

THE GENUS *ANCISTROTERMES*
(ISOPTERA)



BY

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THE GENUS *ANCISTROTERMES* (ISOPTERA)

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SYNOPSIS

The history of the genus is discussed, and eight species are dealt with, of which two are described as new. Two species are placed in synonymy.

INTRODUCTION

ISOPTERA of the subfamily Macrotermitinae (Termitidae) occur in Africa south of the Sahara and in tropical Asia. They are characterized by the presence of fungus combs in chambers forming part of the nest system. The nests are mainly subterranean but some species, under favourable circumstances, build mounds.

In Africa four genera of Macrotermitinae, *Macrotermes*, *Odontotermes*, *Ancistrotermes* and *Microtermes*, are numerous and widely distributed. They are distinguished from the remaining six less-common genera by the comparatively slender mandibles of the soldier castes, with inner margins not serrated and with no more than a single marginal tooth. They form a series showing a progressive reduction in size, and in the number of antennal segments in all castes, and in the complexity of structure of their fungus combs.

Ancistrotermes is present throughout the extensive areas of savanna woodlands between latitudes 13° North and 23° South, at elevations below 1,600 metres a.s.l. It is common in the gallery forests within the savanna, but is uncommon in closed canopy rain forest on the one hand and in semi-desert thorn bush on the other. One species, *A. latinotus*, is closely associated with the *Brachystegia* etc. woodlands of eastern and southern Africa. The genus as a whole forms a significant part of the soil macro-fauna of a large part of Africa, and is, in addition, of economic importance due to attacks on young trees, especially *Eucalyptus* spp., on plantation crops such as tea, and on constructional timbers.

Silvestri proposed the name *Ancistrotermes* as a subgenus in 1912 and as a genus in 1914 for two West African termites, *Termes crucifer* Sjöstedt and *T. cavithorax* Sjöstedt. Later *A. latinotus* Silvestri from south-east Congo and Angola, *A. guineensis* from Portuguese Guinea and *A. periphraesis* from the Sudan were added. Two species, *A. lembomboensis* Fuller and *A. amphidon* Sjöstedt, are placed in synonymy for reasons given below. Two new species, *equatorius* and *microdens*, are described.

In view of the tentative nature of the original references and the absence of subsequent records, *A. crucifer* var. *diversana* Silvestri and *A. ?dubius* Sjöstedt are omitted from this study. It has not been possible to examine the specimens of *A. wasmanni* Snyder & Emerson, to which Wasmann gave the name *A. cavithorax* but included in his published description significant differences in the soldier mandibles. This brings the total number of species dealt with here to eight.

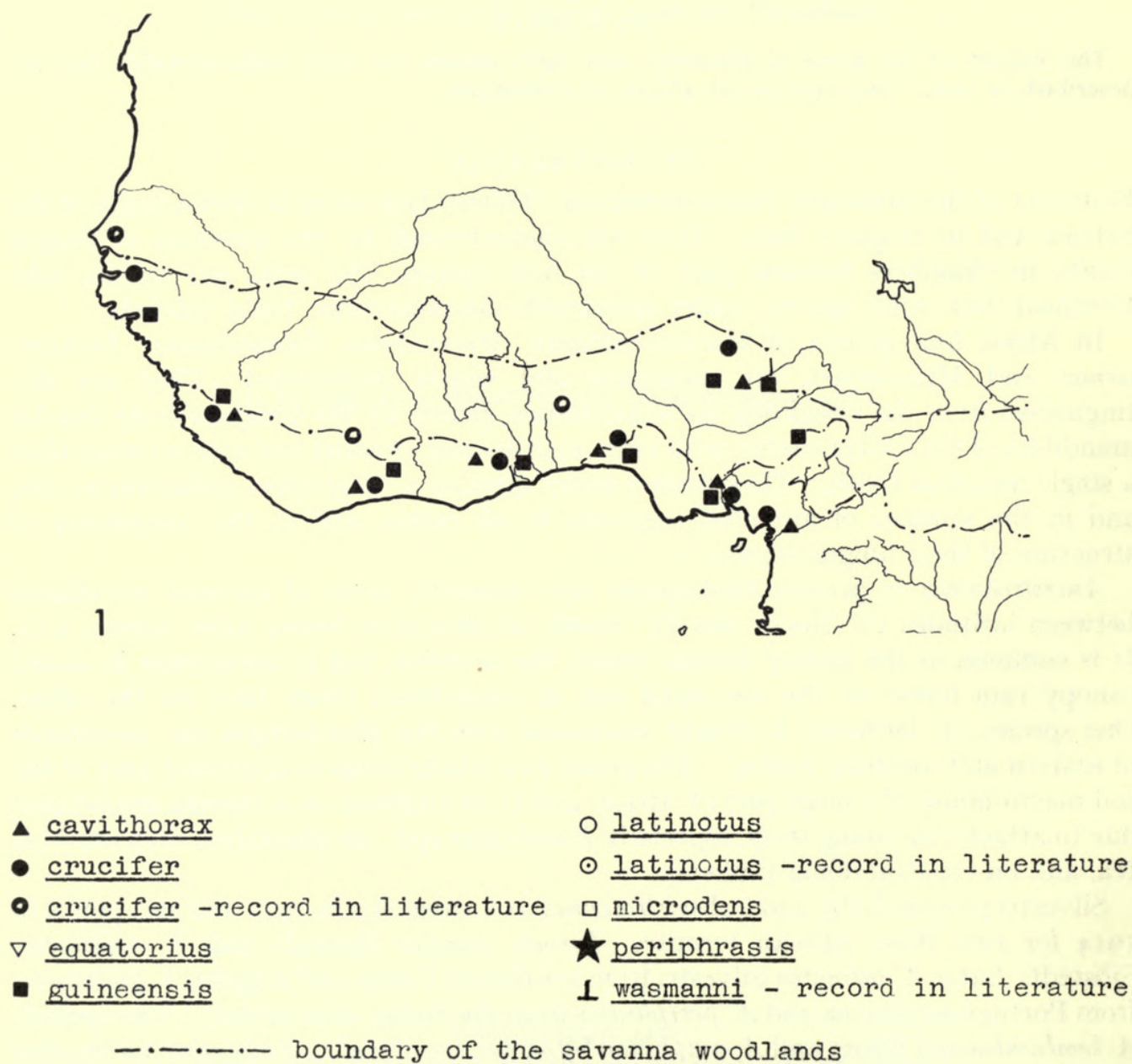


FIG. 1. Distribution of *Ancistrotermes* in West Africa.



FIG. 2. Distribution of *Ancistrotermes* in Central and South Africa.

ANCISTROTERMES Silvestri

Termes (*Ancistrotermes*) Silvestri, 1912, *Ann. Mus. Zool. Napoli* **3** (22) : 4.

Ancistrotermes Silvestri, 1914, *Bol. Lab. Zool. Portici* **9** : 17. [as genus]

Imago. Small (width of head including eyes from 1.58–1.86 mm., length of fore wing from 15–20 mm.); head oval; clypeus inflated, distinctly paler than the rest of the head, with a dark median line; eyes circular, large; ocelli oval, comparatively large and close to the eyes; labrum tongue-shaped with broadly rounded tip; mandibles conforming to the general Macrotermitinae pattern, with no subsidiary tooth on the first marginal of the right mandible (also absent in *Odontotermes* and *Microtermes*); fontanelle a small circular spot; antennae with 17 segments (19 in *Odontotermes* and 15 or 16 in *Microtermes*).

Pronotum approximately semicircular with anterior corners rounded and projecting forwards, and both anterior and posterior margins slightly sinuate. Wings similar to *Microtermes*, veins other than radius and radial sector only feebly chitinized, medius and cubitus not united at the base, weak branches usually present from medius towards radial sector.

Soldier. Distinctly dimorphic, the major soldiers having the head and mandibles in the range 1.50–2.40 mm., and the minor soldiers 1.14–1.90 mm.

Major soldier with head oval or laterally compressed; mandibles robust with strongly incurved tips, left mandible with a small marginal tooth, right mandible with or without marginal tooth but usually with a small basal spur; labrum not broader than long, pointed; antennae with 15 segments (*Odontotermes* has 16 or 17, *Microtermes* has from 12 to 14); pronotum saddle-shaped.

Minor soldier with ovoid head, more or less narrowed towards posterior; mandibles slender, only lightly curved, marginal teeth rudimentary or absent; antennae with 14 or 15 segments.

Worker. There are two worker castes, differing mainly in size; major workers with head width between 1.4 and 1.6 mm., minor workers between 0.8 and 1.0 mm.

Head yellow with paler clypeus and two distinct brown spots marking the inner articulations of the mandibles; thorax and abdomen cream, with a sprinkling of short, pale setae. Head rectangular, wider than long to base of mandibles; clypeus narrow and inflated; mandibles as in imago; antennae with 16 segments (sometimes 15); pronotum saddle-shaped with rounded anterior lobes separated by a distinct median notch, posterior margin curved or lightly emarginate.

The major workers of *Odontotermes* are larger, the head is longer than broad and the antennae have 17 or 18 segments. In *Microtermes* the worker is smaller, the head is slightly longer than broad and the antennae have 14 segments.

List of species (* indicates that the imago is known).

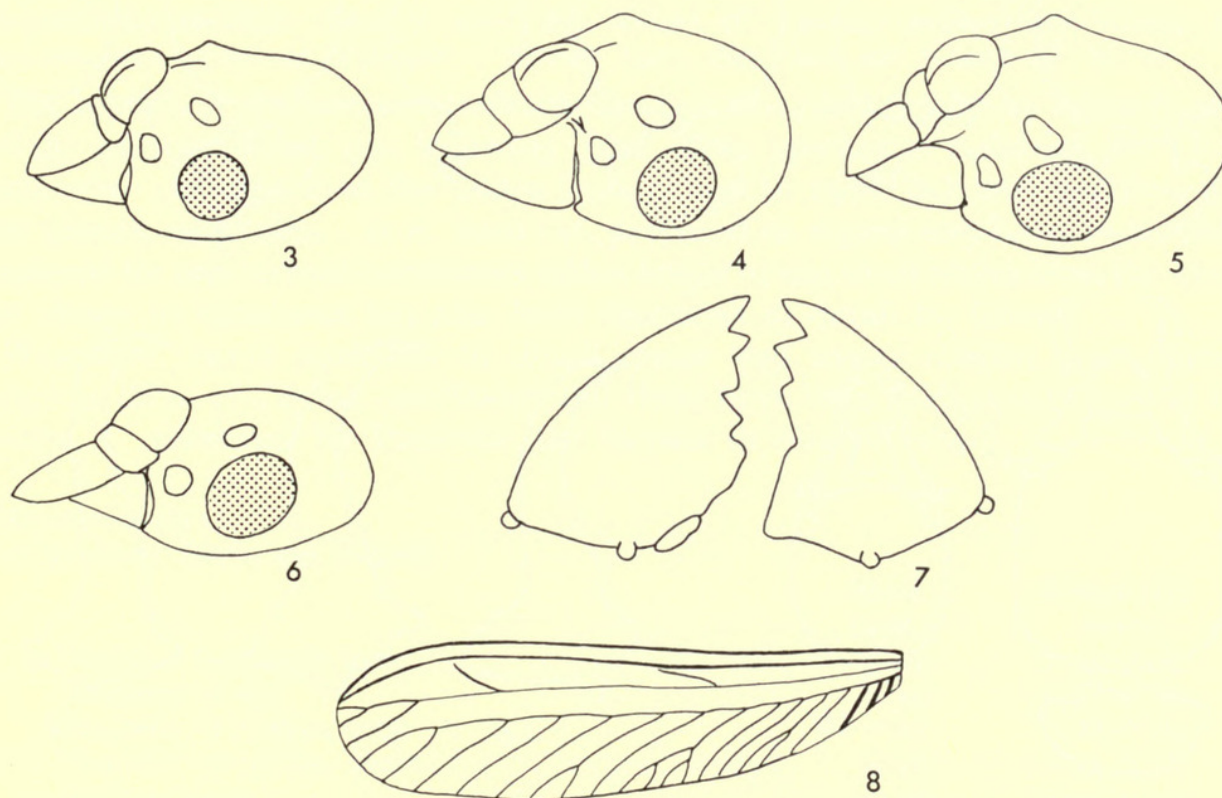
- | | |
|-------------------------------------|----------------------------|
| 1. <i>*cavithorax</i> (Sjöst.) | West Africa |
| <i>amphidon</i> Sjöst. | West Africa |
| 2. <i>*crucifer</i> (Sjöst.) | West Africa, Congo, Angola |
| 3. <i>equatorius</i> n. sp. | East Africa |
| 4. <i>guineensis</i> (Silv.) | West Africa |
| 5. <i>*latinotus</i> (Holmgr.) | Central and East Africa |
| <i>lembomboensis</i> Fuller | South Africa |
| 6. <i>microdens</i> n. sp. | East Africa |
| 7. <i>*periphrasis</i> Sjöst. | Sudan and Congo |
| 8. <i>wasmanni</i> Snyder & Emerson | Congo |

KEY TO *ANCISTROTERMES* IMAGOS

- 1 Width of head including eyes rarely under 1.77 mm.; hind tibia 1.86 mm. or more;
ocelli smaller 2
- Width of head including eyes not more than 1.77 mm.; hind tibia under 1.86 mm.;
ocelli large and broadly oval 3
- 2 Ocelli broadly oval, half the long diameter distant from eyes. *latinotus* (p. 15)
- Ocelli narrowly oval, under one-third the long diameter from eyes *periphrasis* (p. 18)
- 3 Upper surface of head with numerous strong bristles *crucifer* (p. 11)
- Upper surface of head with a few fine bristles *cavithorax* (p. 9)

KEY TO *ANCISTROTERMES* MAJOR SOLDIERS

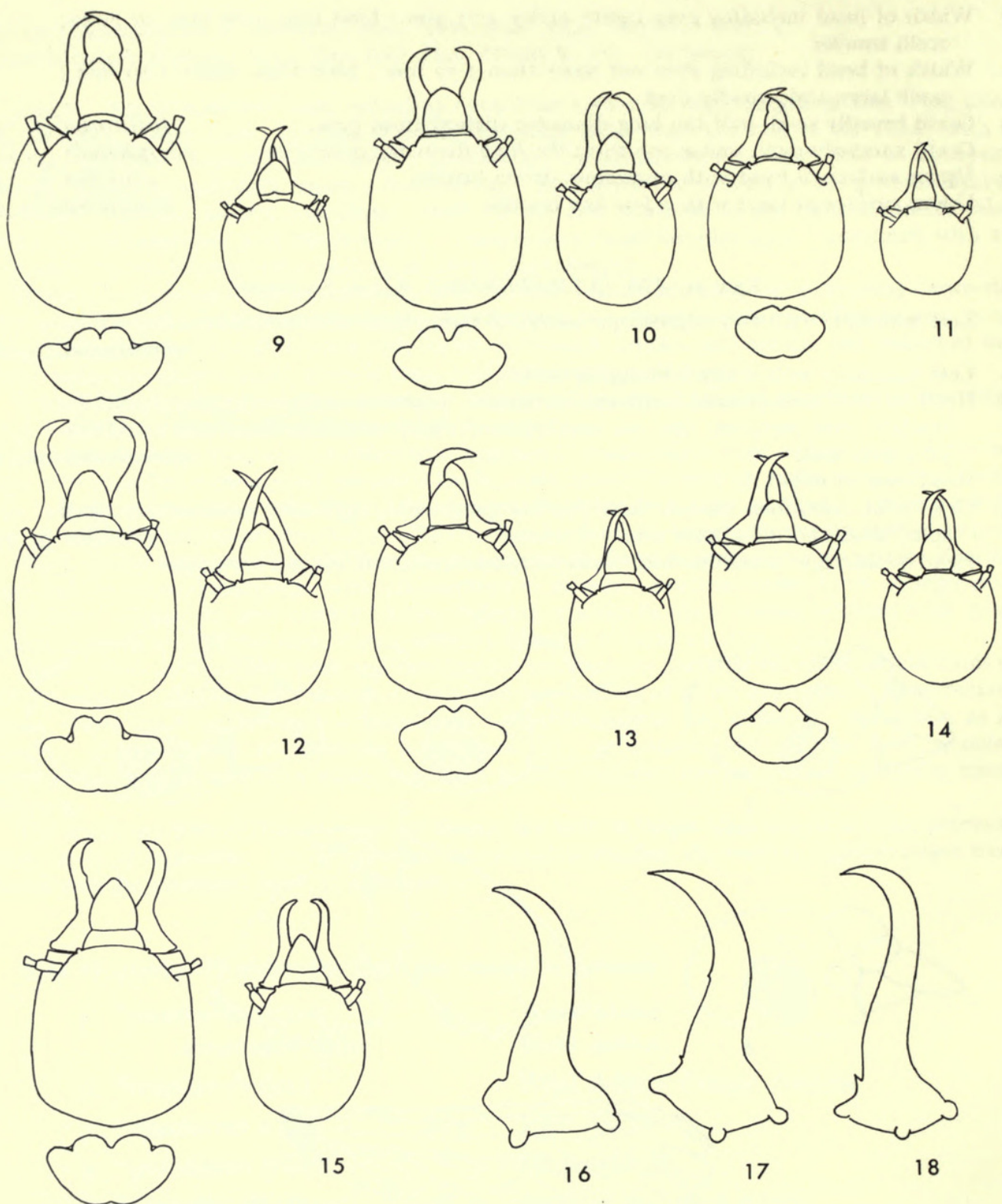
- 1 Left mandible with two microscopic marginal teeth, head and mandibles 1.8–2.0 mm.
 *wasmanni* (p. 20)
- Left mandible with a single marginal tooth 2
- 2 Head laterally compressed, narrowed anteriorly, posterior slightly angular, mandibles
straight with incurved tips, no basal spur on right mandible, head and mandibles
1.82–2.09 mm. *guineensis* (p. 14)
- Head oval or ovoid 3
- 3 Head oval, mandibles robust, each with marginal tooth, right with rudimentary basal
spur, head and mandibles 1.82–2.05 mm. *crucifer* (p. 11)
- Head ovoid, right mandible with small marginal tooth and distinct basal spur 4



FIGS. 3–6. The Imago head in profile. 3. *latinotus*; 4. *crucifer*; 5. *cavithorax*; 6. *periphrasis*.

FIG. 7. Imago mandibles—*cavithorax*.

FIG. 8. Fore wing—*cavithorax*.



FIGS. 9-15. Heads of Major and Minor soldiers. 9. *crucifer*; 10. *microdens*; 11. *cavithorax*; 12. *latinotus*; 13. *periphraasis*; 14. *equatorius*; 15. *guineensis*. FIGS. 16-18. Right mandible of Major soldier. 16. *guineensis*; 17. *crucifer*; 18. *latinotus*.

- 4 Head distinctly narrower at posterior, mandibles lightly curved, head and mandibles
1.68–1.82 mm. ***equatorius*** (p. 13)
– Head not narrowed towards posterior 5
- 5 Mandibles curved from base, sides of head lightly curved, head and mandibles
1.50–1.82 mm. ***cavithorax*** (p. 9)
– Mandibles straight at base, incurving at tips 6
- 6 Pronotum with deep anterior notch, mandibles with very small marginal teeth, head
and mandibles 1.91–2.18 mm. ***microdens*** (p. 17)
– Pronotum with shallow median notch, mandibles with larger marginal teeth 7
- 7 Head rectangular-oval, mandibles lightly curved, head and mandibles 1.82–2.27
mm. ***latinotus*** (p. 15)
– Head ovoid, slightly narrower anterior, mandibles strongly curved, head and mandibles
1.82–1.90 mm. ***periphraasis*** (p. 18)

Ancistrotermes cavithorax (Sjöstedt)

(Text-figs. 5, 7, 8 and 11)

Termes cavithorax Sjöstedt, 1899, *Ent. Nachr.* **25** : 37 [soldier from Cameroon].*Termes cavithorax* Sjöstedt; Sjöstedt, 1900, *K. Sv. Vetakad. Hand.* **34** : 130–132.*Microtermes cavithorax* (Sjöstedt) Holmgren, 1913, *K. Sv. Vetakad. Hand.* **48** : 42.*Termes (Microtermes) cavithorax* Sjöstedt Sjöstedt, 1914, *Ark. Zool.* **8** : 4.*Ancistrotermes cavithorax* (Sjöstedt) Sjöstedt, 1926, *K. Sv. Vetakad. Hand.* **3** : 163.*Ancistrotermes cavithorax* (Sjöstedt); Sjöstedt, 1926, *Rev. Zool. Afr.* **14** : 163–164 [imago from Ghana].*Ancistrotermes amphidon* Sjöstedt, 1926, *Ent. Tidskr.* **47** : 240–241 [soldier from Ghana]. **syn.n.***Ancistrotermes cavithorax* (Sjöstedt); Grassé, 1937, *Ann. Soc. ent. France* **56** : 72–78.

The soldiers of *Ancistrotermes cavithorax* were described briefly by Sjöstedt in 1899 and in greater detail the following year from specimens collected at Victoria, Cameroon. He described the imago from Ghana in 1926, but later ascribed it to a new species, *amphidon*. It is, however, proposed to regard *amphidon* as a synonym employed for one series of *cavithorax* rather larger in size of all castes than the average. The imago of *cavithorax* has also been described in detail by Grassé.

Wasmann (1911) described in detail major and minor soldiers from Sankuru, Congo as those of *Termes cavithorax*, and these have been designated types of a new species *A. wasmanni* by Emerson and Snyder in Snyder (1949).

Measurements :

Imago from Ghana and Nigeria :

	Mean (mm.)	Range (15) (mm.)
Width of head with eyes	1.67	1.59–1.77
Diameter of eye	0.45	0.42–0.52
Diameter of ocellus, long	0.21	0.18–0.24
Diameter of ocellus, short	0.16	0.15–0.18
Ocellus to eye	0.09	0.08–0.10
Width of pronotum	1.53	1.41–1.68
Length of pronotum	0.91	0.91–0.95
Length of hind tibia	1.80	1.72–1.82
Length of fore wing	15.7	15.0–16.0
Width of fore wing	3.9	3.6–4.5

Soldiers from Ghana and Nigeria :

	Major		Minor	
	Mean (mm.)	Range (mm.)	Mean (mm.)	Range (mm.)
Length of head and mandibles	1.62	1.50-1.82	1.21	1.14-1.36
Length of head	1.05	0.91-1.18	0.72	0.68-0.77
Width of head	1.00	0.91-1.14	0.73	0.68-0.82
Length of left mandible	0.74	0.73-0.78	0.58	0.54-0.64
Width of pronotum	0.70	0.64-0.82	0.52	0.50-0.54
Length of hind tibia	0.95	0.91-1.04	0.80	0.77-0.86

Illustrations. Imago, soldier and worker castes are figured by Grassé (1937) together with photographs of the fungus comb present in the nests. Figure of head and pronotum for major and minor soldiers of *amphidon* are given by Sjöstedt (1926).

Distribution. Type locality—CAMEROON: Victoria, in Mus. Stockholm.

Other material. CAMEROON: Mamfe, 1957 (*W. Wilkinson*).

NIGERIA: Eastern Region—Port Harcourt, Ikot-Ekepene road, Umuahia, Onitsha, Abakaliki-Ikom road, Enugu, 1957 (*W. Wilkinson*); Northern Region—Ankpa, Makrudi, Lokoja, Beli, Badeggi, Bida, Jos, Gombe, Kaduna, Zaria, Damaturu, Argungu, Keffi, 1956-58 (*W. A. Sands*); Western Region—Agege, 1912 (*A. D. Peacock*); Ikeji, 1955 (*W. V. Harris*); Ibadan, Oyo, 1958 (*W. A. Sands*); Benin, 1957 (*W. Wilkinson*).

GHANA: Accra, 1926 (*A. J. Pomeroy*); Aburi, 1926 (*W. H. Patterson*) "*amphidon* Sjöstedt, co-types". Koforida, 1922 (*Baker*); Kumasi, 1955 (*W. V. Harris*); Accra, Ejura, Lawra, Wenchi, Volta Bridge, Tamale, Wa, Bolgatanga, 1959 (*W. A. Sands*).

IVORY COAST: Abidjan, 1963; Dabou, 1964 (*P. Bodot*).

SIERRA LEONE: Njala, 1955 (*W. V. H.*); Freetown, Bo, 1958 (*W. A. S.*)

UGANDA: West Nile, Arua, 1965 (*K. W. Brown*).

Additional published records: CONGO: Sankuru, in Sjöstedt (1926).

IVORY COAST: Aboisso, Akakra, Bouaké, Beoumi, Man in Grassé (1937).

The record of *A. amphidon* from Uganda in Harris (1951) is referred to below under *equatorius* n. sp.

Biology. *A. cavithorax* is found throughout West Africa in clearings within the coastal forests, in the mixed woodland savanna, and to the northern limits of the Guinean woodland.

The subterranean nest is a system of oval chambers, many containing fungus comb, connected by galleries of varying length. Grassé describes a nest made of earth situated inside the hollow trunk of a *Borassus* palm, with chambers measuring 5-6 cm. in length and 3-4 cm. high. Many nests are recorded from mounds of *Macrotermes*, *Trinervitermes*, *Cubitermes* and *Thoracotermes*.

Foraging workers seek out dead wood for food, usually fallen logs and timber in contact with the ground. Covered runways are built with soil up the trunks of trees and suitable feeding areas of dead bark are covered with sheets of earth. Young trees are frequently killed as a result of ring-barking by this termite, especially in afforestation projects with *Eucalyptus*. The woodwork of buildings is also subject to attack.

Swarming is recorded between 18.30 and 18.45 hours at Aboisso in the southern Ivory Coast during the month of February (Grassé).

***Ancistrotermes crucifer* (Sjöstedt)**

(Text-figs. 4, 9 and 17)

Termes crucifer Sjöstedt, 1897, *Ent. Tidskr.* **18** : 123 [imago from Sierra Leone and Cameroon].

Termes crucifer Sjöstedt ; Sjöstedt, 1900, *K. Sv. Vetakad. Handl.* **34** : 127-130.

Termes (Ancistrotermes) crucifer Sjöstedt ; Silvestri, 1912, *Ann. Mus. Napoli* **3** : 4-5.

Microtermes crucifer (Sjöstedt) Holmgren, 1912, *K. Sv. Vetakad. Handl.* **48** : 42.

Ancistrotermes crucifer (Sjöstedt) Silvestri, 1914, *Boll. Lab. zool. Portici* **9** : 18.

Ancistrotermes crucifer (Sjöstedt) ; Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* **3** : 162-163.

Ancistrotermes crucifer (Sjöstedt) ; Emerson, 1928, *Bull. Amer. Mus. nat. Hist.* **57** : 468-469.

Ancistrotermes crucifer (Sjöstedt) ; Grassé, 1937, *Ann. Soc. ent. France* **106** : 70-72.

Ancistrotermes crucifer (Sjöstedt) ; Weidner, 1956, *Pub. cult. Comp. Diamantes Angola* **29** : 86-87.

Ancistrotermes crucifer (Sjöstedt) ; Harris, 1958, *Explor. Parc nat. Upemba* **52** : 21.

Ancistrotermes crucifer (Sjöstedt) ; Harris, 1963, *Explor. Parc nat. Garamba* **42** : 31.

The preliminary description of *Termes crucifer* from Sierra Leone and Cameroon was based by Sjöstedt (1897) on the winged imago. This was followed in 1900 by detailed descriptions of all castes "nach den Typen", but the list of material studied indicates soldiers and workers only from Malanga in Angola. This locality is given by Silvestri (1914) as the source of *Ancistrotermes latinotus*, with the result that the first account of *crucifer* soldiers from West Africa is to be found in that paper. The two soldier castes are re-described by Emerson (1928) from north-east Congo, while measurements and figures of Ivory Coast specimens are in Grassé (1937).

Measurements :

Imago :

	"Cotypes", Abo (2) (mm.)	West Africa and Congo	
		Mean (mm.)	Range (9) (mm.)
Width of head with eyes .	1.68-1.77	1.71	1.68-1.77
Diameter of eye . . .	0.45-0.54	0.48	0.45-0.54
Diameter of ocellus, long.	0.25-0.27	0.22	0.21-0.23
Diameter of ocellus, short	0.18	0.15	0.14-0.18
Ocellus to eye . . .	0.08-0.09	0.09	0.09-0.10
Width of pronotum .	1.50-1.54	1.55	1.46-1.68
Length of pronotum .	0.91	0.92	0.82-1.00
Length of hind tibia .	1.72-1.77	1.82	1.72-1.86
Length of fore wing .	15-16	15.7	15.0-16.0
Width of fore wing .	3.7-4.0	3.9	3.6-4.1

Soldiers :

	Major		Minor	
	Mean (mm.)	Range (17) (mm.)	Mean (mm.)	Range (4) (mm.)
Length of head and mandibles	1.91	1.82-2.05	1.37	1.23-1.46
Length of head	1.23	1.09-1.28	0.80	0.68-0.86
Width of head	1.18	1.09-1.28	0.80	0.77-0.86
Length of left mandible	0.82	0.77-0.86	0.69	0.64-0.77
Width of pronotum	0.80	0.77-0.86	0.59	0.54-0.64
Length of hind tibia	1.08	0.86-1.09	0.86	0.82-0.91

Illustrations. The imago head is figured by Silvestri (1914). The head and thorax of the major soldier appears in Silvestri, Emerson (1928), Grassé (1937) and Weidner (1956). Grassé illustrates the whole minor soldier.

Distribution. Type locality—Sierra Leone and Cameroon (Abo and Mungo)—imago.

Material examined. CAMEROON : Abo (*Buchholz*) in Naturhistoriska Riksmuseum, Stockholm.

GAMBIA : Bunaka Kunda, Busumbula, 1956 (*C. R. Wallace*).

SIERRA LEONE : Jarama, 1948 (*F. A. Squire*) ; Njala, 1955 (*W. V. Harris*).

IVORY COAST : Abidjan, 1964 (*C. Noirot*) ; Dabou, 1964 (*P. Bodot*).

GHANA : Aburi, Kumasi, 1925 (*W. H. Patterson*) ; Accra, 1955 (*W. V. Harris*).

NIGERIA : Northern Region—Sokoto, Zaria, Kaduna, Gombe, Jos, Yola, Bida, Zinna, Kabba, Gboko ; Western Region—Ilorin-Oyo road, Ibadan, 1956-58 (*W. A. Sands*) ; Eastern Region—Onitsha, 1957 (*W. Wilkinson*).

CONGO : Garamba National Park, 1950-52 (*H. De Seager*) ; Upemba National Park, 1947 (*G. F. de Witte*).

Additional published records. SENEGAL : Dakar, in Sjöstedt (1926).

IVORY COAST : Man, Dimboko, in Grassé (1937).

TOGO : Misahohe, Bismarckburg, in Sjöstedt (1900).

CONGO : Niangara, Yakulu, in Emerson (1928).

ANGOLA : Dundo, in Weidner (1956).

Biology. *Ancistrotermes crucifer* occurs throughout the savanna and woodland areas of West Africa and the Congo down to the northern limits of *Brachystegia* woodland in Angola. The subterranean nest system is composed of approximately spherical chambers, some 2 inches in diameter, connected by galleries. These chambers contain fungus combs. Nests are also to be found in the walls of mounds constructed by other termites, for example those of *Macrotermes*, *Cubitermes*, *Thora-cotermes* and *Trinervitermes* in Ghana and Nigeria.

The workers build covered runways on dead tree stumps and on the trunks of living trees in search of dead wood. Damage to economic crops is common, particularly to groundnuts and young Eucalyptus trees. In Ghana young saplings of *Gmelina* and teak have been attacked.

Winged adults are recorded as swarming at Dundo, Angola at 18.00 hours in the month of August, and in the Upemba National Park in south-east Congo during October.

Ancistrotermes equatorius sp. n.

(Text-fig. 14)

Imago. Unknown.

Soldiers. Major soldier; head yellow, not noticeably setose; mandibles brown; antennae ivory. Thorax, abdomen and legs ivory.

Head as long as broad, distinctly narrowed towards the posterior, sides curved; labrum rather longer than broad, obtusely pointed; mandibles robust, the distal halves strongly incurved, left mandible with small tooth midway on inner margin; gulamentum broad, narrowed towards the anterior, strongly convex in section; antennae with 15 segments, III small, IV, V and VI equal.

Pronotum with anterior lobes small and pointed, separated by an acute angled notch; posterior margin flatly curved.

Minor soldier; head pale yellow, mandibles light brown. Thorax and abdomen ivory.

Head ovoid, sides converging towards the posterior; labrum conical; mandibles slender, tapering, lightly curved at the tips; antennae with 15 segments, III very short; gulamentum short and broad, convex in cross-section.

Pronotum with short anterior lobes divided by a shallow, obtuse angled median notch.

Measurements:

	Major soldier		Minor soldier	
	Mean (mm.)	Range (10) (mm.)	Mean (mm.)	Range (8); (mm.)
Length of head and mandibles	1.75	1.68-1.82	1.32	1.28-1.36
Length of head	1.10	1.00-1.14	0.75	0.73-0.82
Width of head	1.04	1.00-1.09	0.77	0.73-0.82
Length of left mandible	0.79	0.76-0.82	0.65	0.59-0.68
Width of pronotum	0.73	0.68-0.77	0.56	0.54-0.59
Length of hind tibia	1.02	0.95-1.09	0.85	0.77-0.91

The major soldier is distinguished from other *Ancistrotermes* by the shape of the head, which is narrowed towards the posterior. It differs from *latinotus* in possessing mandibles more robust and curved, and from *amphidon* in having a blunter tooth on the left mandible and a deeper, more angular notch on the anterior margin of the pronotum.

The minor soldier closely resembles that of *cavithorax*.

Holotype, major soldier, UGANDA: Karamoja district, 40 miles south-west of Moroto, 12.x.52 (*W. A. Sands*), in British Museum (Nat. Hist.)

Further records. UGANDA: Karamoja district, Toro Hills, 8.x.52 (*W. A. Sands*); Kitgum, attacking cotton, 22.ix.37 (*A. M. Gwynn*); Busia, inside mound of *Cubitermes*, 21.i.50 (*W. V. Harris*); Soroti, inside *Cubitermes* mound, 13.x.52 (*W. A. Sands*).

Described from 20 major soldiers, 14 minor soldiers and a number of workers from five localities in northern and eastern Uganda.

Ancistrotermes guineensis (Silvestri)

(Text-figs. 15 and 16)

Termes (*Ancistrotermes*) *crucifer* subsp. *guineensis* Silvestri, 1912, *Ann. Mus. Civ. Stor. Nat. Genova* (3) **5** : 227 [Port. Guinea].

Microtermes guineensis (Silvestri) Holmgren, 1913, *Ent. Tidskr.* **34** : 333.

Ancistrotermes crucifer var. *guineensis* (Silvestri) Silvestri, 1914, *Bol. Lab. zool. Portici* **9** : 20-21.

Ancistrotermes crucifer var. *guineensis* (Silvestri) ; Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* (3) **3** : 163.

Ancistrotermes guineensis (Silvestri) ; Grassé, 1937, *Ann. Soc. ent. France* **106** : 68-70.

Soldiers and workers from Portuguese Guinea were described by Silvestri as a subspecies of *Ancistrotermes crucifer* (Sjöst.). This was raised to specific rank by Grassé. Silvestri comments that in relation to *crucifer* "subspecies haec a forma typica mandibularum militis majoris brevitae bene distincta est", while Grassé points out that the major soldier head is more rectangular, and the mandibles more strongly curved at the tips.

Measurements :

	Major soldier		Minor soldier	
	Mean (mm.)	Range (10) (mm.)	Mean (mm.)	Range (5) (mm.)
Length of head and madibles	1.93	1.82-2.09	1.52	1.50-1.54
Length of head	1.26	1.18-1.36	0.91	0.91
Width of head	1.15	1.14-1.23	0.84	0.82-0.86
Length of left mandible	0.77	0.68-0.82	0.73	0.68-0.77
Width of pronotum	0.87	0.82-0.91	0.67	0.64-0.68
Length of hind tibia	1.07	1.00-1.14	0.90	0.86-0.91

These measurements are of soldiers collected in Ghana and Nigeria and are somewhat smaller than the figures given for Portuguese Guinea and for Ivory Coast (width of head 1.26 mm.).

Illustrations. The heads of major and minor soldiers are figured in Silvestri (1912) and Grassé (1937).

Distribution. Type locality—PORTUGUESE GUINEA : Rio Cassine, in Silvestri (1912).

Material examined. GHANA : Accra, 1926 (*A. J. W. Pomeroy*) ; Accra, 1959 (*W. A. Sands*).

NIGERIA : Northern Region—Ayangba, Beli, Bauchi, Kaduna, Portiskum—Kano Road, Minna, Riom, 1956-58 (*W. A. Sands*) ; Western Region—Olokemeje, 1957 (*W. A. Sands*) ; Eastern Region—Port Harcourt—Owerri Road, 1957 (*W. A. Sands*).

CAMEROON : Mamfe, 1857 (*W. Wilkinson*).

Additional published records. GUINEA : Mamou in Silvestri (1914).

IVORY COAST : Akakro in Grassé (1937).

Biology. *A. guineensis* occurs in the Guinean woodland formation along the whole of West Africa, in the more open grass areas and in the dense gallery forest, and in the coastal savanna-forest mosaic. Soldiers and workers are found mainly on dead wood, but in some cases nests have been located beneath the mounds of other termites.

***Ancistrotermes latinotus* (Holmgren)**

(Text-figs. 3, 12 and 18)

Microtermes latinotus Holmgren, 1912, *K. Sv. Vetakad. Handl.* **48** (4) : 42 [soldier from Luapula, S.W. Congo].

Microtermes latinotus Holmgren ; Holmgren, 1913, *Ent. Tidskr.* **34** : 332 [imago].

Ancistrotermes latinotus (Holmgren) Silvestri, 1914, *Bol. Lab. Zool. Scuol. Sup. Agr. Portici* **9** : 19.

Ancistrotermes lembomboensis Fuller, 1922, *S. Afr. J. nat. Hist.* **3** : 103. **syn. n.**

Ancistrotermes latinotus (Holmgren) ; Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* **3** : 161.

Ancistrotermes latinotus (Holmgren) ; Harris, 1948, *Proc. R. ent. Soc. Lond. (B)* **17** : 80.

Ancistrotermes latinotus (Holmgren) ; Grassé & Heim, 1950, *Rev. sci. Paris* **88** : 3-13.

Ancistrotermes latinotus (Holmgren) ; Weidner, 1956, *Pub. cult. Comp. Diamantes Angola* **29** : 86.

Holmgren (1912) lists under the genus *Microtermes* as a new species *M. latinotus* from Luapula with the remark "The figures of a soldier *Termes crucifer* which Silvestri gives (1912, *Ann. Mus. Zool. Napoli* **3** : 4-5) does not agree with the type of this species at all and belongs most likely to a new species which I designate *Microtermes latinotus* n. sp." In the following year this species is included by Holmgren in his keys to the African *Microtermes*, the imago being mentioned for the first time, being separated from *crucifer* by the larger ocelli and indistinct fontanelle, while the soldier is said to differ from *crucifer*, *cavithorax* and *guineensis* by a pronotum much broader than the head. This last is incorrect, being derived from an error in Silvestri's illustration of his Luapula soldier.

Silvestri (1914) provides the first descriptions and correct figures of *A. latinotus*. He makes no reference to Holmgren's locality and gives as habitat Angola : Malanga. This refers to specimens of imagos and soldiers from Angola which Sjöstedt had listed in his Monographie (1900) under *Termes crucifer*.

Sjöstedt (1926) considers that the correct attribution of *latinotus* is to Silvestri. To remove *latinotus* Holmgren as a *nomen nudum* would render the name inadmissible for further use in the genus. This would be undesirable from a practical standpoint, but it is doubtful if the question does, in fact arise.

Fuller's *Ancistrotermes lembomboensis* (1922) from Swaziland, Transvaal and Mozambique is a synonym which appears to have arisen from an incorrect appreciation of Silvestri's measurements of the imago ocellus.

Measurements :

Imago :

	Angola, Malanga		Zambia and Tanganyika	
	Male (mm.)	Female (mm.)	Mean (mm.)	Range (16) (mm.)
Width of head with eyes . . .	1.82	1.82	1.82	1.72-1.86
Diameter of eye	0.45	0.45	0.45	0.41-0.50
Diameter of ocellus, long . . .	0.18	0.23	0.21	0.18-0.27
Diameter of ocellus, short . . .	0.13	0.13	0.14	0.13-0.16
Ocellus to eye	0.13	0.13	0.13	0.09-0.18
Width of pronotum	1.64	1.68	1.72	1.60-1.84
Length of pronotum	1.02	1.09	1.02	0.82-1.14
Length of hind tibia	1.86	1.86	1.95	1.86-2.00
Length of fore wing	18.0	18.0	17.7	16.0-20.0
Width of fore wing	4.0	4.0	4.3	3.8-4.8

Soldiers. Rhodesia to Tanganyika :

	Major		Minor	
	Mean (mm.)	Range (25) (mm.)	Mean (mm.)	Range (10) (mm.)
Length of head and mandibles . . .	2.06	1.82-2.27	1.79	1.68-1.90
Length of head	1.24	1.09-1.41	0.97	0.86-1.04
Width of head	1.17	1.00-1.36	0.95	0.77-1.06
Length of left mandible	0.87	0.82-0.95	0.83	0.77-0.90
Width of pronotum	0.83	0.73-1.00	0.67	0.59-0.73
Length of hind tibia	1.07	1.00-1.14	0.90	0.82-1.00

Illustrations. The imago head and the head and thorax of the major soldier are figured in Silvestri (1914). Sjöstedt (1926) has a small figure of the minor soldier head.

Distribution. Type locality—South-east CONGO: Luapula (*Duchessa d'Aosta*).

Material examined. ANGOLA: Malanga (*Mechow*) in Naturhistoriska Riksmuseum, Stockholm.

ZAMBIA: N'changa, 1931 (*C. T. Macnamara*); Samfya, nr. Lake Bangweulu, Fort Roseberry, Kitwe, Ndola, Choma, Kafue Bridge, 1957 (*W. G. H. Coaton*); nr. Tunduma, 1953 (*Sands & Wilkinson*).

RHODESIA: Chipinga District, 1939 (*A. Cuthbertson*); Trelawney, 1949 (*G. H. Bunzli*); Gokwe, 1962 (*M. G. Bingham*).

MALAWI: Mlange, 1932 (*C. Smeë*); Karonga, Bua River, Kasungu, Fort Johnstone, Zomba, Lower Shire River, Domasi, 1953 (*Sands & Wilkinson*); Lilongwe, 1959 (*W. V. Harris*).

SWAZILAND: Lebombo Flats, 1916 (*C. Fuller*—"cotypes" of *lembomboensis*).

SOUTH AFRICA: Messina, 1916 (*C. Fuller*).

TANGANYIKA: Uvinza, 1934; Kigoma, 1934; Shinyanga, 1934; Muheza, 1934; Tabora, 1935; Songea, 1935; Kasulu, 1935; Tabora, 1935; Morogoro, 1937; Lindi, 1938; Uzinza, 1938; Usangu, 1939 (*W. V. Harris*); Handeni, Daluni,

Ngomeni, 1951, Mkomasi, Mwakijembe, Gombelo, 1952 (*P. B. Kemp*) ; Nachingwea (*M. Bigger*).

KENYA : Kinango, 1952 (*P. B. Kemp*) ; Ngombeni and Lukongo near Mombasa, 1952 (*W. A. Sands*).

Additional published records. CONGO : Libenge, in Sjöstedt (1926).

CENTRAL AFRICAN REPUBLIC : Bossembelé, in Grassé & Heim (1950).

MOZAMBIQUE : Xinavane nr. Lourenço Marques, in Fuller (1922).

The specimens labelled "Sudafrika, Periguy col." in the Stockholm collection have a further label "Kap? Rhodesia?".

Biology. *A. latinotus* occurs mainly to the south of the equator, and in association with the *Brachystegia-Isoberlinia* woodlands or "miombo". In north-east Tanganyika and adjacent Kenya, where the vegetation is in general the drier *Acacia-Commiphora* thicket, *A. latinotus* is found in isolated patches of miombo on higher ground.

The nest system is a loose agglomeration of interconnected chambers, roughly spherical and from 2 to 3 inches in diameter. These chambers contain fungus combs of a typically convoluted form. Nests have been located by trenching, or during terracing operations on sloping ground. They have also been found in the outer walls of mounds constructed in woodland by *Macrotermes* and *Pseudacanthotermes*, and in open grasslands within the miombo by *Cubitermes*, *Crenitermes* and *Trinervitermes*.

Workers feed on fallen logs and branches, and construct covered runways on the trunks of trees in search of dead wood. They are attracted to wooden pegs, fence posts, etc. They have been recorded attacking *Eucalyptus* seedlings, tea bushes and cotton.

The soldiers have a vague odour, likened by one observer to that of the grass *Cymbopogon*.

Swarming has been observed at various times between 15.00 hours and sunset, but mainly between 17.00 and 18.00 hours, during the rainy season (October to April in eastern Tanganyika). The appearance of winged adults is not restricted to periods of overcast sky.

Ancistrotermes microdens sp. n.

(Text-fig. 10)

Imago. Unknown.

Soldiers. Major soldier ; head broadly oval with flatly curved posterior ; labrum large, as wide as long, with obtuse tip ; mandibles robust, basally straight, then curving strongly towards the tip, each mandible with a single median marginal tooth, the right mandible with a short basal spur ; antennae 14-15 segments, depending on the separation of a short III from IV.

Pronotum with small, pointed anterior lobes separated by a deep notch ; posterior margin lightly sinuate.

Minor soldier ; head ovoid, narrower at the posterior ; labrum large, pointed ; mandibles slender, straight with in-curved tips, marginal teeth inconspicuous ; antennae 15 segments, III very short.

Pronotum with short, rounded anterior lobes separated by a rounded notch ; posterior margin almost straight.

Measurements :

	Major soldiers		Minor soldiers	
	Mean (mm.)	Range (mm.)	Mean (mm.)	Range (mm.)
Length of head and mandibles	1.99	1.91-2.18	1.63	1.54-1.72
Length of head	1.26	1.18-1.41	0.92	0.86-1.00
Width of head	1.15	1.09-1.25	0.91	0.86-0.91
Length of left mandible	0.78	0.73-0.82	0.79	0.77-0.82
Width of pronotum	0.88	0.82-0.95	0.71	0.68-0.77
Length of hind tibia	1.05	1.00-1.14	0.92	0.91-0.95

The major soldier agrees with the published description of *A. wasmanni* apart from the "two very small teeth in the middle of the left mandible". It differs from *latinotus* in the reduced marginal tooth on the left mandible and the considerably deeper anterior marginal notch of the pronotum. *A. cavithorax* has a more rounded head, and *periphraasis* has more strongly in-curved mandibles.

The minor soldier is larger than *periphraasis*, with the head proportionately longer. Compared with *latinotus* the mandibles are more strongly curved, the head narrower at the posterior, and the pronotum distinctly wider.

Holotype, major soldier, KENYA: Kisumu, on lake shore in upper levels of *Macrotermes* mound, 18.iv.52 (*W. A. Sands*), in British Museum (Nat. Hist.).

Paratypes, major and minor soldiers from type colony; KENYA: West Suk, 4.x.52. UGANDA: Toror Hills, Karamoja District, 8.x.52; Moroto, river valley, 7.x.52; Moroto, 5.x.52 (*W. A. Sands*).

Described from major and minor soldiers in six series from western Kenya and adjacent Karamoja District of Uganda.

Ancistrotermes periphraasis Sjöstedt

(Text-figs. 6 and 13)

Ancistrotermes periphraasis Sjöstedt, 1924, *Rev. Zool. Afr.* **12**: 496 [minor soldier from the Sudan].

Ancistrotermes periphraasis Sjöstedt; Sjöstedt, 1926, *Rev. Zool. Afr.* **14**: 149-150 [imago from Congo].

Ancistrotermes periphraasis Sjöstedt; Sjöstedt, 1926, *Ent. Tidskr.* **47**: 241-242 [major soldier from Ghana].

This species was established by Sjöstedt for soldiers collected in Kordofan Province, Sudan. Later the imago was described from the Upper Uelé area of the Congo, in association with similar soldiers. In the same year specimens of two soldier castes from Ghana were considered to represent the minor soldier, as already described, and the hitherto unknown major soldier. Only the minor soldier has been figured.

Additional material from Kordofan has now become available, consisting of six series of both major and minor soldiers. The minor soldiers are similar to the holotype of Sjöstedt. The opportunity is taken to add to the original descriptions. It

has not been possible to examine the major soldier from Ghana, but the minor soldier is sufficiently different from the Sudan specimens as to cast doubt on this record.

Imago. "Close to *latinotus*, from which it differs slightly but significantly in size, is darker in colour, and possesses cross veins in the sub-costal area of the wing which are absent in *latinotus*. The ocelli are much closer to the eyes than in *latinotus*".

Other characters mentioned by Sjöstedt are: head oval, dark brown with pale yellow, fairly large clypeus; eyes quite circular; ocelli oval, the ratio of the long and short diameters being 8:5, the distance between ocellus and eye equal to one quarter of the long diameter; antennae with 17 segments; pronotum with a deep median anterior notch, and posterior margin lightly indented; wings with oblique cross veins in the subcostal area.

Measurements of three morphotypes from Iri, Upper Uelé:

	(mm.)
Width of head with eyes	1.86
Diameter of eye	0.54
Diameter of ocellus, long	0.25
Diameter of ocellus, short	0.15-0.18
Ocellus to eye	0.06-0.08
Width of pronotum	1.64-1.72
Length of pronotum	1.00-1.09
Length of hind tibia	1.86-1.96
Length of fore wing	20
Width of fore wing	4.6

Soldiers. Major soldier; head orange-yellow, mandibles dark brown, antennae pale yellow. Pronotum, abdomen and legs pale yellow, with numerous pale yellow bristles.

Head broadly rectangular, with sides and posterior curved; labrum short and broad with obtuse tip; mandibles strongly in-curved at the tip, left mandible with a small median tooth, below which the margin is straight until a small notch separates it from the large basal process; right mandible without a median tooth, but basal spur present; antennae with 15 segments, III small, IV and V equal and shorter than II; gulamentum broad with lightly curved sides, strongly convex in cross-section.

Pronotum with small, pointed anterior lobes and emarginate posterior.

Minor soldier; head yellow, mandibles brown, antennae pale yellow. Pronotum, abdomen and legs pale yellow with inconspicuous short, pale bristles.

Head oval; labrum large with obtuse tip; mandibles long and slender with slightly in-curved tips and smooth inner margins; antennae with 14-15 segments.

Anterior lobes of pronotum not so acutely pointed as in major soldier, posterior straight.

Measurements:

	Major range (mm.)	Minor range (mm.)
Length of head and mandibles	1.82-1.90	1.36-1.41
Length of head	1.23-1.32	0.77-0.82
Width of head	1.11-1.18	0.77
Length of left mandible	0.77-0.86	0.68
Width of pronotum	0.73-0.86	0.59
Length of hind tibia	1.04-1.09	0.82-0.86

The major soldier differs from *guineensis* in having a rounded posterior margin to the head, and in lacking the rounded anterior lobes of that species. The marginal tooth of the left mandible is smaller.

Sjöstedt describes the minor soldier as being "nearest to *cavithorax*, but with more strongly in-curved mandibles".

Illustrations. The head and pronotum of the minor soldier are figured by Sjöstedt in his Revision (1926).

Distribution. Type locality—SUDAN: Kordofan Prov., El Amira-Bir Jochan (*R. Ebner*), minor soldier and worker, Sjöstedt No. 507 in Mus. Stockholm. Morpho-type imagos—CONGO: Uelé Prov., Iri, éclosion dans la pluie, 5 hrs. 21.iv.25 (*H. Schouteden*), Sjöstedt No. 517a in Mus. Stockholm, and in Mus. Tervuren, associated with minor soldiers.

Additional material. SUDAN: Kordofan Prov. Kadugli, vii.52; Kadugli-Talodi road, attacked by *Pheidole* ants, vi.52; El Berdab, attacking cotton plants, xi.52; Jebel Debri, ix.52; Lamma, x.52; Lake Keilad, vi.52; Jebel Miri, vi.52 (*C. Sweeney*).

Ancistrotermes wasmanni Snyder & Emerson

Termes cavithorax Sjöstedt; Wasmann, 1911, *Rev. Zool. Afr.* 1: 102 [soldiers from Congo].

Ancistrotermes cavithorax (Sjöstedt) Sjöstedt, 1926, *K. Sv. Vetakad. Handl.* (3) 3: 163 [locality].

Ancistrotermes wasmanni Snyder & Emerson in Snyder, 1949, *Smithson. Misc. Coll.* 112: 247.

A series of soldiers and workers from the Congo was identified by Wasmann as *Termes cavithorax*, with the comment that they agreed with Sjöstedt's description apart from the mandibles of the major soldier being "strongly bent and sharp pointed, the right one without teeth, the left with two very small teeth in the middle, the hind one only visible under magnification". Sjöstedt includes this locality in his account of *Ancistrotermes cavithorax* in his Revision.

Snyder & Emerson consider the series to represent a new species, to which they give the name *wasmanni*, without further discussion, in Snyder's Catalog.

It has not been possible to examine Wasmann's specimens in this study.

Measurements. Wasmann gives the following measurement:

	Major soldiers (mm.)	Minor soldiers (mm.)
Total length	4.0-4.3	2.5-3.6
Length of head and mandibles	1.8-2.0	1.2-1.6

Illustrations. None.

Type locality. CONGO: Sankuru, in Wasmann (1911).

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Harris, W V. 1966. "The genus *Ancistrotermes* (Isoptera)." *Bulletin of the British Museum (Natural History) Entomology* 18, 1-20.

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