very probably occur also in Sumatra or Java and have been overlooked by previous collectors.

Of the 37 forms of ants from Krakatau and the 11 from Verlaten I., ten are common to both islands. This seems to be similar to the proportions among the insects in general, for DAMMERMAN says: "On Krakatau 441 species of insects altogether have been found; on Verlaten I. 238. These two islands have only 114 species in common, one fifth of the total for both islands."

The list of ants from Sebesi and Prinsen Island comprises a number of forms which are more characteristic of the adjacent Sumatran and Javan coasts. This is particularly true of Sebesi, the number recorded solely from Prinsen Island being too small to be of much importance as data in this connection. DAMMERMAN makes the following interesting statement in regard to Sebesi, a statement to some extent borne out by a study of the ants: During the eruption of 1883 Sebesy was said to be only partly devastated and at our first visit the island looked indeed rather normal, at least the northern part of it which is the best place to go ashore. According to our presumption, the vegetation here was wholly restored although VERBEEK in his well-known work on Krakatau (1885) gives a colored drawing of the island from the N. E. side, soon after the eruption, from which it can be seen that the whole island was covered with gray ashes, above which only a few burnt trees arise. But the layer of ashes was far less thick than on Krakatau and certainly less hot. By the enormous flood waves, which succeeded the eruption, everything in the plain of the island was swept away and all the inhabitants, about 2000 people, were drowned. The present flora of Sebesy, however, is quite different from that on Krakatau and seems to be in a far more advanced stage of restauration. Dr. DOCTERS VAN LEEUWEN, who also visited Sebesy, is of the opinion that the vegetation of the island was only partly destroyed, and was restored soon, only galls having disappeared altogether. So we supposed the fauna also would be far more normal than on Krakatau, but the result of our research proves that the fauna of Sebesy was also destroyed wholly, or nearly so, at the eruption of 1883". Concerning the ants he remarks: "Species of ants are only a trifle more numerous than on Krakatau, but some species, viz. the gramang-ant (*Plagiolepis longipes* JERDON) were extremely abundant".

The problem of the means whereby insects and other animals have reached the once sterilized Krakatau group and Sebesi is considered in detail by DAMMERMAN and he expresses the following opinion: "Considering different possibilities the animals may have come to the islands as follows: — by active flying or swimming; by the air or winds; by ocean currents, and through the medium of other animals or man. Now computing how many winged animals there are on Krakatau, Verlaten I. and Sebesy, we get respectively 81%, 83% and 79% of the total amount. This high percentage proves, I think, that flight or sailing on the wind plays an important part in the repopulation of the islands by animals. It is true that many insects may have reached the islands not on the wing but on drifting wood or plants in the form of egg, larva or pupa. However, I believe we must attribute a greater share to the dispersal by air than is usually done", etc.

It is significant in this connection that the only ant with apterous females recorded in the foregoing list is *Dorylus laevigatus* and that this species was found only on Sebesi to which, in all probability, it has been carried from the adjacent Sumatran coast either in floating vegetation or in merchandise.

On my recent trip to the Galapagos Island I was impressed by a similar case, that of the minute *Monomorium floricola* JERDON. This is the only known species with apterous females from the Archipelago and I found it only on Tower Island, which is the nearest to the mainland. On the small beach of the island we also found some trunks of cocoanut trees that must have drifted all the way from the Central or South American coast. Some years ago I published an account of a colony of *Pheidole peregrina* WHEELER which had been transported in a drifting log from the Brazilian coast to San Sebastian Island <sup>1)</sup>. On returning from the Galapagos Islands to Panama I made an observation which shows how far flying queen ants may be carried out to sea. While the yacht „Noma” was passing Point Mala and was fully 30 km. from the nearest land, a large Azteca queen suddenly alighted on the hand of a friend who was sitting by my side. The weather was mild and sunny with a very gentle breeze blowing off shore. Although Azteca queens are heavy-bodied and rather clumsy in flight, this individual had managed to cross an expanse of water considerably greater than that which separates Krakatau from Sebesi and fully two-thirds of the distance between Krakatau and the coast of Java. There would seem, therefore, to be little difficulty in accounting for the ant-population on the small islands of the Sunda Strait.

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<sup>1)</sup> Ants Carried in a Floating Log from the Brazilian Mainland to San Sebastian Island. *Psyche*, 23, 1916, pp. 180-183.