

PARC NATIONAL DE L'UPEMBA
I. MISSION G. F. DE WITTE

en collaboration avec
W. ADAM, A. JANSSENS, L. VAN MEEL
et R. VERHEYEN (1946-1949).

Fascicule 52 (1)

NATIONAAL UPEMBA PARK
I. ZENDING G. F. DE WITTE

met medewerking van
W. ADAM, A. JANSSENS, L. VAN MEEL
en R. VERHEYEN (1946-1949).

Aflevering 52 (1)

ISOPTERA

BY

W. VICTOR HARRIS (London)

About three thousand termites were collected by G. F. DE WITTE and his colleagues during the course of their expedition to the Parc National de l'Upemba, in the south-east corner of the Belgian Congo, in 1947. Altogether 18 species are represented, of which it has been possible to ascribe specific names to 13, and of these five are described here as new. In the following list those species which are present only in the alate form are indicated with an A :

KALOTERMITIDAE.

- A *Kaloterмес* sp.
- A *Neoterмес sepulvillus* (EMERSON).

TERMITIDAE.

- Amiterмес limpopoensis* FULLER.
- Creneterмес fruitus* n. sp.
- Thoracoterмес lusingensis* n. sp.
- Cubiterмес muneris* (SJÖSTEDT).
- Cubiterмес minitabundus* (SJÖSTEDT).
- Cubiterмес oblectatus* n. sp.
- A *Cubiterмес* spp.
- Noditerмес festivus* n. sp.
- Anoploterмес* sp.
- Macroterмес bellicosus* (SMEATHMAN).
- A *Odontoterмес badius* (HAVILAND).
- Odontoterмес latericius* (HAVILAND).
- A *Ancistroterмес crucifer* (SJÖSTEDT).
- A *Microterмес upembae* n. sp.
- Trinerviterмес* sp.

The localities between [] are outside the boundaries of the Park, but adjacent thereto.

The specimens fall into two groups, those collected at the lower altitudes (550-700 m) being mainly winged adults taken while swarming, while those from the higher altitudes (1.300-1.800 m) are mainly queens and non-reproductive castes from mound building communities. For this reason comparison of the faunas of these broad zones is not possible. A note on nest associations is appended.

Ordre ISOPTERA

Family KALOTERMITIDAE

Genus **KALOTERMES** HAGEN.1. — **Kalotermes** sp.

One alate female, somewhat damaged, of an apparently undescribed species close to *K. mkuzii* COATON, but distinctly more robust.

Kaswabilenga, 700 m, 3-4.XI.1947 (916 a).

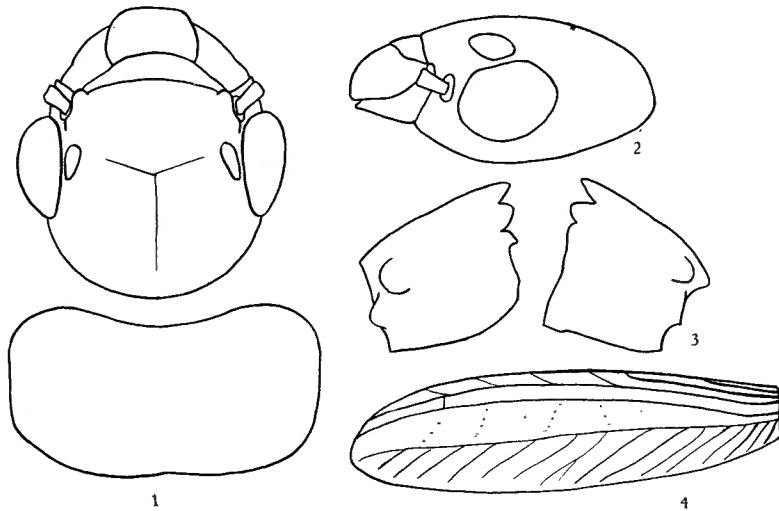


FIG. 1-4. — *Neotermes sepulvillus* (EMERSON).
1: Head and pronotum of imago. — 2: Head, lateral view. —
3: Mandibles. — 4: Fore wing.

Genus **NEOTERMES** HOLMGREN.2. — **Neotermes sepulvillus** (EMERSON).

(Figs. 1-4.)

Kalotermes (Neotermes) sepulvillus EMERSON, 1928, Bull. Amer. Mus. nat. Hist., 57 : 421.

Alates of both sexes agree closely with the description of the holotype from Stanleyville, apart from the forewings being slightly longer. Other

species in Africa are larger, except for *N. aburiensis* SJÖSTEDT as described by GRASSÉ (1937) which differs from *N. sepulvillus* mainly in body colour and wing venation.

Imago, males and females.	Range (5). mm.
Width of head across eyes	1,60- 1,82
Eye, diameter	0,59- 0,68
Ocellus, long diameter	0,18- 0,27
Ocellus, short diameter	0,13- 0,18
Pronotum, width	1,68- 1,91
Pronotum, length	0,95- 1,05
Forewing, length	11,00-11,50
Forewing, width	2,90- 3,50
Antennal segments	XVII- XIX

Lukawe, affl. r. dr. Lufira, 700 m, 6-9.X.1947 (814) 1 ♀, 2♂;
riv. Lupiala, affl. dr. Lufira, 700 m, 6-9.X.1947 (807 a) 2 ♀, 1 ♂.

Family TERMITIDAE WESTWOOD.

Subfamily AMITERMITINAE KEMNER.

Genus AMITERMES SILVESTRI.

3. — *Amitermes limpopoensis* FULLER.

Hamitermes limpopoensis FULLER, 1922, S. Afr. J. nat. Hist., 3 : 124.

This species was described from specimens collected in Northern Transvaal, on the Limpopo River. A single specimen of a soldier from Salisbury, Southern Rhodesia (col. G. A. K. MARSHALL, B. M. N. H. 1911) is also placed in the species, together with numerous examples from Nyasaland (col. SANDS & WILKINSON, 1953).

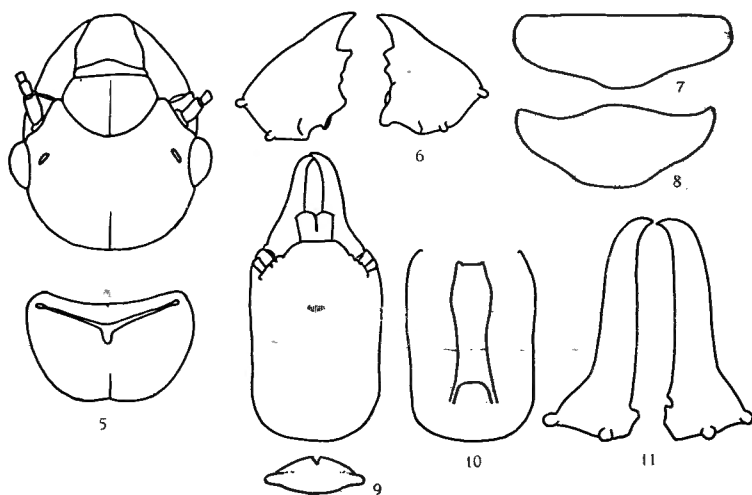
Mabwe, r. E. lac Upemba, 585 m, 17-20.XI.1948 (1950 a) 1 soldier.

Subfamily TERMITINAE SJÖSTEDT.

Genus **CRENETERMES** SILVESTRI.4. — **Crenetermes fruitus** n. sp.

(Figs. 5-11.)

Imago-female. — Head dark brown, with postclypeus, labrum and antennae distinctly paler in colour; almost semicircular from above, the width across the eyes exceeding slightly the length from posterior margin

FIG. 5-11. — *Crenetermes fruitus* n. sp.

Imago : 5, Head and pronotum; 6, Mandibles; 7, Sternum of abdominal segment VIII, ♀; 8, Sternum VIII of *C. umbraticola*.
Soldier : 9, Head and pronotum; 10, Head, ventral view to show gumentum; 11, Mandibles.

to front of postclypeus. Eyes protruding, rounded. Ocelli small, narrow oval, their long diameter equal to distance from eyes. Postclypeus inflated, anterior margin straight, sides converging towards the front, posterior a regular curve. Labrum with straight anterior, sides slightly sinuate, and posterior margin distinctly emarginate. Mandibles as figured, with the apical tooth far from the marginals. Antennae incomplete, segments II and V equal in length, III shorter than IV, and these two together less than II.

Pronotum about as dark as head with anterior margin unbroken concave, sides curved to lightly emarginate posterior; pale Y-shaped area. Meso- and metanota dark brown, with legs paler.

Abdomen with intersegmental membrane densely spotted with minute setae; anterior margin of seventh sternum straight.

Male. — In general as female; the unexpanded abdomen a darker brown with abundant pale hairs.

	Female. mm.	Male. mm.
Width of head across eyes	1,50	1,50
Eye, maximum diameter	0,34	0,36
Ocellus	0,13 × 0,09	0,13 × 0,09
Distance from ocellus to eye	0,14	0,13
Left mandible, length	—	0,73
Pronotum, width	1,36	1,32
Pronotum, length	0,07	0,82
Hind tibia, length	1,59	1,59

Differs from *C. umbraticola* and *C. albotarsalis* in having much smaller ocelli, which are more distant from the eyes; in the anterior margin of the pronotum being more concave; in the hind tibia being distinctly shorter and more robust; and in comparison with *C. umbraticola*, the sternum of segment 8 is broader and with anterior margin straight, not sinuate (see fig. 7 and 8).

Soldier. — Head yellow, suffused with brown in the frontal area, mandibles dark with paler bases; thorax, legs and abdomen pallid.

Head long rectangular, anterior slightly wider, sides lightly sinuate, posterior flatly rounded. Mandibles long and straight with sharply in-curved tips. Labrum rectangular with emarginate anterior margin, and parallel sides; pronounced median longitudinal furrow. Fontanelle small and inconspicuous, in a shallow depression, fringed with short pale hairs. Antennae with 15 segments; segment III distinctly shorter than the rest.

Pronotum broad and short, with anterior lobes sharply up-turned, and sides strongly convergent to narrow rounded posterior.

	Range (5). mm.
Length of head with mandibles	3,96-4,18
Head, length	2,73-2,77
Head, width	1,86-2,05
Left mandible, length	1,36-1,54
Pronotum, width	1,18-1,32
Pronotum, length	0,50-0,54
Hind tibia, length	1,28-1,36

Differs from the soldier of *C. umbraticola* in being slightly smaller, with the mandibles proportionately longer; in the head being broader towards the anterior, rather than slightly narrower; in the shape of the gula-mentum being less constricted in the middle like an hour-glass; and in the distinctly shorter hind tibiae. Differs from *albotersalis* in having the frontal area sloping back and not overhanging the fontanelle.

Holotype : Soldier, Lusinga, 1.760 m, 17.VII.1947 (584 a) Institut des Parcs Nationaux du Congo Belge.

Morphotypes : Male and female de-alates from type colony, in same collection.

Paratypes : 7 soldiers from type colony, 2 soldiers [Kenia, affl. dr. Lusinga et affl. dr. Lufwa, 1.585 m, 15.VII.1947 (565 a)], in association with *Cubitermes muneris*, etc., in same collection and British Museum.

Genus **THORACOTERMES** WASMANN.

5. — **Thoracotermes lusingensis** n. sp.

(Figs. 12-16.)

Imago-female. — Head dark brown, with dense cover of very short hairs, except on vertex, and a few scattered longer hairs; rounded. Ocelli narrow oval, more than their long diameter distant from the eyes. Fontanelle inconspicuous. Frontal area with a triangular depression from fontanelle to clypeus. Postclypeus only slightly inflated, dark brown in colour. Labrum pale brown with unpigmented tip. Mandibles as figured. Antennae dark brown (incomplete), segments III and IV short, together less than either II or V.

Pronotum dark brown, anterior margin straight, corners broadly rounded and sides converging to narrow, lightly emarginate posterior.

Meso- and metanota dark brown, with curved sides converging to narrow posterior margin, distinctly bilobed. Legs and abdominal sclerites dark brown.

	mm.
Width of head across eyes	2,00
Eye, maximum diameter	0,54
Ocellus	0,20 × 0,15
Distance of ocellus from eye	0,27
Pronotum	2,05 × 1,36
Hind tibia, length	2,36

Male. — Generally similar to female.

Differs from a topotype queen of *T. macrothorax*, determined by SJÖSTEDT, in having the ocelli much smaller and more distant from the eyes, and the posterior lobes of the meso- and metanota rounded and not conspicuously pointed.

Soldier. — Head pale brown at vertex, much darker in front; sides lightly curved, converging slightly in front; posterior margin rounded. Fontanelle large, oval, ringed with hairs. Clypeus short and broad.

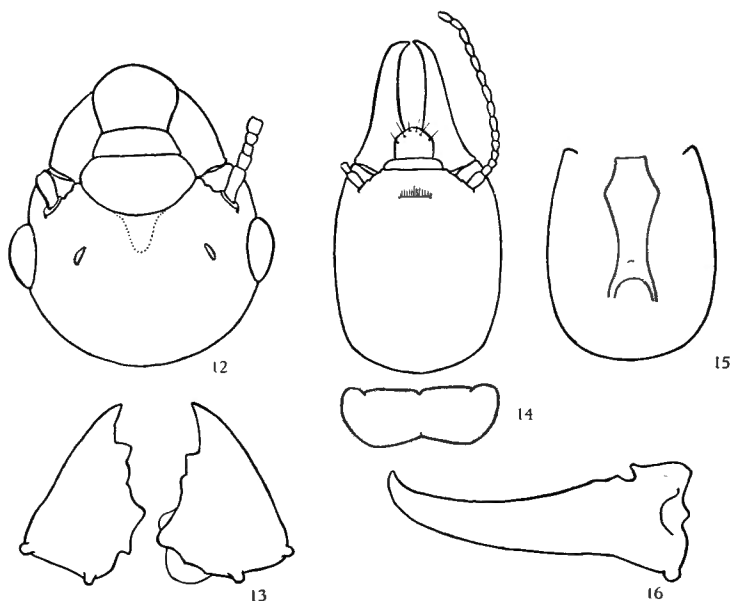


FIG. 12-16. — *Thoracotermes lustingensis* n. sp.

Imago : 12, Head; 13, Mandibles. Soldier : 14, Head and pronotum; 15, Head, ventral view; 16, Left mandible.

Labrum brown, about as long as broad, with parallel sides and obtuse tip bearing a number of bristles, ventral surface with a strong median rib. Mandibles black, robust, with strongly incurved tips and smooth inner margins, apart from basal teeth. Antennae with 15 segments, III shortest, II and V each slightly longer than IV. Gula-mentum widest a short distance from the anterior margin, middle portion constricted, widening towards the posterior, strongly convex in cross-section.

Pronotum typical of genus, nearly as wide as head, proportionately short, anterior corners rounded and projecting forwards, posterior margin in two shallow lobes.

	Range of 10. mm.	Mean. mm.
Length of head with mandibles	4,55-4,76	4,63
Head, length	2,86-3,00	2,94
Head, width	2,23-2,41	2,36
Left mandible, length	1,72-1,82	1,78
Pronotum, width	2,13-2,27	2,19
Pronotum, length	0,86-0,91	0,90
Hind tibia, length	1,82	1,82

T. macrothorax topotypes determined by SJÖSTEDT have a more rectangular head, less robust mandibles, and gulamentum much more constricted. Emerson's measurements of *macrothorax* from Cameroons and Stanleyville give greather length of head with shorter mandibles, and slightly longer hind tibiae. *T. brevinotus* has sides of head less curved, and anterior margin of pronotum convex without projecting corners.

Holotype : Soldier, Lusinga, 1.760 m, 17.VII.1947 (582 a), in Institut des Parcs Nationaux du Congo Belge.

Morphotype, female : Queen from type colony, as above, in same collection.

Morphotype, male : From type colony as above, in same collection.

Paratypes : Four soldiers, numerous workers and nymphs from type colony. Seven soldiers, numerous workers and nymphs from type locality. Two females, one male, eleven soldiers, workers and nymphs [Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.585 m, 15.VII.1947 (565 a)], in same collection and British Museum.

Genus **CUBITERMES** WASMANN.

6. — **Cubitermes muneris** (SJÖSTEDT).

(Figs. 17-19.)

Eutermes (Cubitermes) muneris SJÖSTEDT, 1913, Rev. zool. afric., **2** : 370.

Cubitermes muneris SJÖSTEDT, 1926, K. sv. Vet. Akad. Handl., (3), **3** (1) : 231.

The soldiers of *Cubitermes muneris* were described from Welgelegen, Katanga, the male and female imagos — kings and queens — are described here.

Imago-female. — Head dark brown, with numerous short hairs on the frontal area. Fontanelle in a small but distinct depression on the

flat area between the ocelli. Postclypeus brown with median dark line, inflated. Labrum pale brown with many short yellow hairs. Mandibles typical, as figured. Ocelli small, narrow oval, approximately a long diameter distant from the eyes. Antennae with segment III slightly shorter than IV, and both of these shorter than the other segments.

Pronotum dark brown; anterior margin straight; sides sloping to narrow, emarginate posterior; shallow median longitudinal furrow present, with short transverse furrow close to anterior margin.

Male. — Generally as female, but limbs and abdominal sclerites darker brown.

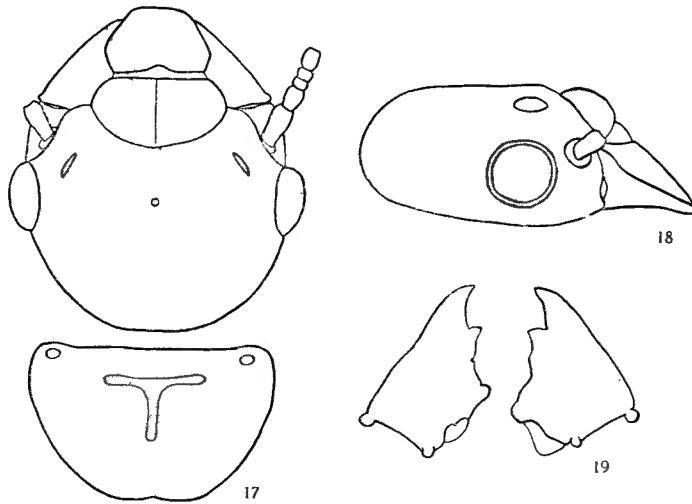


FIG. 17-19. — *Cubitermes muneris* (SJÖSTEDT), morphotype imago.
17: Head and pronotum. — 18: Head, lateral view. — 19: Mandibles.

	Female.		Male.	
	Morpho- type. mm.	Range (5). mm.	Morpho- type. mm.	Range (4). mm.
Width of head across eyes.	1,36	1,36-1,41	1,32	1,32-1,41
Eye, maximum diameter ...	0,32	0,32	0,32	0,30-0,34
Ocellus, long diameter	0,14	0,14-0,18	0,13	0,11-0,15
Ocellus, short diameter	0,09	0,09-0,10	0,09	0,08-0,09
Distance from eye to ocellus.	0,13	0,12-0,15	0,13	0,12-0,15
Pronotum, width	1,18	1,18-1,23	1,14	1,10-1,18
Pronotum, length	0,77	0,73-0,77	0,77	0,70-0,77
Hind tibia, length	1,46	1,41-1,50	1,54	1,46-1,55

Soldier.

Range of 6.	mm.								
	3,41-3,77	...	...	...	...	...	...	...	...
	1,86-2,13	...	...	...	...	...	...	...	...
	1,36-1,60	...	...	...	...	...	...	...	...
	1,68-1,86	...	...	...	...	...	...	...	...
	0,77-0,86	...	...	...	...	...	...	...	...
	0,36-0,41	...	...	...	...	...	...	...	...
	1,18-1,28	...	...	...	...	...	...	...	...

Male and female: Kankunda, affl. g. Lupiala et s. affl. dr. Lufira, 1.300 m, 26.XI.1947 (1058 a), with 12 soldiers and many workers, in Institut des Parcs Nationaux du Congo Belge.

Kankunda, as above, ♂ and ♀, with 24 soldiers (1059 a).

Kankunda, as above, ♀, with 12 soldiers (1060 a).

Lusunga, 1.760 m, 14.VII.1947, 3 ♂ and 3 ♀, with 1 soldier and 1 worker, (557 a).

Mubale, affl. g. Munte et s. affl. dr. Lufira, 1.480-1.780 m, 10.V.1947, 2 ♀, (353 a).

[Kenia, affl. dr. Lusunga et s. affl. dr. Lufwa, 1.585 m, 28.III.1947, ♂ and ♀, 3 soldiers (116 a)].

[Kenia, as above, 15.VII.1947, 3 ♀ and 1 ♂, from two colonies in association with *Thoracotermes lusungensis*, *Anoplotermes* sp. etc. (565 a)].

7. — **Gubitermes minitabundus** (Sjöstedt).

(Figs. 20-23.)

Butermes (*Gubitermes*) *minitabundus* Sjöstedt, 1913, Rev. zool. afric. 2 : 368.

Isognathotermes minitabundus Sjöstedt, 1926, K. sv. Vet. Akad. Handl. (3) 3 (1) : 216.

Gubitermes minitabundus Snyder, 1949, Smithsonian. misc. Coll. 112 : 161.

The soldiers of *Gubitermes minitabundus* were described from Welegen, Katanga and the imagos later from Luiluabourg. Specimens in the British Museum (Nat. Hist.) from Abercorn, Northern Rhodesia (col. P. E. Glover, 1947) agree well with the types.

Sjöstedt (1926) describes the mounds of this termite as « Erdnest mit oder ohne Hut ». In open grassland the mushroom-like mounds, frequently with double or treble caps, may occur in considerable numbers. In the savannahs south of the Tropical Rain Forest, *G. minitabundus* appears to behave as does *G. fungifaber* in similar country north of the Forest. These two species are also fairly similar in appearance.

Imagos :		Female (?)		Male (?)	
Width of head across eyes	1,60	1,64	1,64	0,41	0,13-0,15
Eye, maximum diameter	0,36	0,36	0,41	0,13	0,13-0,15
Ocellus, long diameter	0,13	0,13	0,13	0,09-0,11	0,13-0,15
Ocellus, short diameter	0,09-0,11	0,09-0,11	0,11	0,15-0,18	0,15-0,18
Distance from eye to ocellus	0,15-0,18	0,15-0,18	1,46	0,91	1,46
Pronotum, width	1,46	1,46	0,91	1,82-1,91	0,91
Pronotum, length	0,91	0,91	1,82-1,91	1,82-1,91	1,82-1,91
Hind tibia, length	1,80-1,82	1,80-1,82	1,82-1,91	1,82-1,91	1,82-1,91

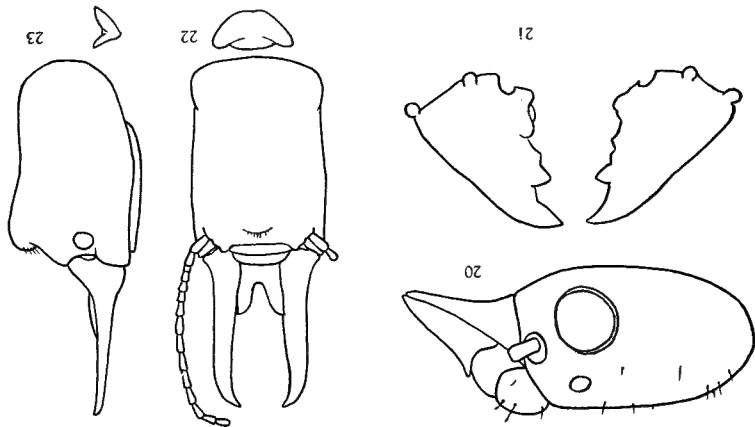


FIG. 20-23. — *Cubitermes minilabundus* (SÖSTEDT).
 Imago : 20, Head, lateral view; 21, Mandibles. Soldier : 22, Head
 and pronotum; 23, Head and pronotum, lateral view.

Soldier.

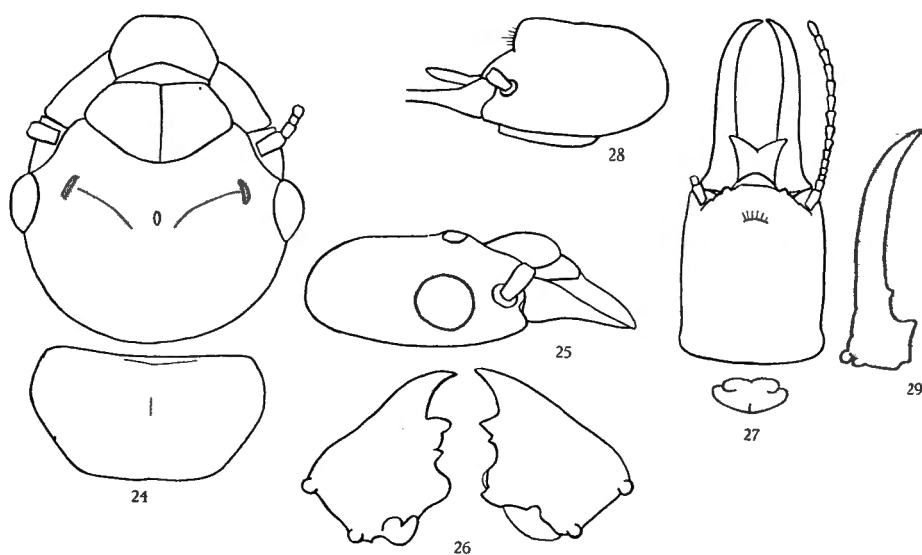
Range of ♂.		mm.	
Length of head with mandibles	5,00-5,45	2,95-3,18	2,95-3,18
Head length	1,96-2,05	2,13-2,41	2,13-2,41
Head, width	1,28-1,30	0,45-0,59	0,45-0,59
Left mandible, length	1,50-1,68	1,50-1,68	1,50-1,68
Pronotum, width	1,28-1,30	1,28-1,30	1,28-1,30
Pronotum, length	0,45-0,59	0,45-0,59	0,45-0,59
Hind tibia, length	1,50-1,68	1,50-1,68	1,50-1,68

Lusinga, 1.760 m, 17.VII.1947, 1 queen, 1 king, 9 soldiers, numerous workers (583 a).
 [Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.583 m, 28.III.1947, 1 queen, 1 king, 2 soldiers (118 a)].

8. — *Cubitermes oblectatus* n. sp.

(Figs. 24-29.)

Imago-female. — Head dark chestnut brown, with many short pale hairs except on vertex. Frontal area with depression anterior to fontanelle and reaching the margin with clypeus; fontanelle in a small pit on flat area between the ocelli. Postclypeus a little paler than rest of head,

FIG. 24-29. — *Cubitermes oblectatus* n. sp.

Imago : 24, Head and pronotum; 25, Head, lateral view; 26, Mandibles.
Soldier : 27, Head and pronotum; 28, Head, lateral view; 29, Left mandible.

with a dark median line. Labrum brown with paler margins, and many pale short hairs. Mandibles as figured. Ocelli small, narrow oval, one and a half times their long diameter removed from the eyes. Antennae dark brown; segments III shorter than IV, and both noticeably shorter than the rest.

Pronotum similar in colour to head, and with numerous short pale hairs; anterior margin straight, sides curving to narrow, barely emarginate posterior; median furrow slight. Legs yellow brown. Abdominal tergites uniformly pale brown with numerous short hairs; intersegmental membrane with evenly distributed pale brown spots.

	Range of 3. mm.
Width of head across the eyes	1,77-1,82
Eye, maximum diameter	0,44
Ocellus	0,15 × 0,11
Distance from eye to ocellus	0,22
Pronotum	1,68 × 1,04
Hind tibia, length	1,86-1,90

Soldier. — Head grey-brown, rectangular, with posterior corners rounded and slightly broader than remainder of head, posterior margin shallowly curved; frontal area slightly raised, with the large fontanelle hidden from above in the steeply cut front. Mandibles robust and about as long as the head, curvature slight to moderate without the tips in-curving strongly, inner margins lightly serrated, left mandible with prominent basal tooth. Labrum large, bifid with pointed lobes, narrower at base than at tips. Antennae with 15 segments, III shorter than IV, dull brown. Gula mentum wide near anterior margin, much narrower for the remaining three-quarters of its length.

Pronotum small, saddle-shaped with anterior lobes up-turned, pale in colour.

	Range of 9. mm.	Mean. mm.
Length of head with mandibles	5,54-5,86	5,61
Head, length	2,64-3,09	2,98
Head, width	2,27-2,54	2,38
Left mandible, length	2,73-3,18	2,98
Pronotum, width	1,23-1,36	1,32
Hind tibia, length	1,72-1,82	1,79

Soldiers resemble *C. inclitus*, but many be distinguished by their larger size, and by the shape of their labrum which is more shallowly incised. *C. ugandensis* and *C. heghi* are significantly smaller. *C. bulbifrons* is larger, and has the frontal area projecting forward and more swollen.

Holotype : Soldier, Lusinga, 1.760 m, 14.VII.1947 (561 a) in Institut des Parcs Nationaux du Congo Belge.

Morphotype : Female (queen) from type colony, in same collection.

Paratypes : 1 queen, 15 soldiers and numerous workers from type colony. [Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.585 m, 15.VII.1947, 2 queens, 20 soldiers and numerous workers from 3 nests (565 a)] in same collection and British Museum.

9. — *Cubitermes* spp.

The genus *Cubitermes* is also represented by winged adults of two species, neither of which is included above. In view of the large number of species of this genus which have been described from soldiers alone, or from soldiers and alates taken in association but not in fact belonging to each other, it is not considered desirable to proceed further with these short series of winged forms without soldiers. They belong to two species :

- (i) Lusinga, 1.760 m, 23.III.1947, 1 (106 a); 10.IV.1947, 1 (223 a).
Kankunda, affl. g. Lupiala et s. affl. dr. Lufira, 1.300 m, 14-20.XI.1947, 1 (1006 a); 22-28.XI.1947, 3 (1032 a); 22-24.XI.1947, 2 (1036 a).
[Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.760 m, 28.III.1947, 2 (136 a)].
- (ii) Lupiala, affl. dr. Lufira, 700 m, 6.X.1947, 1 (809 a).
Kaswabilenga, r. dr. Lufira, 700 m, 8.XI.1947, 1 (970 a).

Genus **NODITERMES** SJÖSTEDT.10. — *Noditermes festivus* n. sp.

(Figs. 30-34.)

Imago-female. — Head dark brown with numerous pale hairs; generally rounded in shape. Eyes relatively small. Ocelli large, oval, their distance from the eyes equal to their long diameter. Fontanelle conspicuous as a pale longitudinal streak (!-shaped) in a slight depression. Clypeus inflated, slightly paler than the head with a dark median line, posterior margin near semi-circular. Labrum pale, as long as broad, sides converging from midway to rounded tip. Mandibles as figured, dark brown with large terminal points.

Pronotum dark brown with pale hairs, anterior margin straight, sides curving to short emarginate posterior. Abdominal segments brown, legs paler.

Male. — In general as female.

	Female. mm.	Male. mm.
Width of head across the eyes	1,14	1,10
Eye, maximum diameter	0,26	0,26
Ocellus	0,12 × 0,09	0,12 × 0,09
Distance from eye to ocellus	0,12	0,12
Hind tibia, length	1,04	1,04
Pronotum	0,86 × 0,60	0,91 × 0,58

N. profestus differs in having both sexes larger and lacking the long narrow pale fontanelle.

Soldier. — Head pale yellow, slightly darker at the margins; rectangular with sinuate sides and flatly curved posterior. Frontal area projecting as an obtuse angled peak, in profile raised above the general level of the head and falling away steeply in front, overhanging the fontanelle. Labrum short, with deep U-shaped notch and finely pointed lobes. Mandibles dark brown, longer than the head, slender, curving slightly from the base,

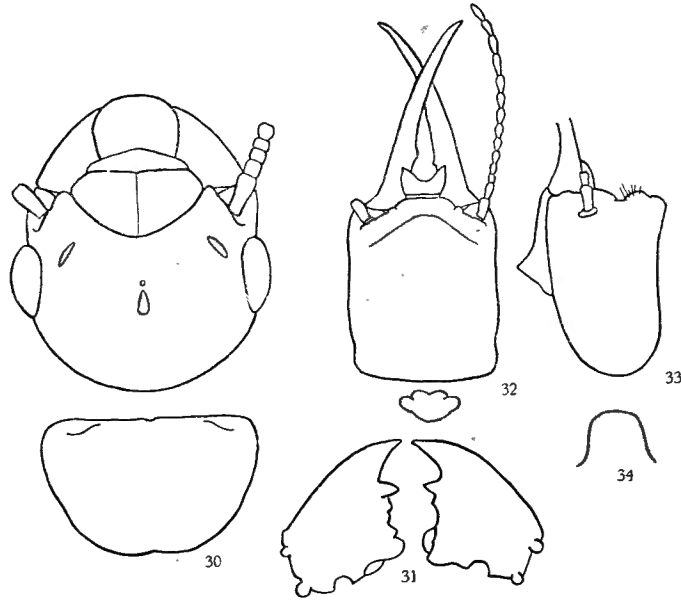


FIG. 30-34. — *Noditermes festivos* n. sp.

Imago : 30, Head and pronotum. Worker : 31, Mandibles.
Soldier : 32, Head and pronotum; 33, Head, lateral view;
34, Gula process, frontal view.

points sharp, inner margins each with a single small tooth towards the base. Antennae with 14 segments, IV smaller than III and V. Gulamentum ribbon-like, with prominent process that is acute angled when viewed from the side and from the front is a truncated cone lightly rounded off.

Pronotum small, near white, saddle-shaped with small anterior lobes. Abdomen and legs white.

	Range of 4. mm.
Length of head with mandibles ...	2,73-2,82
Head, length	1,41-1,46
Head, width	1,14-1,21
Left mandible, length	1,50-1,54
Pronotum	0,54 × 0,23
Hind tibia, length	0,82-0,86

N. indoensis is near, but differs in having the labrum more deeply incised, and the gula process bilobed when viewed from the front. *N. lamanianus* is larger, with the labrum relatively larger, and mandibles both shorter and more curved. *N. profestus* has the labrum with more obtuse angled notch, mandibles finer and straighter at their tips, and the gula process is more cylindrical from the side, and broader from in front with slightly bilobed margin. In *N. wasambaricus* the frontal projection is greater, and the gula process appears bilobed.

Holotype : Soldier, [Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.585 m, 28.III.1947 (117 a)] in Institut des Parcs Nationaux du Congo Belge.

Morphotype : Male and female from type colony as above, in same collection.

Paratypes : 3 soldiers with workers from type colony as above; 1 queen, 2 soldiers and workers from type locality, 17.VII.1947 (585 a), in same collection and British Museum.

Genus **ANOPLOTERMES** MÜLLER.

11. — **Anoplotermes** sp.

Anoplotermes is represented in the collection by one dealate male « king » and three dealate females, « queens », associated with *Cubitermes* spp. from three nests. This genus is without a soldier caste and is for this reason not so well known as its wide distribution in Africa would warrant. *Anoplotermes* is frequently found in the mounds of various *Cubitermes*, though some, if not all species are capable of an independent existence.

Lusinga, 1.760 m, 14.VII.1947, 1 king, 2 queens (561 a), with *C. oblectatus*.

[Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.585 m, 15.VII.1947, 1 queen (565 a) with *Cubitermes* spp.].

Subfamily MACROTERMITINAE.

Genus **MACROTERMES** HOLMGREN.12. — **Macrotermes bellicosus** (SMEATHMAN).

- Termes bellicosus* SMEATHMAN, 1781, Phil. Trans. Roy. Soc. **71** : 141.
Termes bellicosus HAGEN, 1858, Catalogue of the Neuropterous insects in the collection of the British Museum. Part I : 17.
Macrotermes bellicosus FULLER, 1922, S. Afr. J. nat. Hist. **3** (2) : 72.
Amplitermes bellicosus SJÖSTEDT, 1926, K. sv. Vet. Akad., Handl. (3) **3** (1) : 85.
Bellicositermes bellicosus SJÖSTEDT, 1926, Rev. zool. afric. **14** : 143.
Macrotermes bellicosus SNYDER, 1949, Smithson. misc. Coll. **112** : 209.

This species is represented in the collection by numerous soldiers and workers from Karibwe. The soldiers are robust and deeply pigmented, approximating *M. goliath*, especially in the case of the minor soldiers. *M. goliath* major soldiers from neighbouring localities in Rhodesia and Nyasaland are larger, with pronota broader and distinctly more rounded at the sides.

The following measurements agree closely with those given by EMERSON (1928, Bull. Amer. Mus. nat. Hist. *57* : 446) for this species in localities immediately north of the Tropical Rain Forest.

	Major soldier (5). mm.	Minor soldier (5). mm.
Length of head with mandibles	9,30-9,60	6,10-6,20
Head, length	6,40-6,60	3,80-3,90
Head, width	5,10-5,30	2,90-3,30
Left mandible, length	2,86-3,18	2,26-2,36
Pronotum, width	4,09-4,41	2,50-2,64
Pronotum, length	2,00-2,13	1,32-1,41
Hind tibia, length	3,80-4,00	2,90-3,00

Karibwe, affl. Lusinga et s. affl. dr. Lufwa, 1.700 m, 8-10.III.1947, numerous soldiers and workers (15 *a*).

Genus **ODONTOTERMES** HOLMGREN.13. — **Odontotermes badius** (HAVILAND).

Termes badius HAVILAND, 1898, J. linn. Soc. (Zool.) **26** : 385.

Odontotermes (Odontotermes) badius HOLMGREN, 1912, K. sv. Vet. Akad. Handl. **48** (4) : 36.

This is a widely distributed termite in wooded grassland and deciduous woodland from Ethiopia across to the Cameroons and down to Cape Province. It is represented in this collection by alates from three localities.

Lusinga, 1.760 m, 15.III.1947, 1 (50 a); 17.III.1947, 1 (55 a); 10.IV.1947, 14 (233 a).

Kankunda, r. dr. Lupiala, 1.300 m, 13-27, XI.1947, 1 (963 a).

[Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.700 m, 8 (126 a); 2 (136 a)].

14. — **Odontotermes latericius** (HAVILAND).

Termes latericius HAVILAND, 1898, J. linn. Soc. (Zool.) **26** : 386.

Odontotermes latericius HOLMGREN, 1913, Ent. Tidskr. **34** : 328.

[Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1.585 m, 10.XII.1947, 1 soldier (81 b)].

Genus **ANCISTROTERMES** SILVESTRI.15. — **Ancistrotermes crucifer** (SJÖSTEDT).

(Figs. 35-36.)

Termes crucifer SJÖSTEDT, 1897, Ent. Tidskr. **18** : 123.

Microtermes crucifer HOLMGREN, 1912, K. sv. Vet. Akad. Handl. **48** (4) : 41.

Ancistrotermes crucifer SILVESTRI, 1914, Boll. Lab. zool. Portici **9** : 18.

Two long series of winged imagoes agree closely with co-types from Abo in the Cameroons. *A. crucifer* is widely distributed in West Africa from Dakar to the northern Congo Belge. *A. latinotus* is recorded from Angola, Rhodesia, Nyasaland and East Africa, and in the Luapula area of the Congo Belge. Other species of the genus would appear to be less widely distributed. However in this case the Congo Rain Forest belt does not appear to act as a barrier between northern and southern savannah species, and recently WEIDNER (1956, Pub. Cult, Comp. Diam. Angola **29** : 87) has recorded *A. crucifer* soldiers from the Dundo area of Angola. Head and pronotum of alate *crucifer* and *latinotus* are figured.

Measurements of a male and a female from Lukawe are given below with those of two co-types males from Abo.

	Lukawe (2). mm.	Abo (2). mm.
Width of head across the eyes	1,68	1,68-1,77
Eye, maximum diameter	0,50	0,45-0,54
Ocellus, long diameter	0,23	0,25-0,27
Ocellus, short diameter	0,16-0,18	0,18
Distance of ocellus from eyes	0,09	0,09
Pronotum, width	1,46-1,50	1,50-1,54
Pronotum, length	0,86-0,91	0,91
Forewing, length	16,00	15,00-16,00
Forewing, width	4,00	3,70-4,00
Antennal segments	XVII	XVII

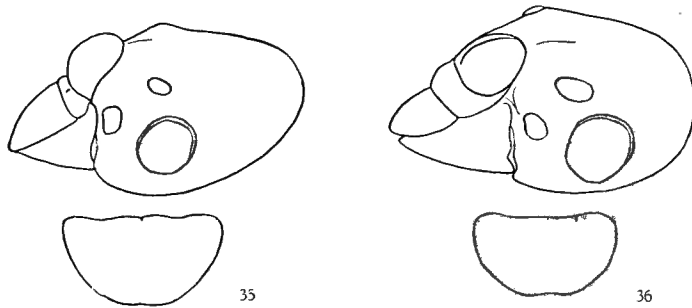


FIG. 35-36. — *Ancistrotermes*.
Head in lateral view, and pronata of imagoes :
35, *A. latinotus*; 36, *A. crucifer*.

Riv. Lupiala, affl. dr. Lufira, 700 m, 6-9.X.1947, 72 alates (807 a).
Lukawe, affl. dr. Lufira, 700 m, 6-9.X.1947, 61 alates (814 a).
Kaswabilenga, 700 m, 17.X. 1947, 1 alate (845 a).

Genus **MICROTERMES** WASMANN.

16. — *Microtermes upembae* n. sp.

(Figs. 37-41.)

Imago-female. — Head brown, with numerous small unpigmented spots each with a pale yellow hair; oval, the width across the eyes exceeding the distance from anterior of postclypeus to posterior margin of head by $\frac{1}{7}$ th. Fontanelle inconspicuous. Eyes large, protruding, black. Ocelli oval, situated close to the eyes. Mandibles as figured. Postclypeus yellow, without a dark median line, slightly inflated, anterior margin straight.

Labrum broad, with rounded tip. Antennae with 14 segments, III scarcely shorter than IV but narrower, IV and V equal.

Pronotum yellow-brown, without a distinct pale T-shaped mark; anterior lightly emarginate, posterior more so. Wings hyaline, slightly pigmented at base, with only sub-costa and radius well defined in yellow, branching of media and cubitus variable. Abdomen and legs yellow-brown.

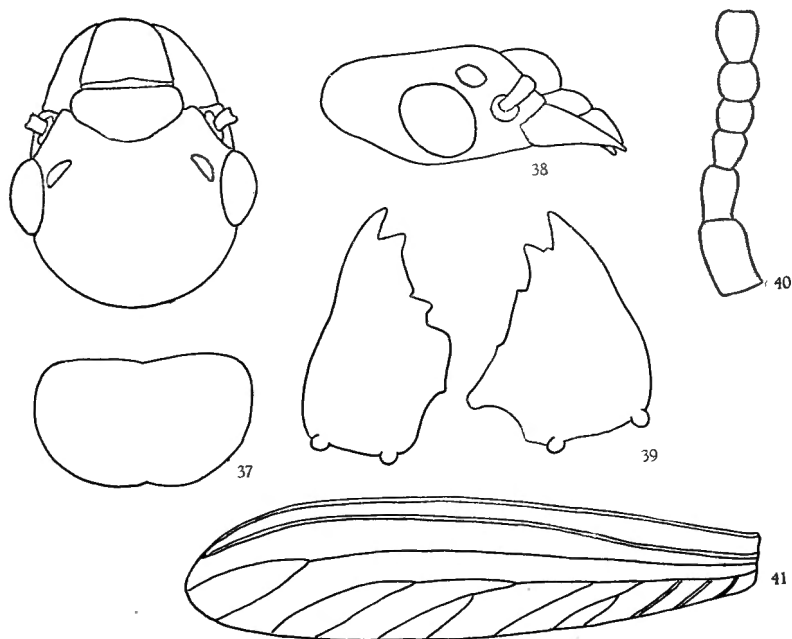


FIG. 37-41. — *Microtermes upembae* n. sp.

Imago: 37, Head and pronotum; 38, Head, lateral view; 39, Mandibles; 40, Antennal segments I-VI; 41, Fore wing.

Male. — Generally as female but with abdomen less bulky and wings shorter.

	Female (2). mm.	Male (2). mm.
Width of head across the eyes	1,18-1,28	1,18
Eye, maximum diameter	0,36-0,41	0,36
Ocellus	0,18 × 0,13	0,18 × 0,13
Distance of ocellus from eye	0,04	0,03-0,04
Pronotum, width	1,18	1,00-1,14
Pronotum, length	0,77	0,64-0,68
Hind tibia, length	1,28	1,14-1,23
Forewing, length	13,00-13,50	11,00-11,30
Forewing, width	3,00	2,80-2,90

Described from 2 ♀ and 57 ♂, from Riv. Lupiala, and 60 from elsewhere.

This termite differs from closely related *Microtermes* as follows :

*M. pallidiventr*is from Elizabethville has 15-segmented antennae, IV being longer than III, larger ocelli, pronotum with straight anterior margin and definite T-shaped mark; *M. magnocellis* from Tanganyika has larger ocelli and a relatively narrower head; *M. osborni* from Stanleyville is smaller, with a visible fontanelle, and ocelli relatively further from the eyes.

Holotype : Alate female, Riv. Lupiala, affl. dr. Lufira, 700 m, 6-9.X.1947 (807 a) in Institut des Parcs Nationaux du Congo Belge.

Morphotype : Alate male, as above, in same collection.

Paratypes : 1 ♀, and 56 ♂ as above.

Lukawe, affl. r. dr. Lufira, 700 m, 6-9.X.1947, 53 (814 a).

Kaswabilenga, r. dr. Lufira, 700 m, 8.XI.1947, 7 (970 a), in same collection and British Museum.

Subfamily NASUTITERMITINAE.

Genus **TRINERVITERMES** HOLMGREN.

17. — **Trinervitermes** sp.

One major soldier, three minor soldiers and some workers were associated with *Noditermes festivus*. Such a series is inadequate for determination in a new locality, or for description if a new species, in view of the considerable variation to be met with in *Trinervitermes*. This species is close to *T. dispar*, the soldiers having red-brown heads with the nasus slightly darker in colour, short and cylindrical. Length of head to tip of nasus 2,05 and 1,72 mm in the major and minor forms respectively.

[Kenia, affl. dr. Lusinga et s. affl. dr. Lufwa, 1,585 m, 28.III.1947 (117 a)].

NEST ASSOCIATIONS.

Some termites are rarely, if ever, found anywhere else than in the mounds of other termites; others may be able to make mounds of their own but show a preference for associating with another species. The degree of association appears to vary from actual sharing of the galleries of a mound still in the occupation of a « primary mound builder », through a less intimate relationship where the intruder adapts for its own use part of a mound not actually in use, to the complete taking over of a

mound from which the original inhabitants have departed, either by accident or by force. In Africa, large tracts of grassland, both montane and aquatic, and of savanna maintain large populations of small-mound termites, usually species of *Cubitermes*, and their constructions exhibit all degrees of nest association. Such associations involve smaller species of the same genus, related genera such as *Thoracotermes* and *Crenitermes*, and certain specialised genera including *Anoplotermes*, which has no soldier caste, and *Apicotermes* with its highly developed nest construction. These nest associations lead to the mixing of the various castes of the two or more species concerned, and may cause alates and soldiers of different genera to be described as a single new species.

Examples of nest associations found in the present collection are listed. They arise from the presence of two or more species in a tube devoted to the occupants of a single mound.

Anoplotermes sp. occurs in three nests of *Cubitermes oblectatus* (561 a & 565).

Trinervitermes sp. occurs in a nest of *Noditermes festivus* (117 a).

Three mounds from one locality (565 a) present a more complex picture :

	Mound		
	1.	2.	3.
<i>Cubitermes oblectatus</i>	×	×	×
<i>Cubitermes muneris</i>	×	—	×
<i>Thoracotermes lusingensis</i>	×	×	×
<i>Crenitermes fruitus</i>	×	—	—
<i>Anoplotermes</i> sp.	—	—	×

COMMONWEALTH INSTITUTE OF ENTOMOLOGY,
c/o British Museum (Nat. Hist.), London, S.W. 7.

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Photo G. F. DE WITTE.

Fig. 1. — *Cubitermes* mounds in high altitude tree savanna at Lusinga, alt. 1800 m., after the grass has been burnt.



Photo G. F. DE WITTE.

Fig. 2. — Close-up of mound of *Cubitermes minitabundus* (SJÖSTEDT) at Lusinga, alt. 1800 m.



Foto A. JANSSENS.

Fig. 1. — Mound of *Cubitermes muneris* (SJÖSTEDT) at Dipidi, alt. 1800 m.



Photo G. F. DE WITTE.

Fig. 2. — *Cubitermes* mounds in low altitude tree savanna at Babazi, alt. 900 m.

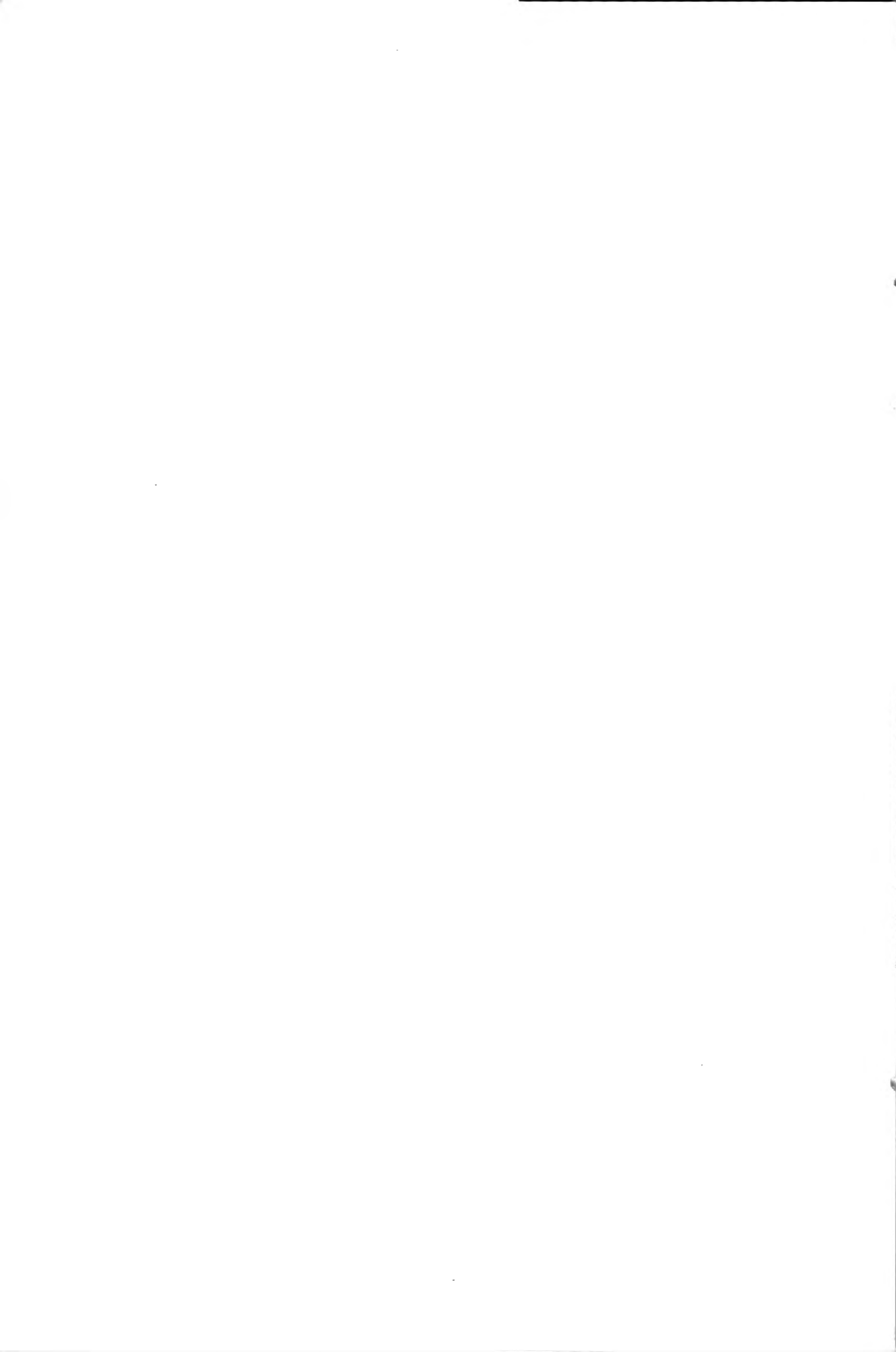




Photo G. F. DE WITTE.

Fig. 1. — Mushroom mounds of *Cubitermes* sp., Kanonga, alt. 695 m.



Photo G. F. DE WITTE.

Fig. 2. — Mound of *Macrotermes bellicosus* (SMEATHMAN), Kaswabilenga, alt. 790 m.,
at edge of escarpment forest.

