

# TERMITES FROM INDONESIA INCLUDING WEST IRIAN

by

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## I — INTRODUCTION

### General

The termites (Insecta: Isoptera) of Indonesia, formerly the Dutch East Indies, have been studied mainly by HAGEN (1858), HAVILAND (1898), DESNEUX (1905, New Guinea), HOLMGREN (1911-14), OSHIMA (1914), DAMMERMAN (1915), BEEKMAN (1919), JOHN (1925), KALSHOVEN (1930), KEMNER (1930, 1934), LIGHT (1937), SNYDER (1949), TOXOPEUS (1950), ROONWAL & SEN-SARMA (1956; and 1960, genera *Kaloterme*s and *Neoterme*s), ROONWAL (in press, Anak Krakatau Isl., Sunda Straits), KRISHNA & EMERSON (1962), and others. As a result, some 200 species have been recorded from that region.

Indonesia occupies a vast area of some 735,000 square miles in South-East Asia and Papua and comprises over 3000 islands of which the larger ones are Sumatra, Borneo, Java, Bali, Celebes, Lombok, Flores, Timor, Halmaheira and New Guinea (the western half of which, now called West Irian, being Indonesian). The region is tropical and lies on either side of the equator. The climate is equable, the average temperature at sea-level being 26°C (79°F). The rainfall is heavy. South of the equator, as in Java and Bali, the rainfall is received during the East monsoon (April to November) as well as the West monsoon (December to March), the heavier precipitation occurring in the latter season. The region is largely mountainous and volcanic, there being about 400 volcanoes of which nearly a hundred are active. Java and Bali are very densely populated and the most intensively cultivated, and natural forests have practically disappeared there. In the other islands vast natural forests still exist.

In the present account, 31 species and subspecies of termites are recorded. Of these, five, belonging to the genera *Prorhinotermes*, *Microcerotermes*, *Bulbitermes* and *Hospitalitermes*, are new to science, and

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several others are new distributional records. Where available, field notes of the collections made by one of us (M.L.R.) in Java and the Sunda Straits in December, 1963, are also given under the species concerned.

The Indonesian termite fauna is exceptionally rich. Hitherto, Java is the only island which has been fairly well explored. Vast areas of rich tropical forests in Sumatra, Borneo, Celebes, etc. and in West Irian remain to be properly explored and there is little doubt that several new species await discovery.

## 2. Abbreviations used

Except where otherwise stated, the following abbreviations have been used:

- coll., collection; collected by.
- det., determined (identified) by.
- don., donor; donated by.
- ex., from; also: example (ex.) or examples (exs.).
- F. R. I. Bogor.**, Forest Research Institute, Bogor (Java).
- Im.**, imago.
- maj.**, major.
- max.**, maximum.
- min.**, minimum; minor.
- Ny.**, nymph.
- Pw.**, Pseudoworker.
- S.**, soldier.
- syn.**, synonym; synonymy.
- W.**, worker.
- Z. S. I.**, Zoological Survey of India, Calcutta.

## 3. Acknowledgements

We are indebted to the following persons for assistance: To Dr. S. SOMADIKARTA and Miss SITI SOEWARNI NOTOATMODJO, both of Bogor, for sending us large collections for study from the Museum Zoologicum Bogoriense and the Forest Research Institute, Bogor, respectively; and to Mr. O. B. CHHOTANI, Zoologist, in the Zoological Survey of India, Calcutta, for assistance in various ways.

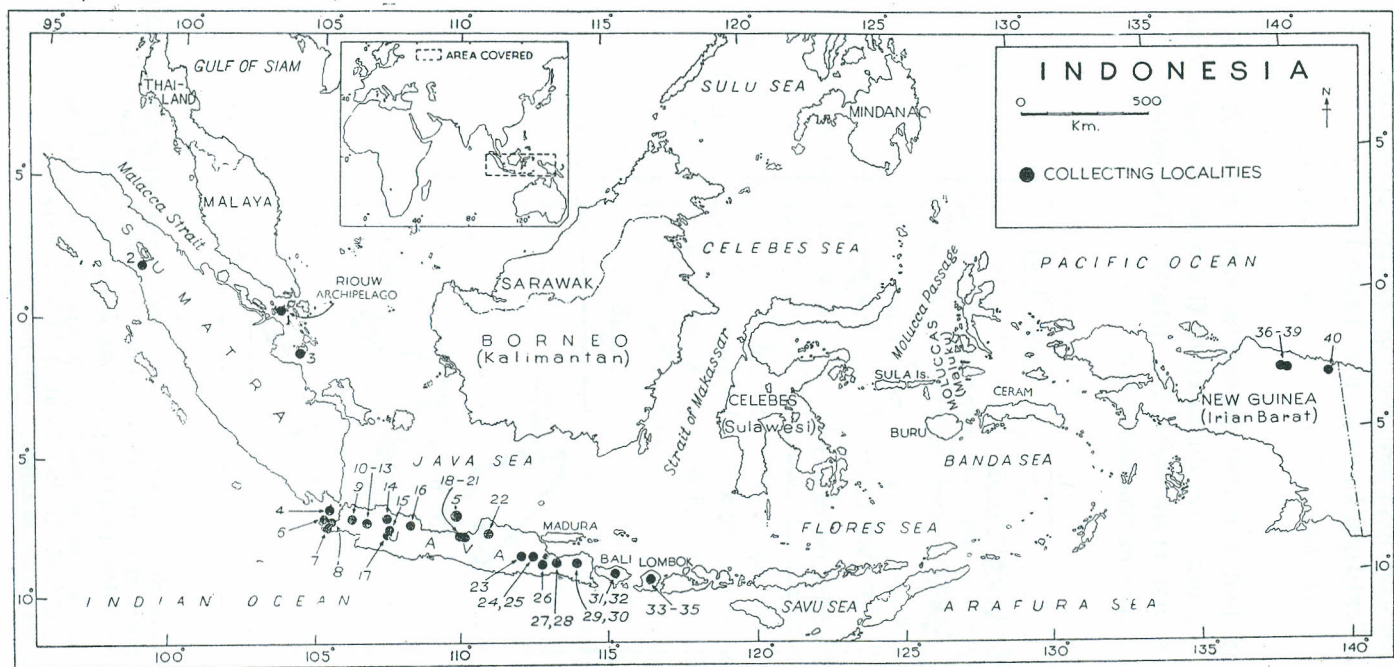


Fig. 1. Map of Indonesia, showing the collecting localities for termites. Locality Numbers refer to serial numbers in Table 1.

*Inset:* Map of the Old World, to show the position of the area covered by the present study.

## II — THE COLLECTIONS AND THE COLLECTING LOCALITIES (Text-figs. 1 and 2; and Table 1)

### 1. The Collections

The termites studied for the present account came from several Indonesian islands, ranging from Sumatra in the west to West Irian (W. New Guinea) in the east (*vide infra* for details). The collections were obtained from the sources mentioned below:

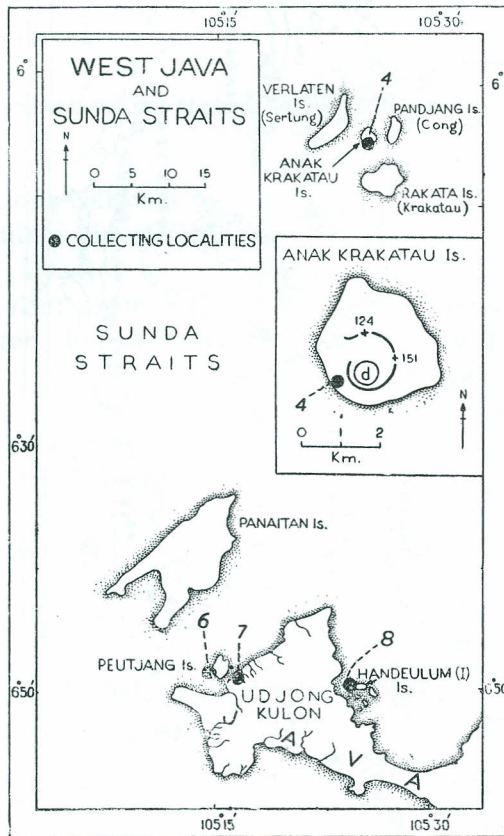


Fig. 2. Map of the Sunda Straits (between Java and Sumatra), Indonesia, showing the Krakatau group of islands (Verlaten Isl. [Sertung], Pandjang Isl. [Cong], Rakata Isl. [Krakatau proper] and Anak Krakatau Isl.).

*Inset:* Anak Krakatau Isl., as in 1952. Thick line indicates the main ridge, the figures showing altitude in metres at the places marked +; d indicates the crater-lake. (Inset after Waalkes, 1960, p. 64).

- (i) From the Director, Museum Zoologicum Bogoriense, Bogor (Java).
- (ii) From the Forest Research Institute, Bogor (Java).
- (iii) A small collection made by Prof. TISNA AMIDJAJA, in 1963, from Bandung (Java).
- (iv) A collection made by one of us (M.L.R.), in December, 1963, from Java and the Sunda Straits.
- (v) A collection made by Dr. S. SOMADIKARTA, in 1965, from Bali.

The following is a list of the collections studied:

- (i) 2 vials, Prof. TISNA AMIDJAJA coll., December 1963, Bandung (Java).
- (ii) 11 vials, Dr. M. L. ROONWAL coll., December 1963, Ujung Kulon (W. Java) and nearby islands, *viz.*, Handeuleum (I) Isl. and Peutjang Isl.; also Anak Krakatau Isl. (Sunda Straits).
- (iii) Lot received from Dr. S. SOMADIKARTA, Museum Zoologicum Bogoriense, Bogor, Java, in December 1963: (a) 9 vials (Nos. M<sub>4</sub> - M<sub>6</sub>, M<sub>8</sub> - M<sub>10</sub>, and 14, 18 and 20), DAMMERMAN coll., June and November 1923, September 1924, May 1926, Riouw Archipelago, Buitenzorg [= Bogor, Java] and Karimondjawa Isl. (Java Sea). (b) 1 vial (No. M<sub>1</sub>), LIEFTINCK coll., April 1935, Bogor (Java). (c) 1 vial (No. M<sub>2</sub>), J. H. DE GUNST coll., September 1942, Bogor (Java). (d) 4 vials (Nos. M<sub>3</sub>, 19, 22 and 23), J. OLTHOF coll., December 1939, November 1940 and October 1941, Java [Bandung, and Buitenzorg (= Bogor)]. (e) 1 vial (No. 21), Bogor (Java), 6. ix. 1934. (f) 1 vial (No. M<sub>7</sub>), V. D. MEER MOHR coll., December 1927, Berhala Isl. (N. E. Sumatra). (g) 18 vials, DJAFAR coll., December 1963, Bogor (Java). (h) 5 vials (Nos. 1 - 5), Dr. L. J. TOXOPEUS coll. [Ned. Ind.-Amerikaansche New Guinea Exped. 1938-39], July 1938, March, April, October, November, 1939, West Irian (W. New Guinea). (i) 1 vial (No. 147), Dr. M. DRESS coll., June 1938, West Irian (New Guinea).
- (iv) 5 vials (Nos. 18 - 22), Dr. S. SOMADIKARTA coll., March 1965, Bali.
- (v) 91 vials (Nos. 1 - 91), F. R. I. STAFF coll., 1949-60, Java; don. F. R. I. Bogor.

## 2. The Collecting Localities

The collections were made from a total of 40 Collecting Stations distributed as follows:

- (i) Riouw (Rhio) Archipelago: 1 station.
- (ii) Sumatra (and its islands): 2 stations.
- (iii) Sunda Straits and Java Sea: 2 stations.

- (iv) Java (and its islands): 25 stations.  
 (v) Bali Island: 2 stations.  
 (vi) Lombok Island: 3 stations.  
 (vii) West Irian: 5 stations.

Fuller details will be found in Table 1.

TABEL 1. List of collecting localities for termites in Indonesia.

Abbreviation: *F.R.I. Staff* (Staff of Forest Research Institute, Bogor, Indonesia);  
 C, Central; E, East; N, North; S, South; W, West; m, metres; S. L., Sea-level.

Collecting localities (1)	Altitude (in metres) (2)	Approximate latitude (3)	Approximate longitude (4)	Name of collector (& year of collection) (5)
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I — RIOUW (RHIO) ARCHIPELAGO (South of Malaya)

1. Doerian [Durian]		1°N	104°E	Dammerman (1923)
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II — SUMATRA (AND ITS ISLANDS)

2. Aek-na-Uli (near Prapat), E. Sumatra	920 m	2°30'N	98°40'E	F.R.I. Staff (1951, '53)
3. Berhala Isl. (Selat Malaka or Sumatra Straits)	—	4°05'N	99°40'E	v. d. Meer Mohr (1927)

III — SUNDA STRAITS AND JAVA SEA

4. Anak Krakatau Isl. (Sunda Straits)	S.L.	6°05'S	105°25'E	Dr. M. L. Roonwal (1963)
5. Karimoendjawa (Karimonjava) Isl. (Java Sea)	—	5°50'S	110°20'E	Dammerman (1926)

Table 1 (Continued)

(1)	(2)	(3)	(4)	(5)
IV — JAVA (AND ITS ISLANDS) (Arranged from west to east)				
6. Peutjang Isl. (near W. tip of Java)	S.L.	6°50'S	105°12'E	Dr. M. L. Roonwal (1963)
7. Udjung Kulon, W. Java	S.L.	6°48'S	105°15'E	Dr. M. L. Roonwal (1963)
8. Handeuleum (I) Isl., near W. tip of Java	S.L.	6°50'S	105°20'E	Dr. M. L. Roonwal (1963)
9. Djasinga, c. 50 km. W. of Bogor, W. Java	100 m	6°34'S	106°22'E	Dammerman (1924); Lieftinck (1935); J. Olthof (1940)
10. Bogor (formerly Buitenzorg), W. Java	250 m	6°34'S	106°45'E	J. H. de Gunst (1942); F.R.I. Staff (1949, '50, '56, '59, '61) Dr. M. L. Roonwal (1963); Djafar (1963)
Buitenzorg (old name for Bogor)	—	—	—	See Bogor above
11. Gn. Batu (near Bogor), W. Java	250 m	6°34'S	106°45'E	F.R.I. Staff (1954, '56, '58)
12. Janlapa (near Bogor), W. Java	300 m	6°40'S	106°45'E	F.R.I. Staff (1959)
13. Tjiapus near Buitenzorg [= Bogor], W. Java	300 m	6°40'S	106°45'E	Dammerman (1911)
14. Purwakarta, W. Java	—	6°50'S	107°30'E	F.R.I. Staff (1959)
15. Bandung [Bandoeang] W. Java	700 m	6°57'S	107°34'E	J. Olthof (1939, 1941); Tisna (1963)
16. Djatibarang, W. Java	—	6°25'S	108°12'E	F.R.I. Staff (1961)
17. Manggar, W. Java	—	6°52'S	108°13'E	F.R.I. Staff (1952)
18. Gedangan, C. Java	125 m	6°55'S	110°20'E	F.R.I. Staff (1952, '53, '54, '55, '60)
19. Ngenden (near Gedangan), C. Java	125 m	6°55'S	110°20'E	F.R.I. Staff (1959)
20. Seneng (near Gedangan), C. Java	125 m	6°55'S	110°20'E	F.R.I. Staff (1954,
21. Telawah, C. Java	125 m	6°55'S	110°20'E	F.R.I. Staff (1953, '54, '59)

Table 1 (Concluded)

(1)	(2)	(3)	(4)	(5)
22. Tjepu, C. Java	—	7°07'S	111°35'E	F.R.I. Staff (1954)
23. Kediri, E. Java	—	7°45'S	112°01'E	F.R.I. Staff (1950, '54)
24. Gadungan (near Pare), E. Java	62 m	7°45'S	112°10'E	F.R.I. Staff (1954)
25. Pare, E. Java	—	7°43'S	112°13'E	F.R.I. Staff (1952, '53, '54)
26. Kandangan (near Malang), E. Java	400 m	7°59'S	112°45'E	F.R.I. Staff (1953, '59)
27. Besuki, E. Java	5 m	7°45'S	113°40'E	F.R.I. Staff (1954)
28. Banjuglugur (near Besuki), E. Java	10 m	7°45'S	113°40'E	F.R.I. Staff (1954)
29. Sumberweringin (near Bondowoso), E. Java	700 m	7°56'S	113°48'E	F.R.I. Staff (1952, '53, '55, '63)
30. Bondowoso, E. Java	—	7°54'S	113°50'E	F.R.I. Staff (1953)
V — BALI ISLAND				
31. Bedugul, Lake Bratan	1200 m	8°15'S	115°10'E	Dr. S. Somadikarta (1965)
32. Dadjan Danu, Lake Bratan	1200 m	8°15'S	115°10'E	Dr. S. Somadikarta (1965)
VI — LOMBOK ISLAND (Lat. c. 8°30'S; long. c. 116°20'E)				
33. Bual	600 m	—	—	F.R.I. Staff (1960)
34. Semeru	900 m	—	—	F.R.I. Staff (1959)
35. Yanbapa Wyona	—	—	—	F.R.I. Staff (1959)
VII — WEST IRIAN (W. New Guinea)				
36. Asaucaria Kamp, Idenburg R. [Ned. Ind. - Amerikaansche New Guinea - Exped. 1938 - 39]	800-900 m	3°20'S	139°E	Dr. L.J. Toxopeus (1939)
37. Bernhard Kamp, Meervlakte, Idenburg R. [- do -]	100 m	3°20'S	139°E	Dr. L.J. Toxopeus (1939)
38. Meervlakte, Idenburg R. [- do -]	100 m	3°20'S	139°E	Dr. L.J. Toxopeus (1939)
39. Tusschen Kamp, Idenburg R. [- do -]	1150 m	3°20'S	139°E	Dr. L.J. Toxopeus (1939)
40. Cycloop Gebergte (Mt.)	200 m	3°20'S	140°30'E	Dr. Meyer Dress (1938)



## III — SYSTEMATIC ACCOUNT

Thirty one species and subspecies of Isoptera, of which five are new to science, are dealt with in the present account and are listed below. They are distributed over 14 genera three families, viz., Kalotermitidae (5 species), Rhinotermitidae (7 species) and Termitidae (18 species and one subspecies).

## List of Indonesian Isoptera included in the present account

## Family I. KALOTERMITIDAE

## Subfamily (a) KALOTERMITINAE

Genus (1) *Neotermes* HOLMGREN

1. *Neotermes dalbergiae* KALSHOVEN
2. *Neotermes tectonae* (DAMMERMAN)

Genus (2) *Cryptotermes* BANKS

3. *Cryptotermes cyanocephalus* LIGHT
4. *Cryptotermes domesticus* (HAVILAND)
5. *Cryptotermes dudleyi* BANKS

## Family II. RHINOTERMITIDAE

## Subfamily (a) COPTOTERMITINAE

Genus (3) *Coptotermes* WASMANN

6. *Coptotermes curvignathus* HOLMGREN
7. *Coptotermes kalshoveni* KEMNER
8. *Coptotermes travians* HAVILAND

## Subfamily (b) RHINOTERMITINAE

Genus (4) *Prorhinotermes* SILVESTRI

9. *Prorhinotermes ravani* n. sp.

Genus (5) *Schedorhinotermes* SILVESTRI

10. *Schedorhinotermes javanicus* KEMNER
11. *Schedorhinotermes tarakanensis* (OSHIMA)
12. *Schedorhinotermes translucens* (HAVILAND)

## Family III. TERMITIDAE

## Subfamily (a) AMITERMITINAE

Genus (6) *Microcerotermes* SILVESTRI

13. *Microcerotermes dammermani* n. sp.

## Subfamily (b) TERMITINAE

Genus (7) *Capritermes* WASMANN

14. *Capritermes buitenzorgi* HOLMGREN

15. *Capritermes mohri* KEMNER

16. *Capritermes santschii* SILVESTRI

## Subfamily (c) MACROTERTERMITINAE

Genus (8) *Macrotermes* HOLMGREN

17. *Macrotermes carbonarius* (HAGEN)

18. *Macrotermes gilvus* (HAGEN)

19. *Macrotermes malaccensis* (HAVILAND)

Genus (9) *Odontotermes* HOLMGREN

20. *Odontotermes grandiceps* HOLMGREN

21. *Odontotermes javanicus* HOLMGREN

22. *Odontotermes makassarensis* KEMNER

Genus (10) *Microtermes* WASMANN

23. *Microtermes insperatus* KEMNER

## Subfamily (d) NASUTITERMITINAE

Genus (11) *Nasutitermes* DUDLEY

24. *Nasutitermes acutus* (HOLMGREN)

25. *Nasutitermes matangensis matangensis* (HAVILAND)

26. *Nasutitermes matangensis matangensisformis* (HOLMGREN)

Genus (12) *Bulbitermes* EMERSON

27. *Bulbitermes durianensis* n. sp.

28. *Bulbitermes lakshmani* n. sp.

Genus (13) *Lacessititermes* HOLMGREN

- 29.
- Lacessititermes batavus*
- KEMNER

Genus (14) *Hospitalitermes* HOLMGREN

- 30.
- Hospitalitermes diurnus*
- KEMNER
- 
- 31.
- Hospitalitermes irianensis*
- n. sp.

We may now deal with the various species in detail.

## Family I. KALOTERMITIDAE

## Subfamily KALOTERMITINAE

Genus (1) *Neotermes* HOLMGREN

The oriental *Neotermes* have recently been revised by ROONWAL & SEN-SARMA (1960) who have described and illustrated all the known species from that region in considerable detail.

1. *Neotermes dalbergiae* KALSHOVEN

1930. *Kalotermes (Neotermes) dalbergiae* L. G. E. KALSHOVEN, De biologie van de djati-termiet (*Kalotermes tectonae* DAMM.), in verband met zijn bestrijding. (Thesis), Wageningen, pp. 29-34; 121-122; fig. 5 [Also as *Meded. Inst. Plantenziekten, Buitenzorg*, No. 76]. Im. and S. *Type-locality*: Java (Banjoemas and Kedoe).
1934. *Neotermes dalbergiae* KALSH., N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 35-36, Im. and S. Java.
1937. *Neotermes dalbergiae* KALSH., S. F. LIGHT, *Pan-Pacific Ent.*, San Francisco, 13 (1-2), p. 16. Java.
1949. *Neotermes dalbergiae* KALSH., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 24. Java.
1960. *Neotermes dalbergiae* KALSH., M. L. ROONWAL & P. K. SEN-SARMA, *Contr. Syst. Orient. Termites* (Indian Counc. Agric. Res., Ent. Monogr. No. 1), New Delhi, pp. 166-171, Text-fig. 31, Pls. 36 & 37 and Tables 27 & 28 (pp. 263, 264). Bandjar (W. Java).

## (a) MATERIAL

One vial (No. 12), 4 S., 1 Im., F. R. I. Bogor Coll., 11. vii. 1952, Pare (E, Java), ex, "teak forest".

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGO

	<i>One ex.</i>
1. Total body-length (with wings), <i>c.</i> . . . . .	13.0
2. Total body-length (without wings), <i>c.</i> . . . . .	6.9
3. Head-length to lateral base of mandibles . . . . .	1.30
4. Max. head-width (with eyes) . . . . .	1.40
5. Max. diameter of eyes (with ocular sclerite)	0.51
6. Max. diameter of lateral ocellus . . . . .	0.25
7. Min. eye-ocellus distance . . . . .	0
8. Length of pronotum . . . . .	0.75
9. Max. width of pronotum . . . . .	1.70
10. Length of forewing (with scales) . . . . .	11.50
11. Length of hindwing (with scales) . . . . .	10.60
12. No. of antennal segments . . . . .	[16, antenna broken] (usually 19-20 in the species)

## (ii) SOLDIERS

	<i>Range (4 exs.)</i>
1. Total length (with mandibles, but without antennae), <i>c.</i> . . . . .	11.9 — 12.1
2. Head-length with mandibles . . . . .	5.63 — 5.83
3. Head-length to lateral base of mandibles . . . . .	3.62 — 3.85
4. Max. head-width . . . . .	2.55 — 2.65
5. Length of mandibles . . . . .	2.00 — 2.20
6. Min. median length of postmentum . . . . .	2.57 — 2.70
7. Max. width of postmentum . . . . .	0.85 — 0.90
8. Width of postmentum at anterior end . . . . .	0.45 — 0.50
9. Width of postmentum at waist . . . . .	0.37 — 0.40
10. Length of pronotum . . . . .	1.28 — 1.35
11. Max. width of pronotum . . . . .	2.60 — 2.80
12. No. of antennal segments . . . . .	16

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia:* Java: Banjoemas, Kedoe, Bandjar; and Pare (the last, present record).

*Elsewhere:* None.

## (d) REMARKS

The single imago is smaller than those mentioned by ROONWAL & SEN-SARMA (1960), thus: total body-length without wings 6.9 (*vs.* 9.5-11.5 mm.); maximum width of head with eyes 1.40 (*vs.* 1.7-2.0 mm.); and so on.

2. *Neotermes tectonae* (DAMMERMAN)

1915. *Calotermes tectonae* K. W. DAMMERMAN, *Tijds. Ent.*, The Hague, 58 (suppl.), pp. 98-100, pl. 3, figs. 1-3 (S & wing of Im. S. and Im. *Type-locality*: Kedung-djati (Java).
1919. *Calotermes tectonae* (DAMMER.), H. BEEKMAN, *Meded. Proefst. v. h. Boschw.*, Buitenzorg (Bogor), No. 4, pp. 21-30. Java.
1930. *Kalotermes tectonae* (DAMMER.), L. G. E. KALSHOVEN, De biologie van de djati-termiet in verband met zijn bestrijding (Thesis), Wageningen, pp. 18-29 and fig. 5a (p. 30). Im. and S. Java.
1934. *Neotermes tectonae* (DAMMER.), N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 34-35. Im., S. and Pw. Middle Java; Sumatra; and Muna Is. (south of Celebes).
1937. *Neotermes tectonae* (DAMMER.), S. F. LIGHT, *Pan-Pacific Ent.*, San Francisco, 13 (1-2), p. 16. Djember (E. Java).
1949. *Neotermes tectonae* (DAMMER.), T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 33. Java.
1960. *Neotermes tectonae* (DAMMER.), M. L. ROONWAL & P. K. SEN-SARMA, *Contr. Syst. Orient. Termites* (Indian Counc. Agric. Res., Ent. Monogr. No. 1), New Delhi, pp. 205-255, text-fig. 46, pls. 64, 65 and tables 38, 39 (pp. 274, 275). Java ("Middel Java" and Semarang).

## (a) MATERIAL

Thirteen vials from West Irian (W. New Guinea) and Java, as follows:

LOT I. — (i) 1 vial, 1 Im., Idenburg River, West Irian (W. New Guinea), *L. J. Toxopeus* coll. (Ned. Ind.-Amerikaansche New Guinea Exped., 1938-39), 7.iii.1939.

LOT II. — 2 vials, Telawak (Central Java), *F. R. I. Bogor* coll., as follows: (ii) No. 83, 2 S., 1 Im., 10 Pw., 4.xii.1953, ex. "teak trees". (iii) No. 31, 5 S., several Pw., 5.ii.1959, ex. "teak forest".

LOT III. — 10 vials, Gedangan (Central Java), *F. R. I. Bogor* coll., 1952-55, ex. "teak tree", as follows: (iv) No. 64, 10 Pw., 9.vi.52. (v) No. 65, several Pw., 30.viii.55. (vi) No. 67, 1 S., several Pw., 25.iii.54. (vii) No. 68, 3 S., 4 Pw., 1.ix.55. (viii) No. 69, 3 S., 8 Pw., 6.ix.55. (ix) No. 71, 5 S., 9 Pw. (x) No. 73, 5 S., several Pw., 30.viii.55. (xi) No. 74, 10 Pw., 30.viii.55. (xii) No. 76, 3 S., 10 Pw., 14.viii.55. (xiii) No. 77, 3 S., several Pw., 9.vi.52.

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGO

	<i>One ex.</i>
1. Total body-length (with wings), <i>c.</i> . . . .	13.6
2. Total body-length (without wings), <i>c.</i> . . . .	10.6
3. Head-length to lateral base of mandibles . . . .	1.40
4. Max. head-width (with eyes) . . . . .	1.70
5. Max. diameter of eyes with ocular sclerite . . . .	0.55
6. Max. diameter of lateral ocellus . . . . .	0.22
7. Min. eye-ocellus distance . . . . .	0
8. Length of pronotum . . . . .	0.87
9. Max. width of pronotum . . . . .	1.75
10. Length of forewing (with scale) . . . . .	11.20
11. Length of hindwing (with scale) . . . . .	10.10
12. No. of antennal segments . . . . .	19

## (ii) SOLDIERS

	<i>Range (27 exs.)</i>
1. Total length (with mandibles but without antennae), <i>c.</i> . . . . .	7.5 — 12.0
2. Head-length (with mandibles) . . . . .	3.70 — 4.50
3. Head-length to lateral base of mandibles . . . .	2.50 — 3.00
4. Max. head-width . . . . .	1.65 — 2.00
5. Length of mandibles . . . . .	1.50 — 1.75
6. Min. median length of postmentum . . . . .	1.90 — 2.20
7. Max. width of postmentum . . . . .	0.60 — 0.78
8. Width of postmentum at waist . . . . .	0.23 — 0.32
9. Length of pronotum . . . . .	0.80 — 1.05
10. Max. width of pronotum . . . . .	1.70 — 2.20
11. No. of antennal segments . . . . .	13 — 15

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia*: Java, Sumatra, Muna Is. (south of Celebes) and West Irian, as follows: *Java*: Djember; Gedangan (present record); Kedung Djati; Telawak (present record). Widely distributed in teak areas. *Sumatra*: Kateman. *Muna Is.*: Teak-growing areas. *West Irian* (W. New Guinea): Idenburg River bank (present record).

*Elsewhere*: None.

## (d) REMARKS

The size of pronotum of the imago is appreciably larger than that given by ROONWAL & SEN-SARMA (1960, p. 274, specimens from Semarang, Java), as follows: Length 0.87 mm. (*vs.* 0.80 mm.); maximum width 1.75 mm. (*vs.* 1.50 mm.).

Genus (2) *Cryptotermes* BANKS3. *Cryptotermes cyanocephalus* LIGHT

1921. *Cryptotermes cyanocephalus* S. F. LIGHT, *Philipp. J. Sci.*, Manila, 19 (1), p. 36, pl. 2. S., Im. *Type-locality*: Manila (Philippines).
1934. *Cryptotermes buitenzorgi* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 45-47, fig. 5. S., Im. *Type-locality*: Buitenzorg (= Bogor, West Java).
1949. *Cryptotermes cyanocephalus* LIGHT, T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 40.

## (a) MATERIAL

Two vials, *F. R. I. Bogor* coll., 1956, W. Java, as follows: (i) No. 21, 5 S., 2 Im., 3 Pw., 6 Ny., 10.x.56, Gn. Batu near Bogor. (ii) No. 48, 5 S., 7 Im. (4 alates, 3 dealates), several Pw. and Ny., 10.x.56, Bogor.

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGOS

	<i>Range</i> (5 exs.)
1. Total body-length with wings, <i>c.</i> . . . . .	6.8 — 7.3
2. Total body-length without wings, <i>c.</i> . . . . .	3.5 — 4.1
3. Head-length to lateral base of mandibles . . . . .	0.75 — 0.81
4. Max. head-width with eyes . . . . .	0.80 — 0.85
5. Max. diameter of eyes (with ocular sclerite)	0.25 — 0.28
6. Max. diameter of lateral ocellus . . . . .	0.10 — 0.12
7. Min. eye-ocellus distance . . . . .	0
8. Length of pronotum . . . . .	0.45 — 0.50
9. Max. width of pronotum . . . . .	0.58 — 0.70
10. No. of antennal segments . . . . .	14

## (ii) SOLDIERS

	<i>Range</i> (5 exs.)
1. Total body-length (with mandibles but without antenna), <i>c.</i> . . . . .	3.8 — 4.4
2. Head-length with mandibles . . . . .	1.25 — 1.37
3. Head-length to the lateral base of mandibles	0.75 — 0.90
4. Max. head-width . . . . .	0.97 — 1.00
5. Length of mandibles . . . . .	0.40 — 0.50
6. Min. length of postmentum . . . . .	0.30 — 0.35
7. Max. width of postmentum . . . . .	0.25 — 0.29
8. Length of pronotum . . . . .	0.58 — 0.65
9. Max. width of pronotum . . . . .	0.87 — 0.95
10. No. of antennal segments . . . . .	11 — 12

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Bogor and vicinity (W. Java).

*Elsewhere:* Philippines: Manila.

4. *Cryptotermes domesticus* (HAVILAND)

1898. *Calotermes domesticus* G. D. HAVILAND, *J. Linn. Soc. Lond.*, London, 26 (169), p. 374, pl. 23, figs. 3-6, Im. (♂ and ♀), S. *Type-locality*: Singapore; and Sarawak (Borneo).
1913. *Calotermes* (*Cryptotermes*) *domesticus* (HAV.), N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), p. 46, pl. 1, fig. 16 (S.). Im., S. Bangkok (Thailand).
1923. *Cryptotermes domesticus* (HAV.), M. OSHIMA, *Capita Zool.*, s'Gravenhage, 2 (3), p. 5. Im. Sumatra (Simular and Sinabang).
1949. *Cryptotermes domesticus* (HAVILAND), T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 40-41. [See for synonymies, etc.].

## (a) MATERIAL

One vial (No. M7); 7 S., and several Pw. and Ny., *v. d. Meer Mohr*. coll., xii. 1927, Berhala Island (Indonesia, just N. of middle Sumatra, *c.* lat. 1°S, long. 104°E).

## (b) MEASUREMENTS (IN MM.), ETC.

## SOLDIERS

	<i>Range</i> (5 exs.)
1. Total body-length (with mandibles but without antennae), <i>c.</i> . . . . .	4.6 — 5.6
2. Head-length with mandibles . . . . .	1.63 — 1.85
3. Head-length to lateral base of mandibles . . . . .	1.13 — 1.33
4. Max. head-width . . . . .	1.16 — 1.35
5. Length of mandibles . . . . .	0.45 — 0.57
6. Length of pronotum . . . . .	0.76 — 0.87
7. Max. width of pronotum . . . . .	1.60 — 1.80
8. No. of antennal segments . . . . .	12 — 13

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia*: Berhala Isl. (just N. of middle Sumatra, *c.* lat. 1°S and long. 104°E), present record. *Sumatra*: Simular, Sinabang. *Krakatau Isl.*: The island.

*Elsewhere*: Widely spread, from India, China, S. E. Asia to the S. Pacific islands (*vide* SNYDER, 1949, *l.c.*).

5. *Cryptotermes dudleyi* BANKS

1918. *Cryptotermes dudleyi* N. BANKS, *Bull. Amer. Mus. nat. Hist.*, New York, 38 (17), p. 660, pl. 51, fig. 3 (S.). Im. and S. *Type-locality*: Panama.
1913. *Calotermes* (*Cryptotermes*) *jacobsoni* N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), p. 48, Im. Java.



1914. *Calotermes (Cryptotermes) jacobsoni* HOLMG., N. HOLMGREN, *Zool Jb. (Syst.)*, Jena, 36 (2-3), p. 235. Im. East Sumatra.
1934. *Cryptotermes (Planocryptotermes) javanicus* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 47-49, fig. 6 (5). *Type-locality*: Buitenzorg (= Bogor, W. Java).
1949. *Cryptotermes dudleyi* BKS., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 41 [See for synonymies, etc.].

## (a) MATERIAL

(i) One vial (No. 85), 1 S., 5 Pw., *F. R. I. Bogor* coll., 14.viii.1954, Seneng (Central Java), ex. "young teak wood".

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIER

1. Total body-length (with mandibles but without antennae), c. . . . .	<i>One ex.</i> 5.2
2. Head-length with mandibles . . . . .	2.15
3. Head-length to lateral base of mandibles . . . . .	1.42
4. Max. head-width . . . . .	1.22
5. Length of mandibles . . . . .	0.65
6. Min. length of postmentum . . . . .	0.60
7. Max. width of postmentum . . . . .	0.35
8. Length of pronotum . . . . .	0.65
9. Max. width of pronotum . . . . .	1.10
10. No. of antennal segments . . . . .	14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java: Bogor* (W. Java); and Seneng (Central Java, present record). *Sumatra* (HOLMGREN, 1914): The island.

*Elsewhere*: Widespread in many parts of the world (Middle and S. America, S. and S. E. Asia, N. Australia, etc. (*vide* SNYDER, 1949, *l.c.*).

## Family II. RHINOTERMITIDAE

## Subfamily (a) COPTOTERMITINAE

Genus (3) *Coptotermes* WASMANN

6. *Coptotermes curvignathus* HOLMGREN  
(Syn. *C. robustus* HOLMGREN)

(i) *Coptotermes curvignathus* HOLMGREN

1913. *Coptotermes curvignathus* N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 77-78, 266, pl. 2, fig. 2 (S.). S., W. and Ny. *Type-localities*: Singapore (Malay Peninsula); Sarawak (Borneo); and Burma. [Restricted to Singapore by ROONWAL and CHHOTANI, 1962, p. 8, *vid infra*.].
1914. *Coptotermes curvignathus* HOLMG., N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36, p. 236, E. Sumatra and Malacca.
1925. *Coptotermes curvignathus* HOLMG., O. JOHN, *Treubia*, Buitenzorg [= Bogor], 6 (3-4), pp. 381-382. S. and W. Malaya Peninsula and E. Sumatra.
1949. *Coptotermes curvignathus* HOLMG., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 77, Malaya and Burma.
1962. *Coptotermes curvignathus* HOLMG., M. L. ROONWAL and O. B. CHHOTANI, *Indian Species of Termite Genus Coptotermes*, New Delhi (Indian Counc. Agric. Res., Ent. Monogr. 2), pp. 8 and 34-35.

(ii) *Coptotermes robustus* HOLMGREN

1913. *Coptotermes robustus* N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), p. 78. S. and W. *Type-locality*: North Borneo.

(iii) *Wrong determination*

1913. *Coptotermes gestroi* WASM., M. OSHIMA, *Phillip. J. Sci.*, Manila, (D) 8 (4), pp. 283-284. [Is really *C. curvignathus*, *vide* SNYDER, 1949, p. 77.].

## (a) MATERIAL

A vial (No. 53), 4 S. (2 whole, 2 heads) and several W., *F. R. I. Bogor* coll., 8.ix.1959, Gn. Batu near Bogor (W. Java).

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS

	Range (2 exs.)
1. Total body-length (with mandibles but without antennae), <i>c</i> . . . . .	4.5 — 4.6
2. Head-length with mandibles . . . . .	2.56 — 2.63
3. Head-length to lateral base of mandibles . . . . .	1.60 — 1.66
4. Max. head-width . . . . .	1.42 — 1.48
5. Length of mandibles . . . . .	0.96 — 0.98
6. Min. length of postmentum . . . . .	0.92 — 0.93
7. Max. width of postmentum . . . . .	0.42 — 0.43
8. Length of pronotum . . . . .	0.53 — 0.56
9. Max. width of pronotum . . . . .	0.96 — 0.98
10. No. of antennal segments . . . . .	(antennae broken)

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Gn. Batu near Bogor (present record). *Borneo* (HOLMGREN, 1913). *Sumatra* (HOLMGREN, 1914, eastern part): Soengei Bamban, Bah Boelian, Bahsoemboe, Tandjong Slamant. Also Siak (northern Sumatra, JOHN, 1925).

*Elsewhere* (HOLMGREN, 1913, 1914; JOHN, 1925): Malay Peninsula and Burma.

7. *Coptotermes kalshoveni* KEMNER

1934. *Coptotermes kalshoveni* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), p. 61. S. *Type-locality*: Semarang (Middle Java).

1949. *Coptotermes kalshoveni* KEM., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 80. Java.

## (a) MATERIAL

A vial (No. 26), 5 S. and 7 W., *F. R. I. Bogor* coll., x, 1951, Aek na Uli (near Prapat, E. Sumatra); ex. "*Pinus merkusii* forest".

## (b) MEASUREMENT (IN MM), ETC.

## (ii) SOLDIERS

	<i>Range</i> (5 exs.)
1. Total body-length (with mandibles but without antennae), <i>c.</i> . . . . .	3.3 — 3.6
2. Head-length with mandibles . . . . .	1.65 — 1.80
3. Head-length to lateral base of mandibles . .	1.13 — 1.26
4. Max. head-width . . . . .	1.00 — 1.10
5. Length of mandibles . . . . .	0.60 — 0.64
6. Min. length of postmentum . . . . .	0.56 — 0.62
7. Max. width of postmentum . . . . .	0.30 — 0.33
8. Length of pronotum . . . . .	0.36 — 0.38
9. Max. width of pronotum . . . . .	0.68 — 0.70
10. No. of antennal segments . . . . .	14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Semarang. *Sumatra* (present record): Aek na Uli (near Prapat, E. Sumatra)

*Elsewhere:* None.

8. *Coptotermes travians* HAVILAND

1898. *Termes (Coptotermes) travians* G. D. HAVILAND, *J. Linn. Soc. Lond. (Zool.)*, London, 26 (169), pp. 391-392, pl. 23, figs. 19-20 (S.), 21-22 (Im.). Im., S. and W. *Type-localities*: Singapore; and Sarawak (Borneo).
1913. *Coptotermes travians* HAV., N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 72-73, pl. 2, fig. 7 (S.) Im., S. and W. Malay Peninsula and Borneo.
1914. *Coptotermes travians* HAV., N. HOLMGREN, *Zool. Jb. (Syst.) Jena*, 36 (2-3), p. 236. Malay Peninsula (Singapore; Taiping, Malacca) and Indonesia (Sumatra and Java).
1925. *Coptotermes travians* HAV., O. JOHN, *Treubia*, Buitenzorg [= Bogor], 6 (3-4), p. 381. Malay Peninsula (Singapore and Kajang) and E. Sumatra (Kota Baroe).
1934. *Coptotermes travians* HAV., N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 62-64. Im., S. and W. Celebes and neighbouring small islands. [Mixed species according to KEMNER.]
1949. *Coptotermes travians* HAV., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 83. Malay Peninsula (Singapore); Indonesia (Sumatra, Java, Borneo); and India (Bengal).
1962. *Coptotermes travians* HAV., M. L. ROONWAL and O. B. CHHOTANI, *Indian Species of Termite Genus Coptotermes*, New Delhi (Indian Counc. Agric. Res., Ent. Monogr. No. 2), pp. 61-69; pls. 17 and 18, text-figs. 9 and 10; and Table 4. S. and W. India, E. Pakistan, Burma, Malay-Peninsula and Indonesia. [See discussion etc. in this paper.]

LOT I. — 12 vials, *F.R.I. Bogor coll.*, 1953-59, as follows: (i) No. 15, 1 Im., 5 S. and 5 Ny., 8.ii.54, Telawak, C. Java. (ii) No. 28, 2 Im., 4 S. and several W., 24.xi.59, Bogor, W. Java, ex "*Pinus merkusii*". (iii) No. 29, 10 S., 10.ix.59, Bogor, W. Java. (iv) No. 39, 2 Im., 4 S., 30.x.53, Pare, Kediri, E. Java, ex "*Albizia lebeeksrades* tree". (v) No. 40, 5 S. and several W., v. 53, Pare, Kediri, E. Java, ex "*Acacia leucophlaca* tree". (vi) No. 41, 2 Im., 4 S. and 2 Ny., 30.x.53, Pare, Kediri, E. Java. (vii) No. 44, 2 Im., 4 S. and several W., 24.i.56, Bogor, W. Java. (viii) No. 45, 2 Im., 3 S. and several W., Bogor, W. Java. (ix) No. 50, 1 S. and several W., 2.viii.54, Telawak, C. Java, ex "teak forest". (x) No. 52, 5 S. and several W., 8.ix.59, Janlapa (near Bogor), W. Java, ex "*Pinus merkusii* tree". (xi) No. 63, 5 S. and several W., 1.ii.53, Gedangan, C. Java, ex "teak forest". (xii) No. 79, 5 S. and several W., 23.xii.54, Gedangan, C. Java.

LOT II. — One vial (No. M<sub>2</sub>), several S. and W., *J. H. de Gunst coll.*, 3.ix.194...(?), Bogor, W. Java.

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGOS

	Range (6 exs.)
1. Total body-length (with wings), <i>c.</i> . . . . .	12.0 — 13.1
2. Total body-length (without wings), <i>c.</i> . . . . .	6.4 — 8.0
3. Head-length to lateral base of mandibles . . . . .	0.86 — 1.25
4. Max. head-width (with eyes) . . . . .	1.37 — 1.45
5. Max. diameter of eyes (with ocular sclerite)	0.35 — 0.45
6. Max. diameter of lateral ocellus . . . . .	0.13 — 0.17
7. Min. eye-ocellus distance . . . . .	0.01 — 0.03
8. Length of pronotum . . . . .	0.75 — 0.85
9. Max. width of pronotum . . . . .	1.30 — 1.35
10. Length of forewing (with scale) . . . . .	9.95 — 10.50
11. Length of hindwing (with scale) . . . . .	9.55 — 10.40
12. No. of antennal segments . . . . .	21 — 22

## (ii) SOLDIERS

	Range (27 exs.)
1. Total length (with mandibles; but without antennae), <i>c.</i> . . . . .	4.2 — 6.5
2. Head-length with mandibles . . . . .	2.00 — 2.26
3. Head-length to lateral base of mandibles . . . . .	1.23 — 1.46
4. Max. head-width . . . . .	1.00 — 1.25
5. Length of mandibles . . . . .	0.73 — 0.83
6. Min. median length of postmentum . . . . .	0.80 — 1.06
7. Max. width of postmentum . . . . .	0.35 — 0.45
8. Length of pronotum . . . . .	0.37 — 0.48
9. Max. width of pronotum . . . . .	0.70 — 0.93
10. No. of antennal segments . . . . .	14 — 15

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* All Java, as follows: Gedangan, Janlapa (near Bogor), Pare (Kediri), Telawak (all present record); also Buitenzorg (= Bogor) and Kedoengdjati (ROONWAL & CHHOTANI, 1962). *Borneo:* Serawak; Soengei Bamban and Tarakan (ROONWAL & CHHOTANI, 1962). *Sumatra:* Bahsoemboe, Kota Baroe and Tandjong Slammat (ROONWAL & CHHOTANI, 1962). *Celebes* (*vide* KEMNER, 1934, doubtful).

*Elsewhere:* India (Orissa, W. Bengal and Assam), E. Pakistan, Burma and Malaya.

## (d) REMARKS

Our imagos are somewhat larger than those described by HOLMGREN (1913), as follows: Head-width (with eyes) 1.37 - 1.45 mm. (*vs.* 1.18), width of pronotum 1.30 - 1.35 mm. (*vs.* 1.06), length of pronotum 0.75 - 0.85 mm. (*vs.* 0.61); and so on. The antennae of imagos have 21-22 segments (HAVILAND, 1898, originally mentioned only 19 segments).

Specimens were obtained from woods of the following species: *Acacia leucocephala* (tree), *Albizia lebeeksrades* (tree), and *Pinus merkusii*; and "teak forest".

Subfamily (b) RHINOTERMITINAE

Genus (4) *Prorhinotermes* SILVESTRI

9. *Prorhinotermes ravani* n. sp.

(Tables 2 and 3; and Text-figs. 3 and 4)

(a) MATERIAL

One vial (No. 57), with 5 soldiers and a few workers (major and minor), Sumberweringin (near Bondowoso), E. Java, alt. 700 m., lat. c. 7°56' S, long. c. 113°48' E, F.R.I. Bogor coll., 26.vii.1952, "ex. exotic garden".

(b) DESCRIPTION

1. IMAGO.

Unknown.

2. SOLDIER (Table 2; and Text-fig. 3)

*General*: Head-capsule pale yellow to golden yellow; frons and postclypeus slightly darker; mandibles reddish brown distally, reddish yellow basally; antennae, labrum and pronotum pale creamish white; mesonotum, metanotum, legs and abdomen paler than head; anteclypeus hyaline. Head, thorax and abdomen sparsely, antennae and legs somewhat strongly, hairy. Total body-length (with mandibles but without antennae) c. 5.8 - 6.8 mm.

*Head: General*: Head-capsule suboval, broadest at postero-lateral corner and converging anteriorly; sides slightly curved outwards; posterior margin broadly rounded, longer than broad (head-length to lateral base of mandibles 1.68 - 1.75; maximum width 1.42 - 1.46 mm.). *Fontanelle*: Distinct, round, translucent; situated at base of anterior-third of dorsum of head-capsule; occipito-fontanelle distance c. 1.16 - 1.20 mm.; aperture leading to a prominent, anteriorly broadening groove reaching upto the middle of postclypeus. *Eyes*: A pair of small translucent round eyes present, situated a little behind base of antennae. *Ocelli*: Absent. *Antennae*: Antennal carinae prominent, reddish brown, encroaching laterally over base of mandibles; antennae with 17 segments; segments 1 and 2 sparsely, and the rest moderately, pilose; segment 1 stout and longest, cylindrical,

with narrow base and broad apex; 2 cylindrical, narrower and shorter than 1; 3 considerably longer than 2; 4 shortest; 5 to the penultimate one pyriform; the last ovate, slightly narrower than the penultimate one.

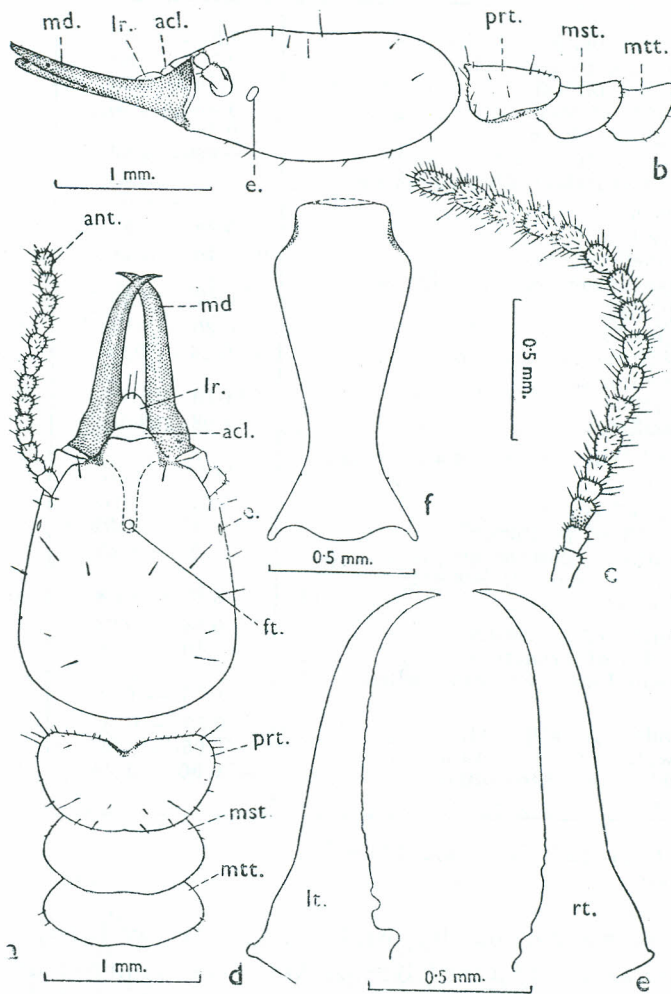


Fig. 3. *Prorhinotermes ravani* n. sp. Soldier (holotype). (a) Head and thorax, in dorsal view. (b) Ditto, in side view. (c) Right antenna. (d) Left mandible, in dorsal view. (e) Ditto, right mandible. (f) Postmentum, in ventral view. *acl.*, anteclypeus; *ant.*, antenna; *e.*, eye; *ft.*, fontanelle; *lr.*, labrum; *lt.*, Left; *md.*, mandible; *mst.*, mesonotum; *mtt.*, metanotum; *prt.*, pronotum; *rt.*, right.

*Labrum*: Almost tongue-shaped; slightly broader than long (median length 0.20 - 0.23 mm.; maximum width 0.26 - 0.30 mm.); sides slightly

TABLE 2. — *Prorhinotermes ravani* n. sp. Body-measurements (in mm) and indices, etc. of soldiers.

Body-parts	Range (3 exs.)	Holotype
1. Total body-length (with mandibles), <i>c.</i> . . . .	5.8 — 6.0	6.1
2. Length of head with mandibles . . . . .	2.73 — 2.82	2.85
3. Length of head to lateral base of mandibles . . . . .	1.68 — 1.73	1.75
4. Maximum width of head . . . . .	1.43 — 1.46	1.42
5. Minimum width of head . . . . .	0.95 — 0.98	0.97
6. Head Index (Maximum width/Length *) . . . . .	0.82 — 0.86	0.81
7. Head-convergence Index (Minimum width/ Maximum width) . . . . .	0.65 — 0.67	0.68
8. Maximum height of head . . . . .	0.82 — 0.84	0.82
9. Occipito-fontanelle distance . . . . .	1.16 — 1.20	1.20
10. Fontanelle-Head Index (Occipito-fontanelle distance/Head-length *) . . . . .	0.67 — 0.71	0.69
11. Median length of labrum . . . . .	0.20 — 0.22	0.23
12. Maximum width of labrum . . . . .	0.26 — 0.28	0.30
13. Length of mandibles:		
(a) Left mandible . . . . .	1.10 — 1.13	1.12
(b) Right mandible . . . . .	1.08 — 1.12	1.11
14. Mandible-Head Index (Left mandible length/ Head-length *) . . . . .	0.64 — 0.67	0.64
15. Median length of postmentum . . . . .	1.13 — 1.16	1.13
16. Maximum width of postmentum . . . . .	0.45 — 0.53	0.48
17. Minimum width of postmentum . . . . .	0.20 — 0.23	0.21
18. Head-postmentum Index (Postmentum length/Head-length *) . . . . .	0.65 — 0.68	0.65
19. Maximum length of pronotum . . . . .	0.58 — 0.63	0.59
20. Maximum width of pronotum . . . . .	1.10 — 1.16	1.10
21. Pronotum-Head Index (Pronotum-width/ Head-width) . . . . .	0.77 — 0.79	0.77
22. Pronotum Index (Length/Width) . . . . .	0.53 — 0.55	0.54
23. Maximum width of mesonotum . . . . .	0.95 — 1.05	1.05
24. Maximum width of metanotum . . . . .	0.96 — 1.06	1.06

\*) Length to lateral base of mandibles.

convex; anterior margin rounded, whitish and with two bristles. *Clypeus*: Divided into an ante- and a postclypeus. Anteclypeus narrow and hyaline; nearly as broad as labrum; anterior margin slightly convex, posterior margin wavy. Postclypeus longer and broader than anteclypeus. *Mandibles*: Sabre-shaped, with slightly incurved tips; broadest at base; inner margin, specially of right mandible, almost straight. Left mandible with minute crenulations on inner margin except near tip, and with two strong projections near base. Right mandible with 3-4 weak crenulations near base. *Postmentum*: Club-shaped; shorter than head-length without man-



dibles (median length of postmentum 1.13 - 1.16 mm.); broadest at base of anterior one-fifth, whence the sides narrowing anteriorly; posteriorly, sides also narrowing upto basal third and again widening out; anterior margin straight to weakly convex; posterior margin somewhat wavy and concave.

*Thorax: Pronotum:* Subreniform, flat, much narrower than head-width and much broader than long (maximum length 0.58 - 0.63, maximum width 1.10 - 1.16 mm.); antero-lateral corners rounded and with a few bristles; anterior margin substraight, with a wide median notch; sides weakly convex and converging posteriorly; posterior margin weakly convex with an indistinct median notch. *Mesonotum:* Narrower than pronotum; lateral angles rounded, with a few bristles on margin; posterior margin convex, with a distinct median notch. *Metanotum:* Almost as wide as mesonotum; lateral corners narrowly rounded with a few bristles on margin; posterior margin convex, with a small median notch. *Legs:* Moderately hairy; femora thickened; tibiae slender, a little longer than femora; apical tibial spur formula 3: 2: 2. Tarsi 4-segmented.

*Abdomen:* Oblong, moderately hairy laterally and dorsally, and strongly hairy ventrally. Cerci one-jointed, hairy, *c.* 0.10 - 0.15 mm. long. Styli one-jointed, hairy, *c.* 0.12 - 0.17 mm. long.

### 3. WORKER MAJOR (Table 3; and Text-fig. 4)

Head fuscous brown, rest of body paler. Head sparsely, and body moderately pilose. Total body-length (including mandibles) *c.* 4.8 - 5.2 mm. Head subcircular, slightly broader than long; Y-suture present but weak. Fontanelle small (diameter *c.* 0.12 - 0.20 mm.), situated at junction of Y-suture. Eyes small (diameter 0.10 - 0.13 mm.), not bulging laterally. Ocelli absent. Antennae with 16-17 segments; segment 1 longest, 2 subequal or longer than 3, 4 shortest. Labrum large, broader than long; broadest in middle; distal tip rounded. Anteclypeus small; postclypeus wider than long, divided in two lateral halves by a median suture. Mandibles of *Prorhinotermes*-type. Left mandible with an apical and 3 marginal teeth; 1st marginal short; 2nd larger than 1st; 3rd shortest. Right mandible also with an apical and 3 marginal teeth; 1st marginal rudimentary; 2nd larger than 1st and subequal to apical; 3rd short and blunt. Pronotum flat; much broader than long; narrowing behind; anterior margin weakly concave, with a prominent median notch. Mesonotum

slightly wider than pronotum; metanotum subequal to or slightly wider than mesonotum. Legs moderately hairy; femora rather stout and swollen. Apical tibial spur formula 3: 2: 2. Tarsi 4-segmented. Abdomen as in soldier; cerci 2-jointed, hairy, *c.* 0.16 mm. long. Styli one-jointed, *c.* 0.13 mm. long.

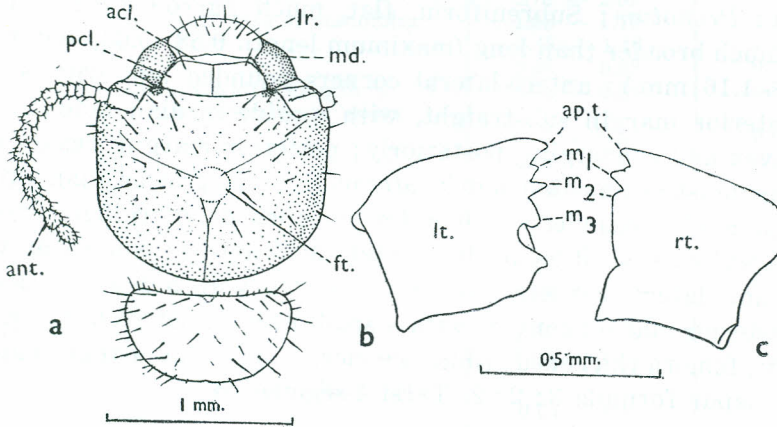


Fig. 4. *Prorhinotermes ravani* n. sp. Worker major (paratype). (a) Head and pronotum, in dorsal view. (b) Left mandible, in dorsal view. (c) Ditto, right mandible.

*aci.*, anteclypeus; *ant.*, antennae; *ap. t.*, apical tooth of mandibles; *ft.*, fontanelle; *lr.*, labrum; *lt.*, left; *md.*, mandible; *m<sub>1</sub>* - *m<sub>3</sub>*, first, second and third marginal teeth respectively of mandibles; *pcl.*, postclypeus; *prt.*, pronotum; *rt.*, right.

TABLE 3. — *Prorhinotermes ravani* n. sp. Body-measurements (in mm) of workers (major and minor).

Body-parts	Worker Major (5 exs.)	Worker Minor (1 exs.)
1. Length of head to tip of labrum . . . . .	1.33 — 1.38	1.14
2. Length of head to lateral base of mandibles . . . . .	1.06 — 1.11	0.80
3. Maximum width of head . . . . .	1.20 — 1.26	1.00
4. Height of head . . . . .	0.53 — 0.56	0.50
5. Median length of labrum . . . . .	0.28 — 0.33	0.17
6. Maximum width of labrum . . . . .	0.50 — 0.56	0.38
7. Maximum length of pronotum . . . . .	0.46 — 0.51	0.38
8. Maximum width of pronotum . . . . .	0.87 — 0.91	0.66
9. Maximum width of mesonotum . . . . .	0.90 — 0.94	0.67
10. Maximum width of metanotum . . . . .	1.00 — 1.10	0.82

## 4. WORKER MINOR (Table 3).

Resembles worker major, except in the following respects: (i) Body smaller (total body-length *c.* 3.3 *vs.* 4.8 - 5.2 mm.). (ii) Antennae with 13 - 14 (*vs.* 16-17) segments. (iii) Pronotum with posterior margin weakly (*vs.* strongly) convex.

## (c) TYPE-SPECIMENS

All type-specimens are in spirit and have been deposited as follows: *Holotype*: A holotype soldier in a vial (Z. S. I. Reg. No. 4359/H8) deposited in the Zoological Survey of India, Calcutta; data as in 'Material' above. *Paratypes*: (i) 2 soldiers and 4 workers, in a vial, in Museum Zoologicum Bogoriense, Bogor, Java. (ii) 1 soldier and 1 worker in a vial, with Prof. A. E. EMERSON, U.S.A. (iii) 1 soldier and 7 workers in a vial (Z.S.I. Reg. No. 4360/H8) in the Zoological Survey of India, Calcutta.

## (d) TYPE-LOCALITY AND GEOGRAPHICAL DISTRIBUTION

Type-locality: Sumberweringin (near Bondowoso), E. Java, alt. 700 m., lat. *c.* 7°56' S, long. *c.* 113°48' E.

Known only from the type-locality.

## (e) COMPARISONS

*Prorhinotermes ravani* n. sp. is close to *P. flavus* (BUGNION & POPOFF) from Ceylon, *P. japonicus* (HOLMGREN) from Formosa and *P. siva* ROONWAL & THAKUR from the Andaman Islands, but differs from them as follows:

1. From *P. flavus*. — SOLDIER: (i) Left mandible with weak crenulations all along inner margin except at tip (*vs.* with weak crenulation at base only). (ii) Right mandible with inner margin almost straight except at tip (*vs.* somewhat concave). (iii) Antennae with 17 (*vs.* with 18-20) segments; segment 3 well chitinised (*vs.* not so) and longer than 2 (*vs.* equal to or shorter than 2). (iv) Anterior margin of pronotum with a prominent median notch (*vs.* without notch). (v) Postmentum waist narrower.

2. From *P. japonicus*. — SOLDIER: (i) Head subrectangular and strongly convergent anteriorly (*vs.* suboval and weakly convergent anteriorly). (ii) Antennae with 17 (*vs.* 17-20) segments; segment 3 well chitinised

(*vs.* not so) and longer than 2 (*vs.* shorter \*). (iii) Median and transverse sutures on head dorsum not distinct (*vs.* distinct). (iv) Inner margin of right mandible almost straight except at tip (*vs.* concave). (v) Anterior margin of pronotum with distinct median notch (*vs.* without notch).

3. From *P. siva*. — SOLDIER: (i) Head subrectangular, strongly convergent anteriorly (*vs.* suboval, less convergent anteriorly). (ii) Left mandible with minute crenulation all along inner margin (*vs.* without crenulations). (iii) Inner margin of right mandible almost straight except at tip (*vs.* weakly concave). (iv) Anterior margin of pronotum substraight with a weak wide median notch (*vs.* with a deep notch). (v) Antennae with 17 (*vs.* 19) segments; segment 3 well chitinised (*vs.* not so). (vi) Postmentum broadest in anterior one-fifth (*vs.* in anterior one-third); minimum width smaller (0.20 - 0.23 *vs.* 0.26 - 0.29 mm.). (vii) Fontanelle groove gradually broadening anteriorly (*vs.* cylindrical).

Genus (5) *Schedorhinotermes* SILVESTRI

10. *Schedorhinotermes javanicus* KEMNER

1934. *Schedorhinotermes javanicus* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 51-54, text-fig. 7 (1-3), Im. and S. (major and minor). *Type-locality*: Java.  
 1949. *Schedorhinotermes javanicus* KEM., T. E. SNYDER, *Smith. misc. Coll.*, Washington, 112, p. 92. Java. (See this for other records, etc.).

(a) MATERIAL

A vial (No. 78), 6 S. (3 major, 3 minor), *F. R. I. Bogor* coll., iii.1958, Bogor (W. Java), ex. "*Pinus tree*".

(b) MEASUREMENTS (IN MM), ETC.

SOLDIERS

	Range	
	Major (3 exs.)	Minor (3 exs.)
1. Total body-length (with mandibles but without antennae), <i>c.</i> . . . . .	5.33 — 5.60	3.8 — 4.0
2. Head-length with mandibles . . . . .	2.20 — 2.32	1.45 — 1.51
3. Head-length to lateral base of mandibles . . . . .	1.43 — 1.50	0.87 — 0.93
4. Max. head-width . . . . .	1.46 — 1.50	0.78 — 0.82
5. Length of mandibles . . . . .	0.77 — 0.82	0.56 — 0.60
6. Min. length of postmentum . . . . .	0.98 — 1.10	0.57 — 0.60
7. Max. width of postmentum . . . . .	0.41 — 0.45	0.30 — 0.33
8. Length of pronotum . . . . .	0.48 — 0.52	0.39 — 0.42
9. Max. width of pronotum . . . . .	0.80 — 0.83	0.52 — 0.55
10. No. of antennal segments . . . . .	16	16

\*) According to Hozawa (1915), segment 2, in 18-segmented antennae, is smallest.

## (e) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Bogor (W. Java, present record); also "Java".

*Elsewhere:* None.

11. *Schedorhinotermes tarakanensis* (OSHIMA)

1914. *Rhinotermes* (*Schedorhinotermes*) *tarakanensis* M. OSHIMA, *Annot. Zool. Jap.*, Tokyo, 8, p. 564, pl. 10, fig. 2, S. (minor) and W. *Type-locality:* Tarakan (Borneo).  
 1920. *Rhinotermes* (*Schedorhinotermes*) *tarakensis* [sic!] OSH., M. OSHIMA, *Philipp. J. Sci.*, Manila, 17 (5), p. 492, pl. 3, figs. 5 and 7; pl. 4, figs. 6 and 7.  
 1921. *Rhinotermes* (*Schedorhinotermes*) *tarakensis* [sic!] OSH., S. F. LIGHT, *Philipp. J. Sci.*, Manila, 18 (3), p. 251.  
 1949. *Schedorhinotermes tarakanensis* (OSH.), T. E. SNYDER, *Smith. misc. Coll.*, Washington, 112, p. 95. Borneo; and Philippines (Luzon).

## (a) MATERIAL

A vial (No. R4/9.12.63); 5 S. (minor) and several W. (major and minor), M. L. Roonwal coll., 9.xii.1963, Peutjang Is. (near W. tip of Java), Java Sea.

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS (MINOR)

	<i>Range</i> (5 exs.)
1. Total body-length (with mandibles but without antennae), <i>c.</i> . . . . .	2.9 — 3.2
2. Head-length with mandibles . . . . .	1.12 — 1.26
3. Head-length to lateral base of mandibles . . . . .	0.70 — 0.76
4. Max. head-width . . . . .	0.68 — 0.73
5. Length of mandibles . . . . .	0.42 — 0.50
6. Min. length of posmentum . . . . .	0.44 — 0.50
7. Max. width of postmentum . . . . .	0.27 — 0.30
8. Length of pronotum . . . . .	0.30 — 0.35
9. Max. width of pronotum . . . . .	0.47 — 0.51
10. No. of antennal segments . . . . .	15

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Borneo:* Tarakan, *Peutjang Isl.* (near western tip of Java, Java Sea: present record).

*Elsewhere:* Philippines: Luzon.

## (d) REMARKS

The second antennal segment is one and a half times as long as the third.

12. *Schedorhinotermes translucens* (HAVILAND)

1898. *Termes translucens* G. D. HAVILAND, *J. Linn. Soc. Lond.*, London, 26 (169), pp. 394-395, pl. 23, figs. 23-26. Im., S. and W. *Type-locality*: Sarawak (Borneo).  
 1911. *Rhinotermes (Schedorhinotermes) translucens* (HAV.), N. HOLMGREN, *Mitt. Berlin. Zool. Mus.*, Berlin, 5 (3), p. 458. Im. Borneo (Sarawak); and 'German New Guinea' (Sattelberg near Finschhafen).  
 1913. *Rhinotermes (Schedorhinotermes) translucens* (HAV.), N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 83-85. Im., S. (major and minor) and W. Java, Borneo (Sarawak) and Celebes (Macassar).  
 1914. *Rhinotermes (Schedorhinotermes) translucens* (HAV.), N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36 (2-3), pp. 240-241. Im. Sumatra, Java, Borneo and Malacca.  
 1949. *Schedorhinotermes translucens* (HAZ.), T. E. SNYDER, *Smith. misc. Coll.*, Washington, 112 p. 96. (See this for further references).

## (a) MATERIAL

Two vials, imagos, from Java and W. Irian, as follows: (i) No. 19, 11 Im., Buitenzorg (= Bogor, W. Java), *J. Olthof* coll. 4.xi.1940. (ii) No. 4, 6 Im., Meervlakte, Idenburg River, West Irian (= W. New Guinea) (Ned. Ind.-Amerikaansche New Guinea-Exped. 1938-39), *L.J. Toxopeus* coll., 12.xi.1939.

## (b) MEASUREMENTS (IN MM), ETC.

## IMAGOS

	Range (5 exs.)
1. Total body-length with wings, <i>c.</i> . . . . .	12.0 — 15.0
2. Total body-length without wings, <i>c.</i> . . . . .	6.7 — 7.4
3. Head-length to lateral base of mandibles . . . . .	1.24 — 1.32
4. Max. head-width with eyes . . . . .	1.67 — 1.75
5. Max. diameter of eyes (with ocular sclerite)	0.47 — 0.53
6. Max. diameter of lateral ocellus . . . . .	0.13 — 0.18
7. Min. eye-ocellus distance . . . . .	0.06 — 0.07
8. Length of pronotum . . . . .	0.80 — 0.88
9. Max. width of pronotum . . . . .	1.40 — 1.55
10. Length of forewing with scale . . . . .	9.95 — 10.40
11. Length of hindwing with scale . . . . .	9.80 — 10.00
12. No. of antennal segments . . . . .	20

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Borneo*: Sarawak. *Celebes*: Macassar. *Java*: Bogor, W. Java (present record); also "Java". *Sumatra*: Eastern and central part. *West Irian* (= W. New Guinea): Meervlakte, Idenburg River (present record).

*Elsewhere*: Malay Peninsula: Malacca. New Guinea (North-East Territory): Sattelberg near Finschhafen, 'German New Guinea'; and "Kola [Samoa Hafen, Huon-Golf]" (HOLMGREN, 1911, pp. 458-459).

## (d) REMARKS

Our specimens agree in the size of body-parts with those described by HOLMGREN (1911) from Borneo and New Guinea.

Family III. TERMITIDAE  
Subfamily (a) AMITERMITINAEGenus *Microcerotermes* SILVESTRI

13. *Microcerotermes dammermani* n. sp.  
(Tables 4 and 5; and Text-figs. 5 and 6)

## (a) MATERIAL

One vial (No. 14), with 8 soldiers and 20 workers, *Dammerman* coll., 12.vi.1923, Durian (lat. c. 1°N, long. c. 104°E), Riouw (Rhio) Archipelago (south of Singapore), Indonesia.

## (b) DESCRIPTION

## 1. IMAGO.

Unknown.

## 2. SOLDIER (Table 4; and Text-fig. 5)

*General*: Head creamish yellow, labrum and pronotum paler; mandibles deep brown; antennae, legs and abdominal tergites yellowish white. Pilosity very sparse. Total body-length including mandibles c. 4.5 - 5.2 mm.

*Head*: Head-capsule subrectangular; length almost one and a half times the width (length without mandibles c. 1.45 - 1.55; maximum width c. 0.90 - 0.97 mm.); sides almost parallel, widest near base of antennae; posterior margin very weakly convex; with a few bristles on vertex and sides. *Fontanelle*: Indistinct. *Eyes and ocelli*: Absent. *Antennae*: With 13 segments; basal segments sparsely, and the remainder fairly, pilose; segment 1 cylindrical and longest; 2 slightly longer than 3 and subequal to 4; 5-8 subequal; 9-13 gradually increasing in length. *Labrum*: Subsquamish, slightly broader than long (maximum width 0.27 - 0.30; maximum length

0.22 - 0.25 mm.) ; distal end broadly rounded ; sides convex ; with two pairs of bristles on body. *Mandibles*: Sabre-shaped, long and slender, with strongly incurved tips ; almost one and a half times the length of head to lateral base of mandible (head-length 1.45 - 1.55 ; mandible length 0.96 - 1.13 mm.) ; inner margin finely serrated ; outer margin strongly convex. *Postmentum*: Elongate, shorter than head-length ; broadest at two-thirds the length from base, whence the sides gradually narrowing slightly in front ; posteriorly the sides narrowing to a waist and widening out again ; anterior margin weakly convex and with a few hairs ; posterior margin concave, slightly swollen medially.

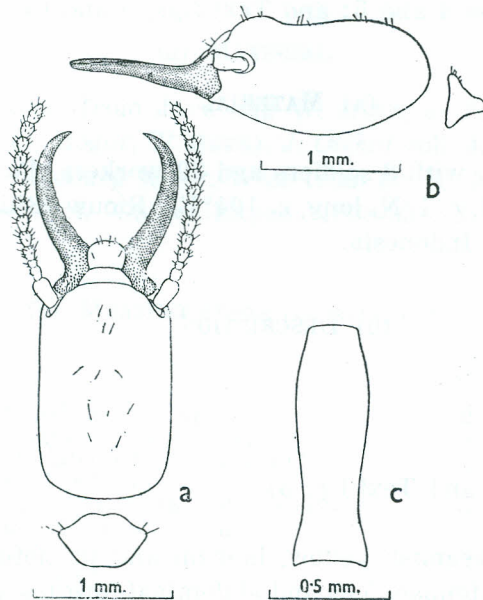


Fig. 5. *Microcerotermes dammermani* n. sp. Soldier (holotype). (a) Head and pronotum, in dorsal view. (b) Ditto, in side view. (c) Postmentum, in ventral view.

*Thorax: Pronotum*: Moderately saddle-shaped ; much narrower than head-capsule ; broader than long (width 0.58 - 0.65 ; length 0.33 - 0.37 mm.) ; fairly pilose ; antero-lateral angles narrowly rounded ; sides narrowing posteriorly ; anterior margin convex, with a weak median notch ; posterior margin convex, with a slight median incurving. *Legs*: Short, pilose ; apical tibial spur formula 2 : 2 : 2. Tarsi 4-segmented.



TABLE 4. — *Microcerotermes dammermani* n. sp. Body-measurements (in mm) etc. of soldiers.

Body-parts	Range (6 exs.)	Holotype
1. Total body-length (including mandibles), <i>c.</i> . . . . .	4.5 — 5.2	5.1
2. Length of head to lateral base of mandibles . . . . .	1.45 — 1.55	1.50
3. Maximum width of head . . . . .	0.90 — 0.98	0.98
4. Maximum height of head . . . . .	0.75 — 0.83	0.83
5. Head-Index I (Width/Length) . . . . .	0.61 — 0.65	0.65
6. Maximum length of labrum . . . . .	0.19 — 0.24	0.19
7. Maximum width of labrum . . . . .	0.27 — 0.30	0.30
8. Length of left mandible . . . . .	0.98 — 1.12	1.10
9. Head-mandibular length Index (Left mandible-length/Head-length) . . . . .	0.69 — 0.75	0.73
10. Minimum median length of postmentum . . . . .	0.90 — 0.98	0.95
11. Maximum width of postmentum . . . . .	0.27 — 0.32	0.30
12. Width of postmentum at anterior end . . . . .	0.20 — 0.22	0.22
13. Width of postmentum at waist . . . . .	0.20 — 0.23	0.23
14. Maximum length of pronotum . . . . .	0.33 — 0.37	0.34
15. Maximum width of pronotum . . . . .	0.58 — 0.65	0.63
16. Pronotum Index (Length/Width) . . . . .	0.54 — 0.57	0.54
17. No. of antennal segments . . . . .	13	13

*Abdomen:* Elongate and hairy. Cerci short, 2-segmented. Styli short, one-segmented.

### 3. WORKER (Table 5; and Text-fig. 6)

Head, postclypeus and labrum yellowish white; anteclypeus and antennae paler; mandibles brownish yellow, toothed margins deep brown; thorax pale yellowish white; rest of body whitish. Head and body sparsely pilose.

Head subsquarish, posteriorly broadly rounded; sides almost parallel; nearly as long as broad (length to lateral base of mandibles 1.00; maximum width 0.98 mm.); with a few bristles on dorsum. Fontanelle absent. Eyes and ocelli absent. Antennae short, with 13 segments; moderately pilose; segment 1 longest, broad and stout; 2 smaller than 1 and distinctly longer than 3, the latter shortest; 4-12 gradually increasing in length; the last (13) long and tapering, longer than the penultimate one. Clypeus: Divided into an ante- and a postclypeus. Anteclypeus narrow, apilose and sharply differentiated from postclypeus; anterior margin convex. Postclypeus large, with several hairs; moderately raised, well marked from frons by

a semicircular suture; divided medially by a vertical suture into two lateral halves. Labrum subrectangular, narrowing distally to form a rounded apex; broader than long; with several bristles on body. Mandibles of *Microcerotermes*-type. Left mandible with an apical and 2 marginal teeth; apical finger-like; 1st marginal stout and smaller than apical; 2nd small and blunt, widely separated from the 1st. Right mandible also with

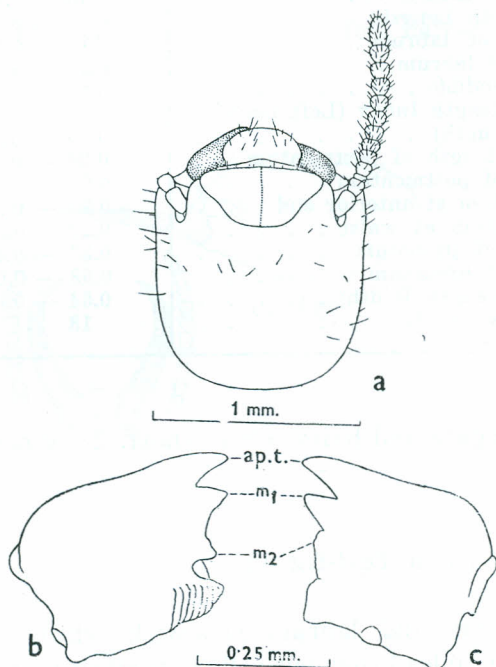


Fig. 6. *Microcerotermes dammermani* n. sp. Worker (paratype). (a) Head in dorsal view. (b) Left mandible, in dorsal view. (c) Ditto, right mandible. *ap.t.*, apical tooth of mandible; *m*<sub>1</sub>, *m*<sub>2</sub>, first and second marginal teeth respectively of mandibles.

an apical and 2 marginal teeth; apical stout and bluntly pointed; 1st marginal subequal or slightly smaller than apical; 2nd smaller than and lying close to 1st and with a long posterior margin. Pronotum weakly saddle-shaped; with a few bristles. Legs short and moderately pilose; apical tibial spur formula 2:2:2. Tarsi 4-segmented. Abdomen elongate, pilose. Cerci short, 2-segmented. Styli short, one-segmented.

TABLE 5. — *Microcerotermes dammermani* n. sp. Body-measurements (in mm) etc. of worker.

Body-parts	1 ex.
1. Total body-length (excluding antennae) c. . . . .	3.2
2. Length of head to tip of labrum . . . . .	1.18
3. Length of head to lateral base of mandibles . . . . .	1.00
4. Maximum width of head . . . . .	0.98
5. Maximum height of head . . . . .	0.50
6. Maximum length of postclypeus . . . . .	0.26
7. Maximum width of postclypeus . . . . .	0.50
8. Maximum length of labrum . . . . .	0.23
9. Maximum width of labrum . . . . .	0.30
10. No. of antennal segments . . . . .	13

## (c) TYPE-SPECIMENS

All specimens in spirit and from a single source (see above under 'Material'). *Holotype*: A soldier in a vial, Z. S. I. Reg. No. 4381/H8; deposited in the Zoological Survey of India, Calcutta. *Paratypes* (soldiers and workers) deposited as follows: (a) 3 soldiers and 10 workers, in a vial, deposited in Museum Zoologicum Bogoriense, Bogor, Indonesia. (b) 2 soldiers and 8 workers, in a vial, Z. S. I. Reg. No. 4382/H8, deposited in the Z. S. I., Calcutta. (c) A soldier and a worker, in a vial, deposited in Forest Research Institute, Dehra Dun. (d) A soldier and a worker, in a vial, deposited with Prof. A. E. EMERSON, U. S. A.

## (d) TYPE-LOCALITY AND GEOGRAPHICAL DISTRIBUTION

Type-locality: Durian, Riouw (Rhio) Archipelago, Indonesia.  
Known only from the type-locality.

## (e) COMPARISONS

*Microcerotermes dammermani* n. sp. is close to *M. los-banosensis* OSHIMA from Los Banos (Luzon, the Philippines) and *M. celebensis* KEMNER from the Celebes, but differs from them as follows:

1. From *M. los-banosensis*: SOLDIER: (i) Head smaller (length to lateral base of mandibles 1.45 - 1.55 vs. 1.66 - 1.72 mm.). (ii) Mandibles long in relation to head (Head-mandibular length Index, i.e., Left mandible-length/Head-length, 0.69 - 0.75 vs. 0.54). (iii) Mandibles thinner (width at middle 0.15 vs. 0.18 mm.).

2. From *M. celebensis*: SOLDIER: (i) Mandibles thin and minutely serrated (*vs.* thick and rather coarsely serrated). (ii) Mandibles longer in relation to head (Head-mandibular length index, *i.e.*, Left mandible length/Head-length, 0.69 - 0.75 *vs.* 0.55). (iii) Fontanelle not visible (*vs.* distinct). (iv) Labrum at the apex broadly rounded (*vs.* rather pointed).

### Subfamily (b) TERMITINAE

#### Genus (7) *Capritermes* WASMANN

#### 14. *Capritermes buitenzorgi* HOLMGREN

- 1914a. *Capritermes (Capritermes) buitenzorgi* N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36 (2-3), p. 280, pl. 7, fig. 26 (S.), S. and W. *Type-localities*: Java (Tjibodas); Malacca (Tandjong, Slammat).
- 1914b. *Capritermes (Capritermes) approximatus* N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36 (2-3), p. 283. Im. *Type-locality*: Buitenzorg (= Bogor, W. Java).
1934. *Capritermes buitenzorgi* HOLMG., N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 175-178, text-fig. 52 (Im.), Im., S. and W. Western Java: Buitenzorg (= Bogor) and Tjiandjoer.
1949. *Capritermes buitenzorgi* HOLMG., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 192. Java; Malay Peninsula.

#### (a) MATERIAL

Two vials, S. and W., Peutjang Is. (near western tip of Java), Java Sea, *M. L. Roonwal* coll., 9.xii.1963, as follows: (i) No. R1./9.12.63, 2 S. and several W. (ii) No. R2./9.12.63, several S. and W.

#### (b) MEASUREMENTS (IN MM), ETC.

##### (i) SOLDIERS

	<i>Range</i> (5 exs.)
1. Total body-length (with mandibles but without antennae), <i>c.</i> . . . . .	5.6 — 6.0
2. Head-length with mandibles . . . . .	3.93 — 4.16
3. Head-length to lateral base of mandibles . . . . .	2.26 — 2.43
4. Max. head-width . . . . .	1.30 — 1.40
5. Length of mandibles . . . . .	1.66 — 1.73
6. Min. length of postmentum . . . . .	1.30 — 1.42
7. Max. width of postmentum . . . . .	0.40 — 0.42
8. Length of pronotum . . . . .	0.30 — 0.34
9. Max. width of pronotum . . . . .	0.70 — 0.76
10. No. of antennal segments . . . . .	14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* (Bogor, W. Java). *Peutjang Isl.*, near western tip of Java, Java Sea (present record).

*Elsewhere:* Malaya peninsula: Malacca (Tandjong, Slammat).

## (d) REMARKS

*Field notes* (M. L. R.): Obtained below bark of a rotten piece of wood and in humid soil; the inside of wood was not attacked. Workers were very numerous and soldiers rare. Also some tiny, whitish Collembola were associated; they ran quickly and also jumped fast. Both workers and soldiers were sluggish.

15. *Capritermes mohri* KEMNER

1934. *Capritermes Mohri* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 178-179, text-fig. 53 (1-2, Im.; 3-5 S.), Im., S., W. *Type-locality:* Buitenzorg (= Bogor, W. Java).
1949. *Capritermes mohri* KEM., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 195. Java.

## (a) MATERIAL

A vial (No. 3), 1 S. (mixed with *Macrotermes gilvus* HAGEN), *Djafar* coll., 7.xii.1963, Bogor (W. Java).

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS

	<i>One ex.</i>
1. Total body-length (with mandibles but without antennae), c. . . . .	5.7
2. Head-length with mandibles . . . . .	3.62
3. Head-length to the lateral base of mandibles . . . . .	2.26
4. Max. head-width . . . . .	1.23
5. Length of mandibles . . . . .	1.36
6. Min. length of postmentum . . . . .	1.30
7. Max. width of postmentum . . . . .	0.83
8. Length of pronotum . . . . .	0.97
9. Max. width of pronotum . . . . .	0.76
10. No. of antennal segments . . . . .	(Broken, 11 present)

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java: Bogor (W. Java).*

*Elsewhere: None.*

16. *Capritermes santschii* SILVESTRI

1922. *Capritermes santschii* F. SILVESTRI, *Rec. Indian Mus.*, Calcutta, 24 (4), pp. 538-541, fig. 3, Im. (♀ alate). *Type-locality: Padang-Pandjang (Sumatra).*
1949. *Capritermes santschii* SILV., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 197. Sumatra.

## (a) MATERIAL

A vial (No. M6), 3 S., several W. and Ny., *Dammerman coll.*, 12.vi. 1923, Durian (Riouw [Rhio] Archipelago, south of Singapore).

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS

	<i>Range (3 exs.)</i>
1. Total body-length (with mandibles but without antennae), <i>c.</i> . . . . .	6.3 — 6.7
2. Head-length with mandibles . . . . .	3.45 — 3.56
3. Head-length to lateral base of mandibles . . . . .	2.00 — 2.10
4. Max. head-width . . . . .	1.00 — 1.13
5. Length of mandibles . . . . .	1.40 — 1.46
6. Min. length of postmentum . . . . .	1.05 — 1.15
7. Max. width of postmentum . . . . .	0.10 — 0.14
8. Length of pronotum . . . . .	0.25 — 0.30
9. Max. width of pronotum . . . . .	0.60 — 0.65
10. No. of antennal segments . . . . .	14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Riouw (Rhio) Archipelago (south of Singapore): Durian (present record). Sumatra: Padang-Pandjang.*

*Elsewhere: None.*

## (d) REMARKS

Our soldiers are somewhat larger than those described by SILVESTRI (1922), as follows: Head-length: with mandibles 3.45 - 3.56 mm. (*vs.* 3.12), without mandibles 2.00 - 2.10 mm. (*vs.* 1.87 - 2.08); and so on,

## Subfamily (c) MACROTHERMITINAE

Genus (8) *Macrotermes* HOLMGREN17. *Macrotermes carbonarius* (HAGEN)

1858. *Termes carbonarius* H. A. HAGEN, *Linn. Ent.*, Berlin, 12, pp. 130-133, pl. 1, fig. 2 (S.); pl. 2, fig. 8 (forewing), pl. 3, fig. 12 (head and pronotum of imago). Im. and S. *Type-locality*: "Borneo"; and Pulo Penang (Borneo).
1898. *Termes carbonarius* HAG., G. D. HAVILAND, *J. Linn. Soc. Lond. (Zool.)*, London, 26 (169), p. 380, Im. and S. (major and minor) and W. Singapore, Malacca and Thailand; also "Borneo?".
1913. *Termes (Macrotermes) carbonarius* HAG., N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 93-94, pl. 3, figs. 1 (Im.), 2 (S. major) and 3 (S. minor). Im., S. (major and minor) and W. (major and minor). Borneo, Malay Peninsula (Malacca and Singapore) and Thailand.
1914. *Termes (Macrotermes) carbonarius* HAG., N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36, p. 242. Malacca (Ulu Pemas, Negri Sembilan).
1925. *Macrotermes carbonarius* (HAG.). O. JOHN, *Treubia*, Buitenzorg (= Bogor), 6 (3-4), p. 385, pl. 17, figs. 7 and 8 (queen and associates); pl. 18, fig. 9 (nest); pl. 23, figs. 27 and 28 (fungus combs). King, queen, S. (major and minor), W. and Ny. Malay Peninsula: Johore, Segamat.
1949. *Macrotermes carbonarius* (HAG.), T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 210. Borneo, Malay Peninsula and Thailand.

## (a) MATERIAL

2 vials, *Dammerman* coll., 1923, Doerian (= Durian), Riouw (Rho) Archipelago (S. of Singapore), Indonesia, as follows: (i) No. M8, 4 Im., 4 S. (1 major, 3 minor), 17.xi.23. (ii) No. M9, 4 S. (major), vi. 23.

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGOS

	Range (3 exs.)
1. Total body-length (with wings), c. . . . .	28.5 — 29.3
2. Total body-length (without wings), c. . . . .	16.6 — 17.3
3. Head-length to lateral base of mandibles . . . . .	2.00 — 2.53
4. Max. head-width (with eyes) . . . . .	3.16 — 3.20
5. Max. diameter of eyes (with ocular sclerite) . . . . .	0.76 — 0.81
6. Max. diameter of lateral ocellus . . . . .	0.30 — 0.33
7. Max. eye-ocellus distance . . . . .	0.28 — 0.30
8. Length of pronotum . . . . .	1.67 — 1.83
9. Max. width of pronotum . . . . .	3.28 — 3.41
10. Length of forewing (with scale) . . . . .	25.33 — 26.66
11. Length of hindwing (with scale) . . . . .	24.30 — 24.40
12. No. of antennal segments . . . . .	19

## (ii) SOLDIERS

	Range	
	Major (4 exs.)	Minor (3 exs.)
1. Total length (with mandibles but without antennae), c. . . . .	15.0 — 15.3	9.9 — 10.0
2. Head-length with mandibles . . . . .	7.19 — 7.69	5.33 — 5.86
3. Head-length to lateral base of mandibles . . . . .	4.66 — 4.93	3.46 — 3.76
4. Max. head-width . . . . .	3.73 — 4.13	2.73 — 2.96
5. Length of mandibles . . . . .	2.53 — 2.76	2.00 — 2.16
6. Min. median length of postmentum . . . . .	3.32 — 3.35	2.50 — 2.60
7. Max. width of postmentum . . . . .	1.10 — 1.12	0.77 — 0.88
8. Length of pronotum . . . . .	1.46 — 1.52	1.13 — 1.23
9. Max. width of pronotum . . . . .	2.76 — 3.00	2.13 — 2.30
10. No. of antennal segments . . . . .	17	17

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Riouw (Rhio) Archipelago*, south of Malaya Peninsula (present record): Doerian (= Durian). Borneo.

*Elsewhere*: Malay Peninsula: Singapore; Johore; Segamat; Ulu Pedas, Negri Sembilan, Malacca. Also Thailand.

## (d) REMARKS

The head of both imagos and soldiers is deep brown (HAGEN, 1858, gave the colour as jet black, which was probably an error).

The labrum of soldiers major is laterally swollen and vase-shaped, with the hyaline tip having a broad base and an abruptly pointed apex (HAGEN, 1858, Pl. 1, Fig. 2, showed the labrum as quadrate with an acuminate white tip).

18. *Macrotermes gilvus* (HAGEN)

1858. *Termes gilvus* H. A. HAGEN, *Linn. Ent.*, Berlin, 12, p. 148, pl. 3, fig. 14. Im. queen and S. (major and minor). *Type-locality*: Java.
1913. *Termes (Macrotermes) gilvus* (HAGEN), N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 98-100, pl. 3, figs. 9-11. Im., S. (major and minor) and W. (major and minor). Borneo (including Sarawak), Celebes, Java, Sumatra, Timor, Malacca, Singapore, Philippines.
1921. *Termes gilvus* (HAGEN), S. F. LIGHT, *Philipp. J. Sci.*, Manila, 18 (3), p. 251.
1925. *Macrotermes gilvus* (HAGEN), O. JOHN, *Treubia*, Buitenzorg, 6, p. 285, pls. XVI-XIX, figs. 5, 10, 11, king, S. W. and Ny. Borneo, Celebes, Java, Malay Peninsula, Sumatra, Timor, Philippines.
1934. *Macrotermes gilvus* (HAGEN), N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 72-77, text-figs. 9a, b. Im., S. (major and minor), W. (major and minor). Java.
1949. *Macrotermes gilvus* (HAGEN), T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 211. Malay Peninsula, Java, Borneo, Sumatra, Celebes, Philippines.



## (a) MATERIAL

A large collection of 33 vials, all from Java, imagos, soldiers (major and minor) and workers (major and minor) and nymph as follows:

LOT I. — 2 vials, Bandung (W. Java), *Prof. Tisna* coll. 5.xii. 1963, as follows: (i) No. R1/5.12.63, several S. (minor) and W., garden, Institute of Technology, Bandung. (ii) No. R2/5.12.63, 10 S. (1 major, 9 minor), several W., garden of a house in Bandung.

LOT II. — (iii) A vial (No. R3/8.12.63), 1 S. (major), several S. (minor), several W., *M. L. Roonwal* coll., 8.xii.1963, Station No. 2 (Tjigenter, close to sea-shore), Udjong Kulon (W. Java).

LOT III — 11 vials, Bogor (W. Java). *Djafar* coll., 1963, as follows: (iv) No. 4, 3 S. (minor), several W., 7.xii.63. (v) No. 6, 6 S. (1 major, 5 minor), 10 W., 7.xii.63. (vi) No. 9, 2 S. (major), several S. (minor), 2 W., 7.xii.63. (vii) No. 11, several W., 7.xii.63. (viii) No. 12, 12 S. (9 major, 3 minor), 8.xii.63. (ix) No. 13, 4 S. (1 major, 3 minor), several W., 8.xii.63. (x) No. 14, 3 S. (minor), several W., 8.xii.63. (xi) No. 15, several W., 8.xii.63. (xii) No. 16, 2 S. (minor), several W., 8.xii.63. (xiii) No. 17, 3 S. (1 major, 2 minor), several W., 8.xii.63. (xiv) No. 18, 3 S. (major), 8 W., 8.xii.63.

LOT IV. — (xv) 1 vial (No. 18), 1 Q., 3 S. (2 major, 1 minor), 2 W., *Dammerman* coll., ix. 1924, Buitenzorg (= Bogor), W. Java.

LOT V. — 18 vials, *F.R.I. Bogor* coll., 1949-62, as follows: (xvi) No. 2, 3 S. (minor), several W., 10.v.54, Banjuglugur (E. Java), ex. "*Schleichera oleosa* forest for lac cultivation". (xvii) No. 3, 4 S. (2 major, 2 minor), 16.v.54, Besuki (E. Java), ex. "*Schleichera* forest for lac cultivation". (xviii) No. 4, 2 S. (major) [1 parasitised], 2 S. (minor), 9 W. (1 major, 8 minor), 16.v.54, Besuki (E. Java), ex. "*Schleichera* forest for lac cultivation". (xix) No. 5, 1 S. (major), 10 W., 3.ix.52, Pare (near Kediri, E. Java), ex. "*Schleichera* forest for lac cultivation". (xx) No. 7, 1 S. (minor), 5 W., 10.vi.54, Kediri (E. Java). (xxi) No. 8, 4 S. (2 major, 2 minor), 9 W. (3 major, 6 minor), 16.v.54, Besuki (E. Java). (xxii) No. 14, 1 Im., 2 S. (1 major, 1 minor), 8 W., 10.v.54 Pare (E. Java). (xxiii) No. 18, 6 S. (minor), 9 W. (8 major, 1 minor), 1 Ny., 20.v.54, Besuki (E. Java). (xxiv) No. 23, 4 S. (2 major, 2 minor), 10 W. (7 major, 3 minor), 7.vii.61 Djatibarang (W. Java). (xxv) No. 32, 2 S. (major), 10 W., 3.ix.53, Pare (E. Java). (xxvi) No. 35, 1 Im., 4 S. (major) [parasitised], 1 W., 17.vi.52 (Central Java), ex. "teak forest". (xxvii) No. 47, 2 S. (major), 3 W., 17.v.

54, Gn. Batu, Bogor (W. Java). (xxviii) No. 51, 4 S. (3 major, 1 minor), several W., 14.x.49, Bogor (W. Java). (xxix) No. 62, 5 S. (1 major, 4 minor), 8 W. (2 major, 1 minor), 21.v.54, Banjuglugur, Besuki (E. Java). (xxx) No. 66, 1 Im., 3 S. (2 major, 1 minor), 7 W., 9.vi.52, Gedangan (Central Java). (xxxi) No. 70, 1 Im. 5 S. (3 major, 2 minor), 1 Ny., 20.xi.60, Gedangan (Central Java). (xxxii) No. 81, 4 s. (3 major, 1 minor), 7 W. (2 major, 5 minor), 2 Ny., v. 54, Gedangan (Central Java). (xxxiii) No. 88, 5 S. (1 major, 4 minor), 3.xi.53, Kandangan Besowo, Malang (E. Java).

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGOS

	<i>Range</i> (2 exs.)
1. Total body-length (with wings), <i>c.</i> . . . . .	26.0 — 27.1
2. Total body-length (without wings), <i>c.</i> . . . . .	11.7 — 12.0
3. Head-length to lateral base of mandibles . . . . .	1.85 — 2.25
4. Max. head-width (with eyes) . . . . .	2.25 — 2.80
5. Max. diameter of eyes (with ocular sclerite) . . . . .	0.73 — 0.77
6. Max. diameter of lateral ocellus . . . . .	0.25 — 0.35
7. Min. eye-ocellus distance . . . . .	0.10 — 0.15
8. Length of pronotum . . . . .	1.30 — 1.35
9. Max. width of pronotum . . . . .	2.45 — 2.50
10. Length of forewing (with scale) . . . . .	24.0 — 24.8
11. Length of hindwing (with scale) . . . . .	23.0 — 23.7
12. No. of antennal segments . . . . .	19

## (ii) SOLDIERS

	<i>Range</i>	
	<i>Major</i> (15 exs.)	<i>Minor</i> (15 exs.)
1. Total length (with mandibles but without antennae), <i>c.</i> . . . . .	8.0 — 9.0	6.2 — 6.8
2. Head-length with mandibles . . . . .	4.90 — 5.79	3.50 — 3.95
3. Head-length to lateral base of mandibles . . . . .	3.20 — 4.00	2.00 — 2.86
4. Max. head-width . . . . .	2.65 — 3.33	1.60 — 2.70
5. Length of mandibles . . . . .	1.50 — 1.82	1.16 — 1.45
6. Min. median length of postmentum . . . . .	2.30 — 2.65	1.16 — 1.55
7. Max. width of postmentum . . . . .	0.73 — 0.90	0.46 — 0.56
8. Length of pronotum . . . . .	1.15 — 1.45	0.82 — 1.00
9. Max. width of pronotum . . . . .	2.10 — 2.60	1.25 — 1.80
10. No. of antennal segments . . . . .	17	17

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Borneo. Celebes. Java:* Bandung, Banjuglugur, Besuki, Bogor, Djatibarang, Gedangan, Gn. Batu, Kandangan, Kediri, Manggar, Pare, Ujung Kulon (all present record). *Sumatra,*

*Elsewhere:* Malay Peninsula and Philippines.

## (d) REMARKS

*Field notes* (M.L.R.): The material from Udjung Kulon, W. Java (Roonwal coll.) was obtained from galleries in a relatively small, sprawling earthen mound (height c. 60 cm.; diameter at base c. 90 cm.) at the base of a tree (*Lagerstroemia* sp.).

19. *Macrotermes malaccensis* (HAVILAND)

1898. *Termes malaccensis* G. D. HAVILAND, *J. Linn. Soc. Lond. (Zool.)* London, 26 (169), p. 381, S. (major and minor) and W. *Type-locality*: Malacca.
1912. *Gnathotermes Aurivilli* N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 48 (4), p. 23, fig. 6b (S., head), pl. 2, fig. 8 (S), Billiton Isl. [Parasitised soldiers, *vide* KEMNER, 1925, *infra*].
1912. *Gnathotermes Havilandi* N. HOLMGREN, *Ibid.*, p. 23, fig. 6a (S., head) Johore. [Parasitised soldiers, *vide* KEMNER, 1925, *infra*].
1913. *Termes (Macrotermes) malaccensis* HAV., N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), p. 96, pl. 3, figs. 7 (S. major) and 8 (S. minor). Im., S. (major and minor) and W. Malacca, Johore and Banka (off S. E. Coast of Sumatra).
1914. *Termes (Macrotermes) malaccanensis* HAV., N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36, p. 242. Malacca (Selangor, Gab) and E. Sumatra (Lau Boentoe, Tandjong Slammat, Bahsoemboe and Bah Boelian).
1925. *Macrotermes malaccensis* (HAV.), O. JOHN, *Treubia*, Buitenzorg (= Bogor), 6 (3-4), p. 385, S. (minor) and W. Bukit Timah, Singapore.
1925. *Gnathotermes aurivilli* HOLMG. and *G. havilandi* HOLMG., N. A. KEMNER, *Arkiv. Zool.*, Stockholm, 17A (29), pp. 1-15. S. [Parasitised forms; shown to be *M. malaccanus aurivilli* (Billiton Isl. and Singapore) and *havilandi* (Malacca)].
1925. *Gnathotermes aurivilli* HOLMG., N. A. KEMNER, *Ent. Tidskr.*, Stockholm, 46 (3), pp. 157-163, S. (parasitised form of *M. malaccanus*). Singapore.
1949. *Macrotermes malaccensis* (HAV.), T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 214. Malay Peninsula, Sumatra and Billiton Isl.

## (a) MATERIAL

A vial (No. M10), 3 Im., *Dammerman* coll., vi. 1923, Doerian (= Durian), Riouw (Rhio) Archipelago (south of Singapore), Indonesia; ex "at light".

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGOS

	Range (3 exs.)
1. Total body-length (with wings), c. . . . .	20.3 — 23.5
2. Total body-length (without wings), c. . . . .	10.3 — 12.5
3. Head-length to lateral base of mandibles . . . . .	1.86 — 2.00
4. Max. head-width (with eyes) . . . . .	2.50 — 2.60
5. Max. diameter of eyes (with ocular sclerite) . . . . .	0.65 — 0.70
6. Max. diameter of lateral ocellus . . . . .	0.20 — 0.25
7. Min. eye-ocellus distance . . . . .	0.26 — 0.30
8. Length of pronotum . . . . .	1.42 — 1.60
9. Max. width of pronotum . . . . .	2.56 — 2.66
10. Length of forewing (with scale) . . . . .	19.3 — 19.8
11. Length of hindwing (with scale) . . . . .	18.0 — 18.2
12. No. of antennal segments . . . . .	19

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Riouw (Rhio) Archipelago* (south of Malaya Peninsula) (present record): *Durian, Sumatra, Billiton Island* and *Banka* (off S. E. coast of Sumatra).

*Elsewhere:* Malay Peninsula: *Bukit Timah*; *Singapore*; *Malacca*; *Johore*.

## (d) REMARKS

The 3rd antennal segment is almost one and a half times as long as the 2nd (HOLMGREN, 1913, stated that the 3rd segment is smaller than the 2nd).

Genus (9) *Odontotermes* HOLMGREN20. *Odontotermes grandiceps* HOLMGREN

1912. *Odontotermes* [?*Cyclotermes*] *grandiceps*, N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 48 (4), p. 38. *Java. Nomen nudum*.
1913. *Odontotermes* (*Odontotermes*) *grandiceps*, N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 134-135, pl. 4, fig. 8 (Im), pl. 5, fig. 7 (S.), Im., S. and W. *Type-locality:* Java: Nongkodjadar (1200 m. alt).
1914. *Odontotermes grandiceps* HOLMG., N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36, p. 244. *Java, E. Sumatra and Malacca*.
1934. *Odontotermes grandiceps* HOLMG., N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 91-93, text-fig. 14 (S.). Im., S. and W. *Java: Buitenzorg (= Bogor) and Tjisolak, Tjitjourouk (= Tjitjurug)*.
1949. *Odontotermes grandiceps* HOLMG., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 228, *Java, E. Sumatra and Malacca*.

## (a) MATERIAL

A vial (No. 34), 3 S. and several W., *F. R. I. Bogor* coll., 9.i.1953, Gedangan, C. Java.

## (b) MEASUREMENTS (IN MM), ETC.

## (i) SOLDIERS

	Range (3 exs.)
1. Total body-length (with mandibles but without antennae), <i>c.</i> . . . . .	7.0 — 7.3
2. Head-length (with mandibles) . . . . .	3.90 — 3.98
3. Head-length to lateral base of mandibles . . . . .	2.60 — 2.65
4. Max. head-width . . . . .	2.15 — 2.20
5. Length of mandibles . . . . .	1.30 — 1.33
6. Min. length of postmentum . . . . .	1.61 — 1.65
7. Max. width of postmentum . . . . .	0.80 — 0.83
8. Max. length of pronotum . . . . .	0.83 — 0.85
9. Max. width of pronotum . . . . .	1.50 — 1.53
10. No. of antennal segments . . . . .	17

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Buitenzorg (= Bogor), Nongkodjadjar (1200 m. alt.), Tjiogrek, Tjibodas, Tjisolak, Tjitjourouk (Tjitjurug). Also: Gedangan, C. Java (present record). *Sumatra* (eastern part): Tebing Tinggi, Kwala Bingei, Soengei Bamban (HOLMGREN, 1914).

*Elsewhere:* Malaya Peninsula: Selangor, Malacca.

21. *Odontotermes javanicus* HOLMGREN

1913. *Odontotermes javanicus* N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 132-133, pl. IV, fig. 6 (Im.), pl. V, fig. 6 (S.), Im. and S. *Type-locality:* Salak (Java).
1914. *Odontotermes javanicus* HOLMG., N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36, p. 244. Soengei Bamban, Tebing Tinggi (E. Sumatra); and Tjiogrek, Buitenzorg [= Bogor] (Java).
1925. *Odontotermes javanicus* HOLMG., O. JOHN, *Treubia*, Buitenzorg, 6, p. 389, S. W. Malaya Peninsula: Selangor, Batu Caves.
1934. *Odontotermes javanicus* HOLMG., N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm (3) 34 (4), pp. 93-95, text-fig. 15, 1-3 (S.), Im., S. W. Buitenzorg, Depok, Vada (near Tjiandjoer); Madura Isl. (Java).
1949. *Odontotermes javanicus* HOLMG., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 230. Java, E. Sumatra and Malay Peninsula.

## (a) MATERIAL

LOT I. — 3 vials (mixed with *Macrotermes gilvus* HAGEN), Bogor (W. Java), *Djafar* coll., 7.xii.1963, as follows: (i) No. 4, 3 S. (ii) No. 6, 1 S. (iii) No. 9, 4 S.

LOT II. — 3 vials, Java, *F.R.I. Bogor* coll., 1954-56, as follows: (iv) No. 14, 3 S. (mixed with *Macrotermes gilvus* HAGEN), 10.vi.54, Pare (E. Java). (v) No. 46, 2 Im., 4 S., 7.viii.54, Gedangan (Central Java). (vi) No. 82, 3 S., several W., 22.ii.56, Gn. Batu (W. Java).

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGOS (dealates)

	Range (2 exs.)
1. Total body-length (without wings), <i>c.</i> . . . . .	8.0 — 10.0
2. Head-length to lateral base of mandibles . . . . .	1.56 — 1.63
3. Max. head-width (with eyes) . . . . .	2.33 — 2.40
4. Max. diameter of eyes (with ocular sclerite)	0.64 — 0.66
5. Max. diameter of lateral ocellus . . . . .	0.26 — 0.28
6. Min. eye-ocellus distance . . . . .	0.17 — 0.21
7. Length of pronotum . . . . .	1.10 — 1.13
8. Max. width of pronotum . . . . .	1.90 — 2.00
9. No. of antennal segments . . . . .	14

## (ii) SOLDIERS

	Range (8 exs.)
1. Total length (with mandibles but without antennae), <i>c.</i> . . . . .	6.0 — 6.8
2. Head-length with mandibles . . . . .	3.38 — 3.56
3. Head-length to lateral base of mandibles . . . . .	2.26 — 2.50
4. Max. head-width . . . . .	1.80 — 2.00
5. Length of mandibles . . . . .	1.06 — 1.15
6. Min. median length of postmentum . . . . .	1.40 — 1.53
7. Max. width of postmentum . . . . .	0.66 — 0.78
8. Length of pronotum . . . . .	0.65 — 0.82
9. Max. width of pronotum . . . . .	1.33 — 1.48
10. No. of antennal segments . . . . .	17

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Salak, Bogor [Buitenzorg], Tjiogrek, Depok, Vada (near Tjiandjoer), Madura Isl. *E. Sumatra:* Soengei Bamban, Tebing-Tinggi.

*Elsewhere:* Malay Peninsula: Selangor, Batu Caves.

## (d) REMARKS

Our soldiers are somewhat larger than those of KEMNER (1934), thus: Head-length with mandibles, 3.38 - 3.56 mm. (*vs.* 3.27 - 3.36), without mandibles, 2.26 - 2.50 mm. (*vs.* 2.19 - 2.40).

22. *Odontotermes makassarensis* KEMNER

1934. *Odontotermes makassarensis* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 100-102, text-fig. 18, Im. S. and W. *Type-locality*: Makassar (Celebes).
1949. *Odontotermes makassarensis* KEM., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 232. Celebes.

## (a) MATERIAL

Four vials, on Lake Bratan, Bali, *Dr. S. Somadikaria* coll., 1965, as follows: (i) A vial (No. 18), several W., Bedugul, 24.iii.65, 1200 m. alt. (ii) A vial (No. 19), 9 S. and several W., 24.iii.65, Bedugul, 1200 m. alt. (iii) A vial (No. 20), 1 S. and several W., 25.iii.65, Bedugul, 1200 m. alt. (iv) A vial (No. 21), 1 S. and several W., 28.iii.1965, Dadjan Danu, 1200 m. alt. (v) A vial (No. 22), 3 S. and several W., 29.iii.1965, Dadjan Danu.

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS

	<i>Range</i> (5 exs.)
1. Total body-length (with mandibles, but without antennae), <i>c.</i> . . . . .	5.2 — 6.2
2. Head-length with mandibles . . . . .	2.83 — 3.00
3. Head-length to lateral base of mandibles . . . . .	1.78 — 1.90
4. Max. head-width . . . . .	1.55 — 1.65
5. Length of mandibles . . . . .	0.98 — 1.10
6. Min. length of postmentum . . . . .	1.00 — 1.13
7. Max. width of pronotum . . . . .	0.64 — 0.70
8. Length of pronotum . . . . .	0.65 — 0.75
9. Max. width of pronotum . . . . .	1.05 — 1.15
10. No. of antennal segments . . . . .	17

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Bali*: On Lake Bratan as follows: Bedugul and Dadjan Danu, both *c.* 1200 m. alt. (all present record). *Celebes*: Makassar.

*Elsewhere*: None.

Genus (10) *Microtermes* WASMANN23. *Microtermes insperatus* KEMNER(i) *Microtermes insperatus* (KEMNER)

1934. *Microtermes insperatus*. N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm (3) 13 (4), pp. 106-109, text-fig. 21, 1-3 (Im), 4-5 (S.). Im., S. *Type-localities*: Java: Buitenzorg [= Bogor], Depok, Palimanan, Tjimango, Djember.

(ii) *Wrong identifications*

1913. *Microtermes pallidus* HAV., N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), pp. 147-148, pl. 6, figs. 2 (Im.), 7 (S.) Im., S. and W. Malacca, Singapore, Java.

1913. *Microtermes pallidus* HAV., N. HOLMGREN, *Tijds. Ent.*, The Hague, 56, p. 22.

1925. *Microtermes pallidus* HAV., O. JOHN, *Treubia*, Buitenzorg (= Bogor), 6, p. 390, Im., S. and W. Malay Peninsula: Johore, Segamat, Selangor, Kuala Lumpur, Batu Caves.

## (a) MATERIAL

LOT I. — 2. vials from Java, *Djafar* coll., 1963, as follows: (i) No. 2, 1 S., several W., 7.xii.1963, Bogor (W. Java). (ii) No. 6, 1 S. (mixed with *Macrotermes gilvus* HAGEN and *Odontotermes javanicus* HOLMGREN), 7. xii.1963, Bogor (W. Java).

LOT II. — 3 vials, Java, *F.R.I. Bogor* coll., 1953-58, as follows: (iii) No. 20, 1 Im. (dealate), 5 S., 10 W., 21.v.54, Banjuglugur (Besuki, E. Java), ex. "Schleichera forest". (iv) No. 43, 3 S. (major) 2 S. (minor), several W., 15.xii.58, Gn. Batu (W. Java). (v) No. 87, 5 S., several W., 3.xi.53, Kandangan, Besowo and Malang (E. Java).

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGO (dealate)

	<i>One ex.</i>
1. Total body-length (without wings), c. . . . .	2.1
2. Head-length to the lateral base of mandibles . . . . .	1.27
3. Max. head-width (with eyes) . . . . .	1.72
4. Max. diameter of eyes (with ocular sclerite) . . . . .	0.52
5. Max. diameter of lateral ocellus . . . . .	0.32
6. Min. eye-ocellus distance . . . . .	0.04
7. Length of pronotum . . . . .	0.95
8. Max. width of pronotum . . . . .	1.60
9. No. of antennal segments . . . . .	13 (broken)



## (ii) SOLDIERS

	Range (9 exs.)
1. Total length with mandibles but without antennae, c. . . . .	3.3 — 4.5
2. Head-length with mandibles . . . . .	1.33 — 1.56
3. Head-length to lateral base of mandibles . . . . .	0.83 — 1.00
4. Max. head-width . . . . .	0.80 — 0.96
5. Length of mandibles . . . . .	0.50 — 0.60
6. Min. median length of postmentum . . . . .	0.36 — 0.50
7. Max. width of postmentum . . . . .	0.43 — 0.50
8. Length of pronotum . . . . .	0.33 — 0.49
9. Max. width of pronotum . . . . .	0.60 — 0.73
10. No. of antennal segments . . . . .	15

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Buitenzorg (= Bogor), Depok, Palimanan (near Cheribon), Tjimango, Djember; also other places in E. and W. Java (present record).

*Elsewhere:* Malay Peninsula: Johore, Segamat, Selangor, Kuala Lumpur and Batu Caves.

## Subfamily (d) NASUTITERMITINAE

Genus (11) *Nasutitermes* BANKS (*nec.* DUDLEY)24. *Nasutitermes acutus* (HOLMGREN)(Syn. *N. buitenzorgi* (HOLMGREN))(i) *Nasutitermes acutus* (HOLMGREN)

1913. *Eutermes (Eutermes) acutus* N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), p. 189, Im. *Type-locality:* Wonosobo (Java).
1934. *Subutitermes (?) acutus* (HOLMG.), N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), p. 122.
1949. *Nasutitermes acutus* (HOLMG.), T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 265. Java, Sumatra, Malaya Peninsula.

(ii) *Nasutitermes buitenzorgi* (HOLMGREN)

1914. *Eutermes (Eutermes) buitenzorgi* N. HOLMGREN, *Zool. Jb. (Syst)*, Jena, 36, p. 263-264. Fig. 13 (S). S. and W. (major and minor). *Type-localities:* Buitenzorg [= Bogor] at foot of Salak (Java); and Tandjong Slammat (E. Sumatra).
1925. *Eutermes buitenzorgi* HOLMG., O. JOHN, *Treubia*, Buitenzorg [= Bogor], 6 (3-4), p. 395. S. and W. Depok (Java).
1934. *Subutitermes buitenzorgi* (HOLMG.), N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 117-120, text-figs. 25 (Im.), 26 (S.). Im. S. and W. Common all over Java.

## (a) MATERIAL

Four vials, Indonesia, *F. R. I. Bogor* coll., 1952-60, as follows: (i) No. 17, 3 S., 5 W. and 1 Ny., 29.xii.52, Gedangan, C. Java, ex. "teak forest". (ii) No. 27, 1 S., mixed with *Nasutitermes matangensis matangensis* (HAVILAND), 17.xii.60, Bual, Lombok Isl., ex "Albizzia forest". (iii) No. 55, 5 S. and several W., 17.xii.60, Bual, Lombok Isl. (alt 600 m.), ex "Albizzia tree". (iv) No. 75, 3 S. and 8 W., 29.xii.54, Gedangan, C. Java, ex "teak tree".

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS

	Range (5 exs.)
1. Total body-length (from tip of rostrum), c.	3.0 — 4.3
2. Head-length with rostrum . . . . .	1.27 — 1.40
3. Head-length without rostrum . . . . .	0.80 — 0.90
4. Length of rostrum . . . . .	0.47 — 0.53
5. Max. head-width . . . . .	0.77 — 0.85
6. Posterior bulge of head . . . . .	0.23 — 0.30
7. Length of pronotum . . . . .	0.15 — 0.20
8. Max. width of pronotum . . . . .	0.37 — 0.46
9. No. of antennal segments . . . . .	13

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Buitenzorg (= Bogor), Depok. Gedangan (present record), Wonosobo. *Sumatra:* Tandjong Slamat. *Lombok Isl.:* Bual (present record).

*Elsewhere:* Malay Peninsula: Pengaran, Johore.

25. *Nasutitermes matangensis matangensis* (HAVILAND)

1898. *Termes matangensis* G. D. HAVILAND, *J. Linn. Soc. Lond. (Zool.)*, London, 26 (169), pp. 427-428, Im., S. and W. *Type-locality:* Sarawak (Borneo).
1913. *Eutermes (Eutermes) matangensis* (HAVIL.), N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 48 (4), p. 63, pl. 3, figs. 3 (Im.), 4 and 5 (S.). Im. and S. Sarawak (Borneo).
1913. *Eutermes (Eutermes) matangensis* (HAVIL.), N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), p. 183-184, pl. 7, figs. 21 (Im.) and 22 (S.). Im., S. and W. Sarawak (Borneo); Krakatau Isl. (Sunda Straits).
1914. *Eutermes (Eutermes) matangensis* (HAVIL.), N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36, pp. 264-265. Bandar Baroe, 3500 ft. (C. Sumatra). Tjibodas (4500 ft.) and Buitenzorg [= Bogor] (Java). Maxwell's Hill (2000-4500 ft.), Taiping, Malacca (Malaya).

1925. *Eutermes (Eutermes) matangensis* (HAVIL.), O. JOHN, *Treubia*, Buitenzorg [= Bogor], 6 (3-4), p. 398, pl. 19, fig. 12; pl. 20, fig. 13. King, S. and W. Western Sumatra: Ujung Ayer-Pass, Barisan Mts.; Pajacombo; and Harau.
1949. *Nasutitermes matangensis* (HAVIL.), T. E. SNYDER, *Smiths. mic. Coll.*, Washington, 112, p. 287. Borneo, Java, Sumatra, Krakatau Isl., Malay Peninsula.
1959. *Nasutitermes matangensis matangensis* (HAVIL.), B. PRASAD and P. K. SENSARMA, *Revision of Nasutitermes from Indian Region*, New Delhi. (Govt. of India Press), pp. 46-51, text-figs. 18 (Im.), 19 (S.). Im., S. and W. Indo-China (Viet Nam): Saigon. Burma: Monhnit, Pyinmana.

## (a) MATERIAL

A vial (No. 27), 3 S. and 10 W. (mixed with *Nasutitermes acutus* HOLMGREN), F. R. I. Bogor coll., 17.xii.1960, Bual, Lombok Isl., ex. "Albizzia forest".

## (b) MEASUREMENTS (IN MM), ETC.

## (i) SOLDIERS

	Range (3 exs.)
1. Total body-length from tip of rostrum, c. . . . .	4.5 — 4.8
2. Head-length with rostrum . . . . .	1.77 — 1.90
3. Head-length without rostrum . . . . .	1.26 — 1.35
4. Length of rostrum . . . . .	0.61 — 0.66
5. Max. head-width . . . . .	1.25 — 1.30
6. Posterior bulge of head . . . . .	0.37 — 0.40
7. Length of pronotum . . . . .	0.21 — 0.25
8. Max. width of pronotum . . . . .	0.58 — 0.60
9. No. of antennal segments . . . . .	14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Borneo:* Sarawak. *Java:* Buitenzorg (= Bogor); Tjibodas (4500 ft.). *Lombok Isl.:* Bual (present record). *Sumatra:* Bander Barea (3500 ft.); Ujung Ayer Pass, Barisan Mts.; Harau; Pajacombo.

*Elsewhere:* Burma: Monhnit, Pyinmana. Indo-China (Viet Nam): Saigon. Malaya: Maxwell's Hill, 2000-4500 ft., Taiping, Malacca.

26. *Nasutitermes matangensis matangensiformis* (HOLMGREN)

(Syn. *Nasutitermes djemberensis* (KEMNER))

(i) *Nasutitermes matangensiformis* (HOLMGREN)

1913. *Eutermes (Eutermes) matangensiformis* N. HOLMGREN, *K. Sv. Vet. Akad. Handl.*, Stockholm, 50 (2), p. 185, Im., S. and W. *Type-locality:* Sarawak (Borneo); and Naukauri Is. (Nicobars, Indian Ocean).

1914. *Eutermes (Eutermes) matangensiformis* HOLMG., N. HOLMGREN, *Zool. Jb. (Syst.)*, Jena, 36, p. 265, Malaya: Maxwell's Hill, 3500 ft., Malacca. Borneo: Pulo Daat.
1923. *Nasutitermes matangensiformis* (HOLMG.), M. OSHIMA, *Capita Zool.*, The Hague 2 (3), pp. 16-18, figs. 13 (S.) and 14 (W.). Sinabang, Simalur (Sumatra).
1925. *Eutermes (Eutermes) matangensiformis* HOLMG. O. JOHN, *Treubia*, Buitenzorg [= Bogor], 6 (3-4); p. 398, Im., S. and W. Johore, Segamat (Malaya) and Java.
1949. *Nasutitermes matangensiformis* (HOLMG.), T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 286. Borneo, Java, Sumatra, Malay Peninsula, Nicobar Isl.
1956. *Nasutitermes matangensis matangensiformis* (HOLMG.), M. L. ROONWAL and P. K. SEN-SARMA, *Indian J. agric. Sci.*, New Delhi, 26 (2), pp. 27-29, S. Camorta Isl. (Nicobars. Indian Ocean).
- [1966.] *Nasutitermes matangensis matangensiformis* (HOLMG.), M. L. ROONWAL, *Bull. Syst. Zool.*, Calcutta, 1 (2) (in press). Anak Krakatau Isl. (Sunda Straits).

(ii) *Nasutitermes djemberensis* (KEMNER)

1934. *Eutermes djemberensis* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 128-129, fig. 31 (S.). S. and W. *Type-locality*: Djember (E. Java).

(iii) *Wrong determinations*

1925. *Eutermes (Eutermes) javanicus* (HOLMG.) O. JOHN. *Treubia*, Buitenzorg [= Bogor], 6 (3-4), p. 394. S. and W. E. Sumatra: Poeloe Gadang, Siak and Sungei Pinang. Java: Bantam Coast and Depok.
1925. *Eutermes timorensis* HOLMG., O. JOHN, *Ibid.*, p. 398, S., W. and Ny. Padang (W. Sumatra).

(a) MATERIAL

LOT I. — 12 vials, *F. R. I. Bogor* coll., 1951-54, as follows: (i) No. 9, 4 S. and 5 W., 12.xi.53, Bondowoso, E. Java, ex "exotic (tree) forest". (ii) No. 16, 5 S., several W. and 1 Ny., 26.vii.52, Sumberweringin near Bondowoso, E. Java, ex "exotic experimental forest (garden)", alt. 700 m. (iii) No. 19, 5 S. and 5 W., 11.v.54, Kediri, E. Java ex "*Abeurites moluccana* tree". (iv) No. 25, 10 S., 2.xii.53, Tjepu, C. Java. (v) No. 37, 5 S. and 7 W., 9.xi.53, Kandangan, E. Java. (vi) No. 38, 5 S. and 10 W., 24.xii.54, Gandangan, C. Java. (vii) No. 42, 1 Im. and 6 S., 9.xi.53, Pare, Kandangan, E. Java. (viii)-(xi) Nos. 58-61, Sumberweringin, E. Java, ex "exotic experimental garden", as follows: No. 58, 1 Im., 6 S., 5 W., 1 Ny, 27.vii.52; No. 59, 5 S, and several W., 27.vii.52; No. 60, 4 S., several W. and 1 Ny., 26.vii.52; No. 61, 7 S. and several W., 4.iv.51.

LOT II. — A vial (No. M4), several S. and W., *Dammerman* coll. v. 1926, Karimondjawa Isl. (Java Sea), ex "nest on tree".

LOT III. — 4 vials, *M. L. Roonwal* coll., 1963, as follows: (i) No. R2/8.12.63, several S. and W. (major and minor), 8.xii.63, Handeuleum (I)

Isl., W. tip of Java (Sunda Straits). (ii) No. R4/8.12.63, several S. and W. (major and minor), 8.xii.63, Ujung Kulon, W. Java. (iii) No. R5/9.12.63, several S. and W. (major and minor), 9.xii.63, Anak Krakatau Isl. (Sunda Straits). (iv) No. R7/9.12.63, several S. and W. (major and minor), 9.xii.63, Anak Krakatau Isl. (Sunda Straits), ex "nest of carton on drift-wood on shore".

## (b) MEASUREMENTS (IN MM), ETC.

## (i) IMAGOS

	Range (3 exs.)
1. Total body-length (with wings), <i>c.</i> . . . . .	16.8 — 17.0
2. Total body-length (without wings), <i>c.</i> . . . . .	9.0 — 9.5
3. Head-length to lateral base of mandibles . . . . .	1.10 — 1.23
4. Max. head-width (with eyes) . . . . .	1.60 — 1.70
5. Max. diameter of eyes (with ocular sclerite)	0.50 — 0.53
6. Max. diameter of lateral ocellus . . . . .	0.15 — 0.20
7. Min. eye-ocellus distance . . . . .	0.03 — 0.05
8. Length of pronotum . . . . .	0.75 — 0.77
9. Max. width of pronotum . . . . .	1.36 — 1.40
10. Length of forewing (with scale) . . . . .	14.60 — 15.20
11. Length of hindwing (with scale) . . . . .	13.60 — 14.00
12. No. of antennal segments . . . . .	15

## (ii) SOLDIERS

	Range (12 exs.)
1. Total body-length from tip of rostrum, <i>c.</i> . . . . .	4.3 — 5.9
2. Head-length with rostrum . . . . .	1.60 — 2.10
3. Head-length without rostrum . . . . .	1.00 — 1.30
4. Length of rostrum . . . . .	0.58 — 0.75
5. Max. head-width . . . . .	1.00 — 1.45
6. Posterior bulge of head . . . . .	0.28 — 0.40
7. Length of pronotum . . . . .	0.20 — 0.32
8. Max. width of pronotum . . . . .	0.50 — 0.66
9. No. of antennal segments . . . . .	13 — 14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Borneo:* Pulo Daat, Sarawak. *Java:* Bondowoso, Gedangan, Kandangan, Kediri, Pare, Tjepu, Sumberweringin, Ujung Kulon (all present record). Also Bantam Coast, Depok and Djember. *Sumatra:* Padang, Poeloe Gadang, Siak, Simalur, Sinabang, Sungei Pinang. *Sunda Straits:* Anak Krakatau Isl. (ROONWAL, *in press*).

*Elsewhere:* Malay Peninsula: Johore, Segmat, Nicobars (Indian Ocean): Camorta Isl. and Naukauri Isl.

## (d) REMARKS

*Field notes (M. L. R.)*: At Hadeuleum (I) Isl. the workers and soldiers were common in an earthen gallery on the trunk of a large tree; in Udjung Kulon, W. Java they were obtained from the dead trunk of standing palm. In Anak Krakatau Isl. (Sunda Straits), workers and soldiers were common and well established in the black sandy soil and in driftwood (logs and bamboos) a few feet from the shore; two small (c. 20 cm. in long diameter) oval, blackish carton nests, on driftwood, containing living soldiers and workers, were found; soldiers are common, forming 30-40 per cent of the population.

Genus (12) *Bulbitermes* EMERSON27. *Bulbitermes durianensis* n. sp.

(Tables 6-8; and Text-figs. 7 and 8)

## (a) MATERIAL

A vial (No. M5), with a queen, 9 soldiers and several workers (major and minor), *Dammerman* coll., Doerian [Durian], lat. c. 1°N and long. c. 104°E., Riouw (Rhio) Archipelago (south of Singapore), Indonesia.

## (b) DESCRIPTION

## 1. IMAGO (Table 6; and Text-fig. 7)

The following description is based on a single dealated queen with damaged abdomen:

*General*: Head-capsule castaneous brown; antennae, and pronotum yellowish brown; legs yellowish. Head and body sparsely pilose.

*Head*: Head-capsule subsquarish and somewhat flat; as long as broad (maximum width with eyes 1.23, length to lateral base of mandibles 1.22 mm.); posterior margin rounded; sides weakly convex; sparsely pilose. *Eyes*: Large, almost circular, lying close to antennae (minimum eye-antennal distance 0.05 mm.); ocular sclerite fairly broad. *Ocelli*: Elongate-oval, prominent (0.23 mm. long), almost touching the eyes (minimum eye-ocellus distance 0.04 mm.). *Fontanelle plate*: Prominent, fairly large, whitish, longish (0.22 mm. long.) and lying in middle of

head-capsule; suture behind plate well marked. *Antennae*: Broken; 11 basal segments present; lower segments sparsely, and distal ones fairly, pilose; segment 1 stout, cylindrical and longest; 2 slightly longer than 3; 4 smallest; 5 and 6 subequal; 7-11 suboval and gradually increasing in length. *Clypeus*: Anteclypeus hyaline, slightly broader than long; anterior and posterior margins convex, the latter weakly so. Postclypeus much broader than long; with a median groove and a few bristles on body.

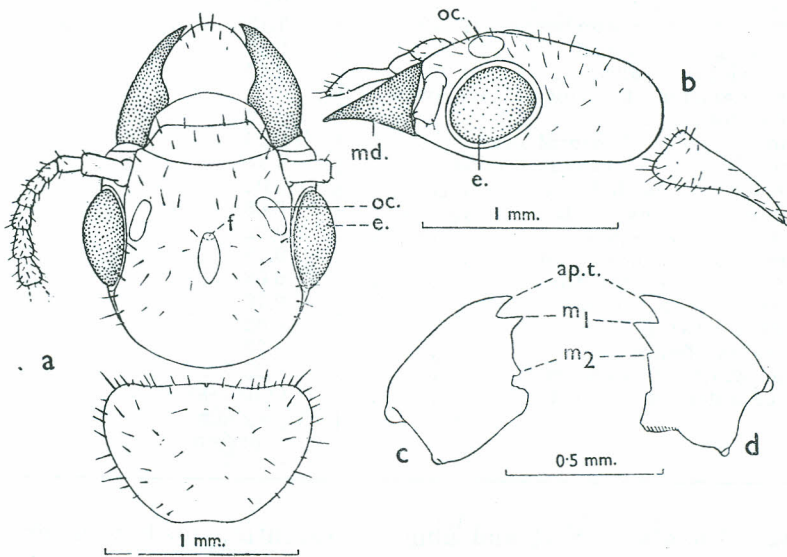


Fig. 7. *Bulbitermes durianensis* n. sp. Imago (paratype). (a) Head and pronotum, in dorsal view. (b) Ditto, in side view. (c) Left mandible, in dorsal view. (d) Ditto, right mandible. *ap.t.*, apical tooth of mandible; *e.*, eye; *f.*, fontanelle; *md.*, mandible, *m*<sub>1</sub> - *m*<sub>2</sub>, first and second marginal teeth respectively of mandibles; *oc.*, ocellus.

*Labrum*: Whitish, round, broader than long (maximum width 0.46; maximum length 0.33 mm.); sides convex; apical margin rounded; with minute hairs on body. *Mandibles*: Of the typical *Bulbitermes*-type. Left mandible with an apical and 2 marginal teeth; apical somewhat blunt, smaller than 1st marginal; the latter long, lying close to apical and with a long concave posterior margin; 2nd small and blunt. Right mandible also with an apical and 2 marginal teeth; apical fairly pointed, smaller than 1st marginal; the latter well marked, with almost equal sides; 2nd blunt and small, lying close to 1st marginal and with a long posterior margin.

TABLE 6. — *Bulbitermes durianensis* n. sp. Body-measurements (in mm) etc. of imago (queen).

Body-parts	One queen
1. Total body-length without wings (and excluding antennae), <i>c.</i> . . . . .	12.00 (?) — abdomen damaged
2. Length of head to lateral base of mandibles . . . . .	1.22
3. Maximum width of head (with eyes) . . . . .	1.23
4. Maximum height of head . . . . .	0.48
5. Maximum length of postclypeus . . . . .	0.50
6. Maximum width of postclypeus . . . . .	1.13
7. Maximum length of labrum . . . . .	0.33
8. Maximum width of labrum . . . . .	0.46
9. Maximum diameter of compound eye (with ocular sclerite) . . . . .	0.53
10. Maximum diameter of lateral ocellus . . . . .	0.23
11. Minimum diameter of lateral ocellus . . . . .	0.14
12. Minimum eye-ocellus distance . . . . .	0.04
13. Minimum eye-antennal distance . . . . .	0.05
14. Length of fontanelle plate . . . . .	0.22
15. Maximum length of pronotum . . . . .	0.70
16. Maximum width of pronotum . . . . .	0.06
17. Length of forewing scale . . . . .	0.70
18. Length of hindwing scale . . . . .	0.62
19. Length of hind-femur . . . . .	1.33
20. Maximum width of hind-femur . . . . .	0.23
21. Number of antennal segments . . . . .	? (Tip broken — 11 segments present)

*Thorax: Pronotum:* Flat and almost crescentic; much broader than long (maximum width 1.06; maximum length 0.70 mm.); antero-lateral corners narrowly founded and clothed with long bristles; lateral margins weakly convex, converging posteriorly; anterior margin almost straight without a median notch; posterior margin substraight, with a small median incurving; body fairly pilose. *Legs:* Short; sparsely pilose, with short to long hairs; hind-femora slender; apical tibial spur formula 2: 2: 2.

*Abdomen:* Damaged.

## 2. SOLDIER (Table 7; and Text-fig. 8)

*General:* Head-capsule light to deep brown; rostrum brown, darker in middle and paler at tip; antennae yellowish brown, paler distally; thoracic tergites, femora and anterior abdominal tergites brown, posterior tergites yellowish brown. Pilosily very sparse; a few hind-tergites with some small bristles.



**Head:** Head-capsule, excluding rostrum, almost pear-shaped, with slight constriction behind base of antennae; slightly longer than broad (head-length without rostrum 0.90 - 0.94; maximum head-width 0.75 - 0.80 mm.); broadest posteriorly; posterior margin broadly rounded; laterally, head in dorsal profile without any depression in middle; posterior bulge of head moderate (0.30 - 0.34 mm.); head with a pair of bristles on vertex, otherwise without hairs. **Rostrum:** Short, almost subconical; length almost equal to half the length of head-capsule without rostrum; no distinct rostral hump present; with a few bristles at the anterior tip.

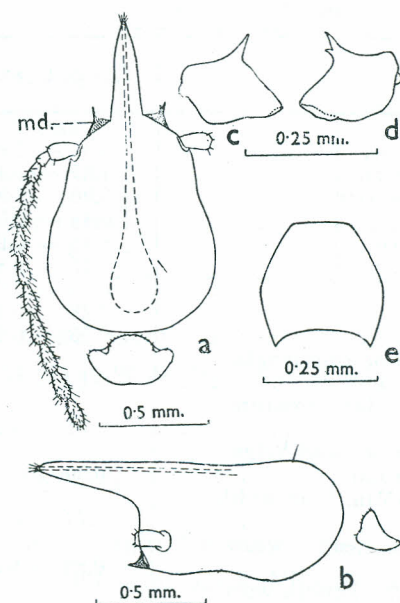


Fig. 8. *Bulbitermes durianensis* n. sp. Soldier (holotype). (a) Head and pronotum, in dorsal view. (b) Ditto, in side view. (c) Left mandible, in dorsal view. (d) Ditto, right mandible. (Note extra tooth on inner margin of anterior process of mandible.) (e) Postmentum, in ventral view. *md.*, mandible.

**Fontanelle:** Fontanelle gland and fontanelle tube prominent. **Antennae:** With 12-13 segments, all fairly pilose, with a few long and many short bristles; pilosity greater in distal segments; segment 1 long, cylindrical and stout; 2 smallest; 3 longer than 2; 4 subequal to 3 (in 13-segmented antennae, much smaller than 3); 5 subequal to 4; 6 to the last gradually increasing in length. **Labrum:** Small, broader than long; anterior margin a little depressed; antero-lateral angles rounded. **Clypeus:** Anteclypeus

whitish, much broader than long; anterior margin weakly convex. Postclypeus distinct, with convex anterior margin; posterior margin not sharply differentiated. *Mandibles*: Reduced and small; each with a short, pointed, dentate or non-dentate, spine-like lateral process, the latter much shorter than outer margin of molar region; usually with a prominent extra tooth at its base in either the left or the right or in both mandibles; molar plate with irregular margin. *Postmentum*: Broader than long (minimum median length 0.23 - 0.27; maximum width 0.26 - 0.30 mm.); broadest in middle; anterior margin substraight, posterior margin concave.

TABLE 7. — *Bulbitermes durianensis* n. sp. Body-measurements (in mm) and indices, etc. of soldiers.

Body-parts	Range (5 exs.)	Holotype
1. Total length of body, <i>c.</i>	3.5 — 3.8	3.5
2. Length of head with rostrum	1.37 — 1.42	1.40
3. Length of head without rostrum	0.90 — 0.94	0.90
4. Length of rostrum	0.47 — 0.50	0.50
5. Maximum width of rostrum	0.15 — 0.20	0.16
6. Maximum width of head	0.75 — 0.80	0.76
7. Minimum width of head	0.56 — 0.60	0.58
8. Posterior bulge of head	0.28 — 0.33	0.33
9. Maximum height of head	0.55 — 0.60	0.56
10. Rostrum-Head Index I (Rostrum-length/ Head-length without rostrum)	0.52 — 0.55	0.55
11. Rostrum-Head Index II (Max. rostrum- width/Max. head-width)	0.21 — 0.25	0.21
12. Head-bulge Index (Posterior head-bulge/ Head-length without rostrum)	0.30 — 0.34	0.33
13. Head Contraction Index (Min. head-width/ Max. head-width)	0.74 — 0.78	0.76
14. Head Index I (Max. width/Length without rostrum)	0.80 — 0.84	0.84
15. Head Index II (Max. height/Length without rostrum)	0.61 — 0.65	0.62
16. Head Index III (Max. height/Max. width)	0.71 — 0.75	0.73
17. Maximum (median) length of postmentum	0.23 — 0.27	0.24
18. Maximum width of postmentum	0.26 — 0.30	0.27
19. Length of pronotum	0.16 — 0.20	0.17
20. Maximum width of pronotum	0.40 — 0.45	0.44
21. Pronotum Index (Length/Max. width)	0.38 — 0.42	0.38
22. Length of hind-femur	0.84 — 0.90	0.90
23. Maximum width of hind-femur	0.10 — 0.14	0.12
24. Length of hind-tibia	1.00 — 1.15	1.07
25. Number of antennal segments	12 — 13	12

*Thorax: Pronotum*: Strongly saddle-shaped; width more than double the length (maximum length 0.16 - 0.20; width 0.40 - 0.45 mm.); anterior margin with a weak median notch; posterior margin convex. *Mesonotum*

*and metanotum*: Posterior margin convex, not medially notched. *Legs*: Femora, tibiae and tarsi moderately slender; femora with numerous short hairs; tibiae more densely pilose; hind-femora longer than tibiae and not reaching the tip of abdomen; tarsi 4-segmented, all densely covered with hairs. Apical tibial spur formula 2: 2: 2.

TABLE 8. — *Bulbitermes durianensis* n. sp. Body-measurements (in mm), etc. of workers (major and minor).

Body-parts	Range	
	Workers major (5 exs.)	Workers minor (5 exs.)
1. Total body-length, c. . . . .	3.6 — 4.0	3.0 — 3.5
2. Length of head to lateral base of mandibles . . . . .	0.98 — 1.00	0.73 — 0.80
3. Maximum width of head . . . . .	1.00 — 1.09	0.82 — 0.90
4. Maximum height of head . . . . .	0.47 — 0.53	0.40 — 0.46
5. Length of labrum . . . . .	0.24 — 0.31	0.19 — 0.25
6. Maximum width of labrum . . . . .	0.35 — 0.42	0.27 — 0.32
7. Length of pronotum . . . . .	0.25 — 0.30	0.14 — 0.21
8. Maximum width of pronotum . . . . .	0.48 — 0.56	0.39 — 0.45
9. Number of antennal segments . . . . .	14	13

*Abdomen*: All terga except the last 3 or 4 devoid of long hairs; sternites with numerous long hairs. Cerci short, 2-segmented, hairy; styli absent.

### 3. WORKER MAJOR (Table 8)

Head brown; thorax light brown; antennae and femora yellowish brown; tergites, tibiae and tarsi paler. Pilosity sparse dorsally and dense ventrally.

Head-capsule subsquarish, almost as broad as long; Y-suture prominent. Fontanelle situated medially at junction of two frontal sutures, and covered with a small white suboval plate. Antennae with 14 segments; all fairly pilose; segment 1 longest, stout and cylindrical; 2 subequal to 3 and slightly longer than 4; 5-14 gradually increasing in length. Anteclypeus whitish, with a distinct convex anterior margin. Postclypeus also well-marked, swollen, light brown; much broader than long; with an indistinct median groove. Labrum much broader than long; anterior and lateral margins convex; with a few bristles on middle portion. Mandibles stout; yellowish brown, with deep brown toothed margins. Left mandible with an apical and 2 marginal teeth; apical well marked, with a broad

base and a little shorter than 1st marginal; the latter well developed, with posterior margin much longer than anterior; 2nd marginal small, widely separated from 1st. Right mandible with an apical and 2 marginal teeth; apical pointed, conical and subequal to 1st marginal; the latter close to apical and stout; 2nd marginal small, blunt and with a long posterior margin; molar plate stout and prominent. Pronotum strongly saddle-shaped; with minute hairs; width almost equal to half the head-width; anterior margin convex, with a weak median notch; posterior margin substraight. Legs moderately long and hairy; hind-femur not reaching the tip of abdomen, and shorter than hind-tibia. Tibial spur formula 2: 2: 2. Tarsi 4-segmented. Abdominal tergites sparsely pilose; sternites fairly pilose. Cerci short, 2 segmented, hairy.

#### 4. WORKER MINOR (Table 8)

Resembles the workers major, except in the following respects: (i) Smaller (total body-length *c.* 3.0 - 3.5 *vs.* 3.6 - 4.0 mm.). (ii) Antennae with 13 (*vs.* 14) segments. (iii) Pronotum weakly (*vs.* strongly) saddle-shaped.

#### (d) TYPE-SPECIMENS

All specimens in spirit and from a single source (see above, 'Material').

*Holotype*: A soldier, in a vial, Z. S. I. Reg. No. 4373/H8, deposited in the Zoological Survey of India, Calcutta.

*Paratypes* (soldiers and workers) deposited as follows: (i) 2 soldiers, 1 queen and 15 workers (10 major, 5 minor) in a vial, Z. S. I. Reg. No. 4374/H8, deposited as above, in the Z. S. I. (ii) 3 soldiers and 15 workers (10 major, 5 minor), in a vial, deposited in Museum Zoologicum Bogoriense, Bogor, Indonesia. (iii) A soldier and 2 workers (1 major, 1 minor), in a vial, deposited in Forest Research Institute, Dehra Dun. (iv) A soldier and 2 workers, in the Indian Agricultural Research Institute, New Delhi. (v) A soldier and 2 workers (1 major, 1 minor), in a vial, deposited with Prof. A. E. EMERSON, U. S. A.

The remaining material, all workers, are in the Z. S. I. as above and are not paratypes.

## (e) TYPE-LOCALITY AND GEOGRAPHICAL DISTRIBUTION

Type-locality: Doerian [Durian] (lat. c. 1°N; long. c. 104°E), Riouw (Rho) Archipelago (south of Singapore), Indonesia.

Known only from the type-locality.

## (f) COMPARISONS

*Bulbitermes durianensis* n. sp., is close to *B. salakensis* (KEMNER) and *B. vicinus* (KEMNER), both from Java, but differ from them as follows:

1. From *B. salakensis*: SOLDIER: (i) Dorsal margin of head, in profile, straight (*vs.* with a slight depression). (ii) Mandibular tooth with usually a distinct extra tooth at its base in either left or right or in both mandibles (*vs.* with only an indistinct impression of extra tooth near about the tip). (iii) Anterior margin of molar plate concave (*vs.* straight). (iv) Segment 3 of antenna about 1½ times longer than 2 (*vs.* about double).

2. From *B. vicinus*: SOLDIER: (i) Mandibular tooth with usually a prominent extra tooth at its base in either left or right or in both mandibles (*vs.* only the right mandible with an extra tooth near about the tip of mandibular tooth).

28. *Bulbitermes lakshmani* n. sp.

(Tables 9 and 10; and Text-figs. 9 and 10)

## (a) MATERIAL

A vial (No. R3/9.12.63), with 50 soldiers and several workers (major and minor), M.L. Roonwal coll., 9.xii.1963, Peutjang Island (lat. 6°50' S, long. 105°12' E), near western tip of Java, Indonesia.

## (b) DESCRIPTION

## 1. IMAGO.

Unknown.

## 4. WORKER MINOR (Table 9; and Text-fig. 9)

*General*: Head-capsule yellowish brown, paler posteriorly; tip of rostrum darker; antennae pale brown; legs yellowish white; thoracic tergites pale yellow; abdominal tergites brown, sternites paler. Head with a single pair of hairs on vertex; tip of rostrum hairy. Total body-length (with rostrum but without antennae) c. 3.5 - 3.8 mm.

*Head*: Head-capsule pear-shaped, with constriction behind the antennae (minimum width 0.42 - 0.50 mm.); longer than broad (length of head without rostrum 0.96 - 1.00; maximum width 0.78 - 0.85 mm.); widest posteriorly; posterior margin rounded; dorsal margin in profile weakly concave. *Rostrum*: Subcylindrical and slender; gradually narrowing and terminating in a narrow, weakly-pointed tip; length equal to nearly half the head-length; basal hump indistinct. *Fontanelle*: Fontanelle tube visible in rostrum; fontanelle gland prominent. *Eyes and ocelli*: Absent. *Antennae*:

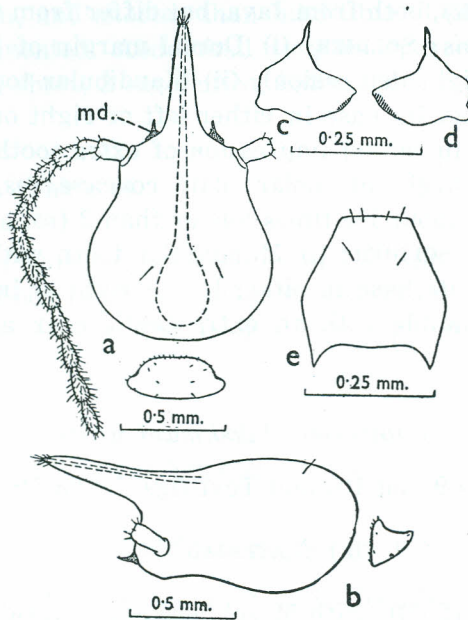


Fig. 9. *Bulbitermes lakshmani* n. sp. Soldier (holotype). (a) Head and pronotum, in dorsal view. (b) Ditto, in side view. (c) Left mandible, in dorsal view. (d) Ditto, right mandible. (Note minute extra tooth on inner margin of anterior process of mandible.) (e) Postmentum, in ventral view. *md.*, mandible.

Generally with 13 segments, sometimes with 14; in 13-segmented antennae, segments 1 and 2 rarely, and the remainder fairly, pilose; segments 1 long, cylindrical; 2 almost half of 3 (in 14-segmented antennae almost equal to 3); 4 smaller than 3; 5-8 gradually increasing in length and becoming club-shaped; 9 to the penultimate one subequal and club-shaped, the last narrower. *Clypeus*: Divided into an ante- and a postclypeus. Anteclypeus a thin, narrow, whitish, hairy line strip along anterior margin of postclypeus. Postclypeus subrectangular, brownish and transversely

swollen; separated from body by an indistinct groove. *Labrum*: Subrectangular; anterior and lateral margins weakly convex. *Mandibles*: Small and rudimentary. Apical process prominent with an almost straight outer margin and broad base; a minute tooth on apical process present (either on left or right or on both, in different positions, generally; molar plate straight or weakly convex. *Postmentum*: Subhexagonal; with a few bristles near anterior margin; slightly broader than long; broadest almost in middle; sides gradually narrowing in front and behind; anterior margin substraight, posterior margin concave.

TABLE 9. — *Bulbitermes lakshmani* n. sp. Body-measurements (in mm), etc. of soldiers.

Body-parts	Range (6 exs.)	Holotype
1. Total body-length (including mandibles) c. . . . .	3.5 — 3.7	3.5
2. Length of head with rostrum . . . . .	1.45 — 1.52	1.52
3. Length of head without rostrum . . . . .	0.96 — 1.00	1.00
4. Length of rostrum . . . . .	0.48 — 0.55	0.52
5. Maximum width of rostrum . . . . .	0.14 — 0.17	0.16
6. Maximum width of head . . . . .	0.80 — 0.86	0.86
7. Minimum width of head . . . . .	0.55 — 0.60	0.60
8. Posterior bulge of head . . . . .	0.30 — 0.38	0.38
9. Maximum height of head . . . . .	0.55 — 0.60	0.60
10. Rostrum-Head Index I (Rostrum length/ Head-length without rostrum) . . . . .	0.50 — 0.55	0.52
11. Rostrum-Head Index II (Max. rostrum- width/Max. head-width) . . . . .	0.18 — 0.20	0.19
12. Head Bulge Index (Posterior head-bulge/ Head-length without rostrum) . . . . .	0.34 — 0.38	0.38
13. Head Contraction Index (Min. head-width/ Max. head-width) . . . . .	0.65 — 0.70	0.70
14. Head Index I (Max. width/Length without rostrum) . . . . .	0.80 — 0.86	0.86
15. Head Index II (Max. height/Length without rostrum) . . . . .	0.57 — 0.60	0.60
16. Head Index III (Max. height/Max. width) . . . . .	0.70 — 0.73	0.70
17. Maximum (median) length of postmentum . . . . .	0.27 — 0.31	0.28
18. Maximum width of postmentum . . . . .	0.27 — 0.32	0.30
19. Length of pronotum . . . . .	0.15 — 0.20	0.18
20. Maximum width of pronotum . . . . .	0.44 — 0.48	0.47
21. Pronotum Index (Length/Max. width) . . . . .	0.34 — 0.42	0.38
22. Length of hind-femur . . . . .	0.88 — 0.95	0.90
23. Maximum width of hind-femur . . . . .	0.11 — 0.14	0.13
24. Length of hind-tibia . . . . .	0.98 — 1.10	1.03
25. No. of antennal segments . . . . .	13 — 14	13

*Thorax: Pronotum*: Saddle-shaped with minute hairs on body; much narrower than head (maximum head-width 0.78 - 0.85; maximum pro-

notum-width 0.44 - 0.48 mm.); sides converging posteriorly; anterior margin convex, with a weak median depression; posterior margin convex, with a median notch. *Mesonotum*: Narrower than pronotum; with a few small hairs on margin; sides rounded; posterior margin almost straight. *Metanotum*: Subequal to pronotum; pilosity as in mesonotum; sides rounded; posterior margin weakly convex. *Legs*: Thin, fairly long and hairy; hind-femur not reaching tip of abdomen; apical tibial spur formula 2: 2: 2. Tarsi 4-jointed.

*Abdomen*: Oblong, hairy, each tergite with a few minute hairs; 3 or 4 posterior tergites with long hairs; sternites more hairy than tergites. Cerci short, 2-jointed. Styli absent.

### 3. WORKER MAJOR (Table 10; and Text-fig. 10)

Head light brown; mandibles yellowish brown with dark brown toothed margins; thorax and abdomen creamy white. Head and body moderately hairy. Total body-length (without antennae) *c.* 4.0 - 4.3 mm.

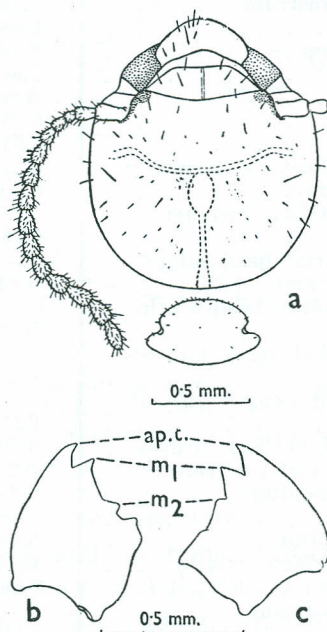


Fig. 10. *Bulbitermes lakshmani* n. sp. Worker major (paratype). (a) Head and pronotum, in dorsal view. (b) Left mandible, in dorsal view. (c) Ditto, right mandible. *ap.t.*, apical tooth of mandible; *m*<sub>1</sub> - *m*<sub>2</sub>, first and second marginal teeth respectively of mandibles.



Head-capsule squarish; length subequal to width (length to base of mandibles 0.98 - 1.10; maximum width 1.00 - 1.16 mm.); posterior margin broadly rounded Y-suture prominent. Fontanelle situated in middle of head-dorsum at junction of Y-suture and covered by a translucent oval plate. Eyes and ocelli absent. Antennae with 15 segments; segment 1 longest; 2 almost half of 1; 3 smallest; 4 slightly smaller than 2 and subequal to 5; 6-9 gradually increasing in length and becoming pyriform; 10-14 subequal; the last slightly narrower than 14. Anteclypeus hyaline, white and apilose; anterior margin projecting in front medially. Postclypeus swollen, pilose; divided into right and left halves by a median suture. Labrum somewhat broader than long; broadest in middle; anterior tip with a weak convexity and clothed with hairs. Mandibles of the typical *Bulbitermes*-type. Left mandibles with an apical and 2 marginal teeth; apical conical and pointed; 1st marginal comparatively blunt, close and subequal to apical; 2nd marginal smallest, widely separated from 1st. Right mandibles also with an apical and 2 marginal teeth; apical with pointed tip, slightly smaller than or subequal to 1st marginal; the latter stout and pointed; 2nd marginal blunt and smallest, and lying close to 1st.

TABLE 10. — *Bulbitermes lakshmani* n. sp. Body-measurements (in mm), etc. of workers major and minor. (5 examples of each).

Body-parts	Workers major	Workers minor
1. Total body-length, c. . . . .	4.0 — 4.3	3.5 — 3.8
2. Length of head to lateral base of mandibles	0.98 — 1.10	0.80 — 0.90
3. Maximum width of head . . . . .	1.00 — 1.16	0.98 — 0.98
4. Maximum height of head . . . . .	0.55 — 0.60	0.38 — 0.45
5. Length of labrum . . . . .	0.27 — 0.33	0.21 — 0.24
6. Maximum width of labrum . . . . .	0.41 — 0.48	0.22 — 0.25
7. Length of pronotum . . . . .	0.28 — 0.33	0.22 — 0.25
8. Maximum width of pronotum . . . . .	0.60 — 0.66	0.43 — 0.47
9. No. of antennal segments . . . . .	15	14

Pronotum strongly saddle-shaped; broader than long (maximum width 0.60 - 0.66; maximum length 0.28 - 0.33 mm.); sides converging posteriorly; anterior margin fairly hairy, convex and with a very weak median notch; posterior margin substraight and without a median notch. Legs short, thin and hairy; hind-femur not reaching tip of abdomen; apical tibial spur formula 2: 2: 2. Tarsi 4-jointed.

Abdomen oblong, hairy; sternites more strongly hairy than tergites. Cerci 2-jointed; styli absent.

#### 4. WORKER MINOR (Table 10)

Resembles workers major, except in the following respects: (i) Smaller (total body-length *c.* 3.5 - 3.8 *vs.* 4.0 - 4.3 mm.). (ii) Antennae with 14 (*vs.* 15) segments. (iii) 3rd antennal segment smaller than 2nd, 4th smallest (*vs.* 3rd smallest and 4th slightly smaller than 2nd). (iv) Pronotum weakly (*vs.* strongly) saddle-shaped.

#### (c) TYPE-SPECIMENS

All type-specimens in spirit and from a single source (see above under 'Material'). *Holotype*: A soldier, in a vial, Z. S. I. Reg. No. 4383/H8, deposited in the Zoological Survey of India, Calcutta. *Paratypes* (soldiers and workers major and minor) deposited as follows: (a) 10 soldiers and 15 workers (10 major, 5 minor) in a vial, Z. S. I. Reg. No. 4384/H8, deposited as above in Z.S.I. (b) 10 soldiers and 10 workers (5 major, 5 minor) in a vial, deposited in Museum Zoologicum Bogoriense, Bogor, Indonesia. (c) 2 soldiers and 4 workers (2 major, 2 minor) in a vial, deposited in Forest Research Institute, Dehra Dun. (d) 2 soldiers and 4 workers (2 major, 2 minor) in a vial, deposited with Prof. A. E. EMERSON, U. S. A.

The remaining specimens from the lot, deposited with the Zoological Survey of India, Calcutta, and are not paratypes.

#### (d) TYPE-LOCALITY AND GEOGRAPHICAL DISTRIBUTION

Type-locality: Peutjang Island (lat. 6°50' S, long. 105°12' E), near western tip of Java, Indonesia.

Known only from the type-locality.

#### (e) COMPARISONS

*Bulbitermes lakshmani* n. sp. is close to *B. vicinus* (KEMNER) and *B. salakensis* (KEMNER), both from Java, and *B. durianensis* ROONWAL & MAITI (n. sp., *vide supra*) from the Riouw (Rhio) Archipelago, but differs from them as follows:

1. From *B. vicinus*: SOLDIER: (i) A minute extra tooth on apical process of mandibles present (on one or both mandibles) or absent, and mostly situated at base of apical process, rarely elsewhere (*vs.* present only on right mandible and at tip of apical process). (iii) Base of apical process of mandible very broad (*vs.* less so).

2. From *B. salakensis*: SOLDIER: (i) The minute extra tooth on apical process of mandibles (*vide supra*) situated at base (*vs.* near apex). (ii) Antennae with 13-14 (*vs.* only 13) segments.

3. From *B. durianensis*: SOLDIER: (i) Larger species (length of head with rostrum 1.45 - 1.55 *vs.* 1.37 - 1.42 mm.; length of head without rostrum 0.97 - 1.00 *vs.* 0.90 - 0.94 mm.) (ii) Extra tooth on apical process of mandible very minute (*vs.* larger). (iii) Dorsal profile of head weakly concave (*vs.* almost straight).

#### Genus (13) *Lacessititermes* HOLMGREN

#### 29. *Lacessititermes batavus* KEMNER

##### (i) *Lacessititermes batavus* KEMNER

1934. *Lacessititermes batavus* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, (3) 13 (4), pp. 148-153, fig 41 (Im.), fig. 42 (substitute reproductive and W. major) and fig. 43 (S. major and minor). Im., S. (major and minor), W. (major and minor). *Type-locality*: Depok (W. Java).

1949. *Lacessititermes batavus* KEM., T. E. SNYDER, *Smiths. misc. Coll.*, Washington, 112, p. 315. Im., substitute reproductive, S. and W. Java.

##### (ii) *Wrong determination*

1925. *Eutermes (Lacessititermes) sordidus* (HAVILAND) [in part], O. JOHN, *Treubia*, Buitenzorg [= Bogor], 6 (3-4), pp. 401-402. Im., Q., S. and W. Java examples only. [According to SNYDER, *supra*, these are really *L. batavus*].

#### (a) MATERIAL

(i) A vial (No. M1), several S. (several major, 3 minor) and W. (major and minor) and several Ny., *Lieftinck* coll., 30.iv.1935, Djasinga, c. 50 km. W. of Bogor (W. Java), 100 m. altitude. (ii) A vial (No. 20), 11 S. (9 major, 2 minor), 2 Im. and 5 W. (4 major, 1 minor), *Dammerman* Coll., iii.1911, Tjiapoes, Buitenzorg (= Bogor).

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS

	Range	
	Major (5 exs.)	Minor (3 exs.)
1. Total body-length to tip of rostrum, c. . . . .	4.39 — 5.38	4.0 — 4.3
2. Head-length with rostrum . . . . .	1.92 — 2.00	1.72 — 1.74
3. Head-length without rostrum . . . . .	1.13 — 1.20	0.99 — 1.06
4. Length of rostrum . . . . .	0.78 — 0.83	0.68 — 0.70
5. Max. head-width . . . . .	1.13 — 1.16	1.00 — 1.06
6. Min. head-width . . . . .	0.76 — 0.83	0.70 — 0.72
7. Posterior bulge of head . . . . .	0.42 — 0.50	0.32 — 0.35
8. Max. length of pronotum . . . . .	0.30 — 0.36	0.28 — 0.30
9. Max. width of pronotum . . . . .	0.60 — 0.66	0.49 — 0.51
10. No. of antennal segments . . . . .	14	14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java:* Depok and Salak (KEMNER, 1934). Djasinga (W. Java, present record).

*Elsewhere:* None.

Genus (14) *Hospitalitermes* HOLMGREN30. *Hospitalitermes diurnus* KEMNER

1934. *Hospitalitermes diurnus* N. A. KEMNER, *K. Sv. Vet. Akad. Handl.*, Stockholm, 13 (4), pp. 154-157, text-figs. 44 (1-3) and 45 (1-3), Im. and S. *Type-locality:* Semarang (middle Java).

1949. *Hospitalitermes diurnus* KEM., T. E. SNYDER, *Smith. misc. Coll.*, Washington, 112, p. 319. Java.

## (a) MATERIAL

Three vials, S., W. and Ny., Java, 1953-59, *F. R. I. Bogor* coll., as follows: (i) No. 11, 5 S. and several W., 12.xi.53, Gedangan (Central Java), ex. "teak forest". (ii) No. 13, 8 S., 2 W and 2 Ny., 18.viii.54, Seneng (near Gedangan, Central Java), ex. "teak forest". (iii) No. 30, 5 S and 5 Ny., viii.59, Ngenden (near Gedangan, Central Java).

## (b) MEASUREMENTS (IN MM), ETC.

## SOLDIERS

	Range (5 exs.)
1. Total body-length, c. . . . .	4.0 — 5.0
2. Head-length with rostrum . . . . .	1.65 — 1.80
3. Head-length without rostrum . . . . .	1.07 — 1.20
4. Length of rostrum . . . . .	0.52 — 0.63
5. Max. head-width . . . . .	1.00 — 1.10
6. Min. head-width . . . . .	0.67 — 0.72
7. Posterior bulge of head . . . . .	0.45 — 0.57
8. Max. length of pronotum . . . . .	0.28 — 0.37
9. Max. width of pronotum . . . . .	0.56 — 0.64
10. No. of antennal segments . . . . .	14

## (c) GEOGRAPHICAL DISTRIBUTION

*Indonesia: Java* (central part): Gedangan and vicinity (Ngenden and Seneng) (all present record); Semarang.

*Elsewhere:* None.

31. *Hospitalitermes irianensis* n. sp.

(Tables 11 and 12; Text-figs. 11 and 12)

## (a) MATERIAL

One vial (No. 3), with 23 soldiers and several workers (major and minor), *Dr. L. J. Toxopeus* coll. (Ned. Ind.-Amerikaansche New Guinea-Exped. 1938-39), 29.vii.1938, Meervlakte (lat. c. 3°20'S., long. c. 139°E., alt. c. 100 m.), Idenburg River, West Irian (West New Guinea), Indonesia.

## (b) DESCRIPTION

## 1. IMAGO.

Unknown.

## 2. SOLDIER (Table 11; and Text-fig. 11)

*General:* Head-capsule reddish brown; rostrum brown, darker in middle, paler at tip; antennae reddish brown, paler distally. Thoracic tergites and femora light brown; abdominal tergites yellowish brown; sparsely pilose, a few hind-tergites with some bristles. Total length (with rostrum) c. 4.1 - 4.8 mm,

*Head:* Head-capsule, excluding rostrum, almost pear-shaped with constriction behind base of antennae; without hairs except for a pair of bristles on vertex; slightly longer than broad (head-length without rostrum 1.20 - 1.26, maximum head-width 1.10 - 1.15 mm.); broadest posteriorly; posterior margin narrowly rounded. Laterally, head posteriorly uplifted, with a marked posterior bulge (bulge 0.47 - 0.52 mm.); dorsal profile with a strong depression in middle. *Rostrum:* Almost subcylindrical,

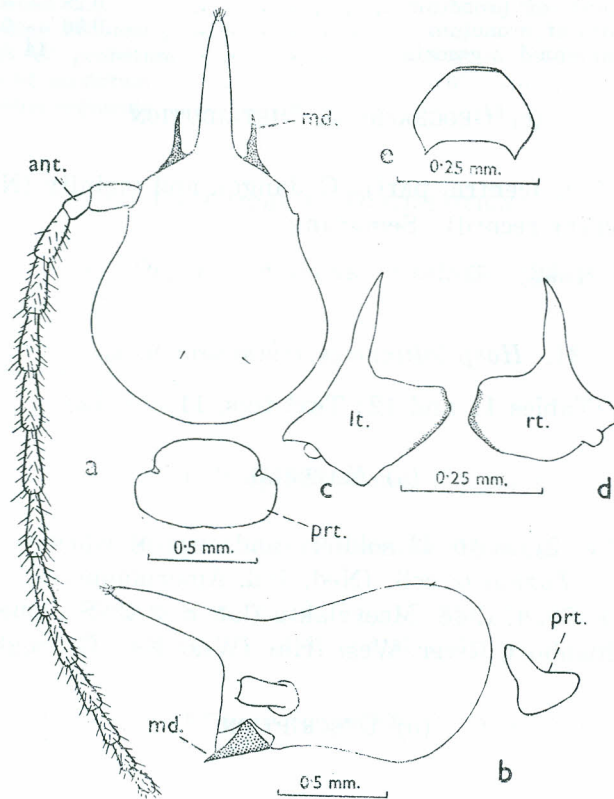


Fig. 11. *Hospitalitermes irianensis* n. sp. Soldier (holotype). (a) Head and pronotum, in dorsal view. (b) Ditto, in side view. (c) Left mandible., in dorsal view. (d) Ditto, right mandible. (e) Labrum, in dorsal view.  
ant., antenna; lt., left; md., mandible; prt., pronotum; rt., right.

short and thin; length equal to half the length of head-capsule; laterally much uplifted; rostral hump absent; with a few bristles at anterior tip; a pair of suboval white spots present laterally behind antennal foveolae.

*Fontanelle*: Fontanelle gland and fontanelle tube prominent. *Antennae*: Very long, with 14 elongate, slender segments, all fairly pilose and with a few long and many short bristles, pilosily greater in distal segments; segment 1 longest, cylindrical and darker than the rest; 2 smallest; 3 twice as long as 2, or a little longer, and only slightly longer than 4; 5 subequal to 4; 6-8 gradually increasing, and 9-14 decreasing, in length. *Labrum*: Flap-like; broader than long; with a few bristles in middle of distal part; anterior margin substraight, hyaline; antero-lateral corners rounded. *Clypeus*: Anteclypeus white, somewhat crescentic and much broader than long. Postclypeus very weakly swollen; medially divided by a shallow groove into right and left halves; anterior margin convex; posterior margin not sharply differentiated from frons. *Mandibles*: Small;

TABLE 11. — *Hospitalitermes irianensis* n. sp. Body-measurements (in mm), etc. of soldiers.

Body-parts	Range (mm.) (5 exs.)	Holotype
1. Total length of body, <i>c.</i> . . . . .	4.1 — 4.8	4.5
2. Length of head with rostrum . . . . .	1.80 — 1.92	1.82
3. Length of head without rostrum . . . . .	1.20 — 1.26	1.22
4. Length of rostrum . . . . .	0.60 — 0.66	0.60
5. Maximum width of rostrum . . . . .	0.13 — 0.17	0.16
6. Maximum width of head . . . . .	1.10 — 1.15	1.11
7. Minimum width of head . . . . .	0.76 — 0.82	0.80
8. Posterior bulge of head . . . . .	0.47 — 0.52	0.50
9. Maximum height of head . . . . .	0.80 — 0.84	0.82
10. Rostrum-Head Index I (Rostrum-length/ Head-length without rostrum) . . . . .	0.49 — 0.52	0.49
11. Rostrum-Head Index II (Max. rostrum- width/Max. head-width) . . . . .	0.12 — 0.15	0.14
12. Head Bulge Index (Posterior head-bulge/ Head-length without rostrum) . . . . .	0.39 — 0.43	0.41
13. Head Contraction Index (Min. head-width/ Max. head-width) . . . . .	0.67 — 0.72	0.72
14. Head Index I (Max. width/Length without rostrum) . . . . .	0.91 — 0.93	0.91
15. Head Index II (Max. height/Length without rostrum) . . . . .	0.66 — 0.69	0.67
16. Head Index III (Max. height/ Max. width) . . . . .	0.71 — 0.75	0.74
17. Maximum (median) length of postmentum . . . . .	0.23 — 0.27	0.26
18. Maximum width of postmentum . . . . .	0.37 — 0.42	0.40
19. Length of pronotum . . . . .	0.31 — 0.36	0.34
20. Maximum width of pronotum . . . . .	0.59 — 0.65	0.64
21. Pronotum Index (Length/Max. width) . . . . .	0.53 — 0.58	0.53
22. Length of hind-femur . . . . .	1.70 — 1.82	1.80
23. Maximum width of hind-femur . . . . .	0.15 — 0.18	0.16
24. Length of hind-tibia . . . . .	2.36 — 2.50	2.36
25. Number of antennal segments . . . . .	14	14
26. Index of length of antennal segments 3/2 . . . . .	2.15 — 2.27	2.17

each with a long, pointed, non-dentate, spine-like lateral process, which is slightly longer than outer margin of molar region; the latter and the molar plate weakly concave. *Postmentum*: Much broader than long (maximum length 0.23 - 0.27 mm.; maximum width 0.37 - 0.42 mm.), broadest in middle; anterior part pilose; anterior and posterior margins substraight.

*Thorax*: Terga marked by a fine, median, longitudinal, whitish line. *Pronotum*: Saddle-shaped; width subequal to half of head-width (maximum head-width 1.10 - 1.15 mm.; maximum pronotum-width 0.58 - 0.65 mm.) and slightly less than twice the length (maximum pronotum-length 0.34 - 0.36 mm.); anterior margin with a distinct median notch; posterior margin convex, with a weak median notch. *Mesonotum* and *metanotum*: Posterior margins convex, not medially notched. *Legs*: Femora, tibiae and tarsi slender and much elongated; femora with numerous short hairs, tibiae more densely pilose; hind-femora either reaching, or extending beyond, tip of abdomen; in hind-leg tibia longer than femur; tarsi 4-segmented. Apical tibial spur formula 2: 2: 2.

*Abdomen*: All terga, except the last 2 or 3, devoid of long hairs, the latter with a few moderately long hairs; sternites with numerous long hairs. Cerci short, 2-segmented, hairy. Styli absent.

### 3. WORKER MAJOR (Table 12; and Text-fig. 12)

Head-capsule deep brown; thorax, antennae and femora light brown; tergites, tibiae and tarsi paler. Pilosity sparse dorsally and dense ventrally. Head squarish, nearly as broad as long upto base of mandibles; Y-suture prominent. Fontanelle covered with a small white, longish plate situated medially at junction of two frontal sutures. Antennae with 15 segments, all densely pilose; segment 1 longest; 2 shortest; 3 much longer than 2 and slightly longer than 4 (*cf.* worker minor); 5-8 gradually increasing, and 9-15 decreasing, in length. Anteclypeus distinct and strip-like. Postclypeus also distinct, swollen, deep brown, much broader than long. Labrum much broader than long, with a few hairs on anterior portion. Mandibles stout; brownish yellow with deep brown toothed margins. Left mandible with an apical and 2 marginal teeth; apical well developed and slightly shorter than 1st marginal; the latter stout and well developed, with posterior margin much longer than anterior; 2nd small with unequal sides, directed downwards and widely separated from 1st. Right mandible



with an apical and 2 marginal teeth; apical tooth pointed, conical and a little smaller than 1st marginal; the latter close to apical, stout and pointed; 2nd small and blunt; molar plate with undulating margin.

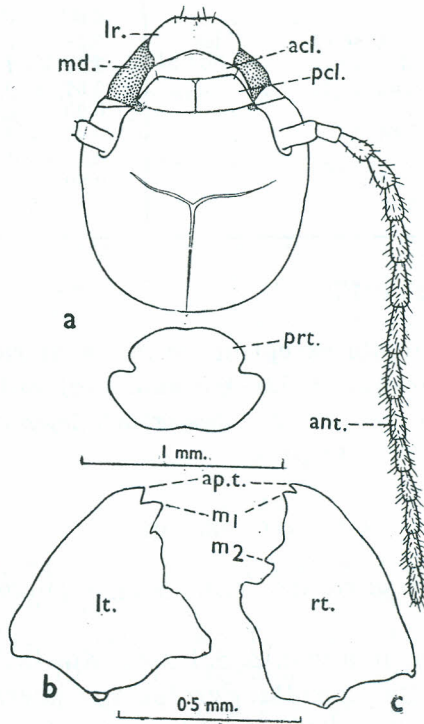


Fig. 12. *Hospitalitermes irianensis* n. sp. Worker major (paratype). (a) Head and pronotum, in dorsal view. (b) Left mandible, in dorsal view. (c) Ditto, right mandible.

*acl.*, anteclypeus; *ant.*, antenna; *ap.t.*, apical tooth of mandible; *lr.*, labrum; *lt.*, left; *m<sub>1</sub>*, *m<sub>2</sub>*, first and second marginal teeth respectively of mandibles; *md.*, mandible; *pcl.*, postclypeus; *prt.*, pronotum; *rt.*, right.

Pronotum strongly saddle-shaped; clothed with fine hairs; width more than half the head-width; anterior margin convex with a slight median depression; posterior margin convex with a weak median notch. Legs long and slender, moderately pilose; hind-femur not reaching the tip of abdomen; hind-tibia longer than hind-femur. Abdominal tergites apilose except the last 2 or 3 which are sparsely pilose with long hairs; sternites moderately pilose with long hairs. Cerci short, 2-segmented, hairy.

TABLE 12. — *Hospitalitermes irianensis* n. sp. Body-measurements (in mm), etc. of workers major and minor. (5 examples of each.)

Body-parts	Workers major	Workers minor
1. Total body-length, c. . . . .	5.0 — 6.0	3.6 — 4.3
2. Length of head to lateral base of mandibles	0.98 — 1.10	0.84 — 0.90
3. Maximum width of head . . . . .	1.19 — 1.26	0.86 — 1.00
4. Maximum height of head . . . . .	0.57 — 0.62	0.43 — 0.48
5. Maximum length of labrum . . . . .	0.20 — 0.27	0.18 — 0.22
6. Maximum width of labrum . . . . .	0.47 — 0.51	0.32 — 0.36
7. Length of pronotum . . . . .	0.50 — 0.54	0.32 — 0.37
8. Maximum width of pronotum . . . . .	0.80 — 0.85	0.57 — 0.63
9. No. of antennal segments . . . . .	15	15

## 4. WORKER MINOR (Table 12)

Resembles worker major except in the following respects: (i) Smaller (total body-length c. 3.6 - 4.3 *vs.* 5.0 - 6.0 mm.). (ii) 3rd antennal segment slightly longer, or subequal to, 2nd (*vs.* much longer). (iii) Pronotum, weakly saddle-shaped (*vs.* strongly so).

## (c) TYPE-SPECIMENS

All specimens are in spirit and from a single source (*vide* above under 'Material').

*Holotype*: A soldier, in a vial, Z. S. I. Reg. No. 4357/H8, deposited in Zoological Survey of India, Calcutta. *Paratypes* (soldiers and workers) deposited as follows: (a) 10 soldiers and 10 workers (5 major, 5 minor), in a vial, in Museum Zoologicum Bogoriense, Bogor (Java). (b) 10 soldiers and 10 workers (5 major and 5 minor), in a vial, Z. S. I. Reg. No. 4358/H8, as above in Z. S. I., Calcutta. (c) A soldier and 2 workers (1 major, 1 minor), in a vial, in Forest Research Institute, Dehra Dun. (d) A soldier and 2 workers (1 major, 1 minor), in a vial, with Prof. A. E. EMERSON, U.S.A.

The remaining material (workers only, all in a single vial) are in the Z. S. I., Calcutta, and are not paratypes.

## (c) TYPE-LOCALITY AND GEOGRAPHICAL DISTRIBUTION

Type-locality: Meervlakte, Idenburg River, West Irian (W. New Guinea), Indonesia.

Known only from type-locality.

## (d) COMPARISONS

*Hospitalitermes irianensis* n. sp. is close to *H. moluccanus* AHMAD (from the "Dutch East Indies") and *H. papuanus* AHMAD (from Papua) but differs from them as follows:

1. From *H. moluccanus*: SOLDIER: (i) Apical portion of mandibles long, slender, and directed anteriorly (*vs.* minute and directed a little laterally). (ii) Head-rostrum cylindrical (*vs.* almost conical). (iii) Posterior bulge of head greater. (iv) Pronotum index (Maximum length/Maximum width) lower (0.53 - 0.58 *vs.* 0.63).

2. From *H. papuanus*: SOLDIER: (i) Head profile strongly concave, without a low hump at base of rostrum (*vs.* moderately concave, with a low hump at base of rostrum). (ii) Head drawn and narrowly rounded behind (*vs.* not drawn and broadly rounded behind). (iii) Head-rostrum cylindrical (*vs.* almost conical). (iv) Apical portion of mandibles long and slender (*vs.* short and sharply pointed).

## IV — SUMMARY

1. Termites (Insecta: Isoptera) from several islands of Indonesia, ranging from Sumatra in the west to West Irian (W. New Guinea) in the east, are dealt with. The collections are from 40 different Collecting Stations as follows: Riouw (Rhio) Archipelago (1 station), Sumatra and its islands (2 stations), Sunda Straits and the Java Sea (2 stations), Java and its islands (25 stations), Bali Island (2 stations), Lombok Island (3 stations) and West Irian (5 stations).

2. Thirty one species and subspecies are dealt with. They belong to three families and 14 genera as follows:

Fam. Kalotermitidae: *Neotermes* and *Cryptotermes*.

Fam. Rhinotermitidae: *Coptotermes*, *Prorhinotermes* and *Schedorhinotermes*.

Fam. Termitidae: *Microcerotermes*, *Capritermes*, *Macrotermes*, *Odonotermes*, *Microtermes*, *Nasutitermes*, *Bulbitermes*, *Lacessititermes* and *Hospitalitermes*.

3. Five species are new to science. These are:

(i) *Prorhinotermes ravani* n. sp. (E. Java).

(ii) *Microcerotermes dammermani* n. sp. (Riouw [Rhio] Archipelago).

- (iii) *Bulbitermes durianensis* n. sp. (Riouw [Rhio] Archipelago).
- (iv) *Bulbitermes lakshmani* n. sp. (Peutjang Island, near western tip of Java).
- (v) *Hospitalitermes irianensis* n. sp. (West Irian).

4. In addition to those of the new species mentioned above, the following are new locality records from Indonesia or some of its constituent parts:

*Neotermes tectonae*: West Irian.

*Cryptotermes domesticus*: Berhala Isl. (N. of Sumatra).

*Schedorhinotermes tarakanensis*: Peutjang Isl. (near W. tip of Java, Java Sea).

*Schedorhinotermes translucens*: West Irian.

*Capritermes buitenzorgi*: Peutjang Isl. (near W. tip of Java, Java Sea).

*Capritermes santchii*: Riouw (Rhio) Archipelago.

*Macrotermes carbonarius*: Riouw (Rhio) Archipelago.

*Macrotermes malaccensis*: Riouw (Rhio) Archipelago.

*Odontotermes makassarensis*: Bali.

*Nasutitermes acutus*: Lombok Isl.

*Nasutitermes matangensis matangensis*: Lombok Isl.

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