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The African Genus *Foraminitermes* Holmgren (Isoptera, Termitidae, Termitinae)¹

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The purpose of the present paper is to establish the identity and phylogeny of the genus *Foraminitermes*; to describe and illustrate two new species, a new imago, and a new soldier; and to redescribe the existing species. Type specimens of the new species are deposited in the American Museum of Natural History. Duplicate paratypes and paramorphotypes are deposited in the United States National Museum, Smithsonian Institution, Washington, D. C.; the British Museum (Natural History), London; and the Division of Entomology, Department of Agricultural Technical Services, Pretoria, Republic of South Africa.

Holmgren in 1912 described the genus *Foraminitermes* for the imago of *F. tubifrons*. He was not certain of its systematic position but mentioned that its mandibles indicated a relationship with the genus *Mirotermes*. Because of Holmgren's inadequate description and because, until recently, the repository of the type of *F. tubifrons* has been unknown, the identity and relationships of *Foraminitermes* have been a puzzle, and it has been impossible to place the genus in any of the known families of termites.

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Snyder (1949) placed it alone with a question mark. In 1961, I discovered the three cotype specimens of *F. tubifrons* in the Zoologisches Museum, Humboldt Universität, East Berlin.

Silvestri in 1914 described the genus *Ceratotermes* for the soldier of *C. valens* and included in it two other African species, *C. corniferus* (Sjöstedt) and *C. rhinoceros* (Sjöstedt). These two species had previously been placed by Holmgren (1912) in the subgenus *Labiatermes* of the genus *Cornitermes*, which was included in his "*Syntermes Reihe*" (now the subfamily Nasutitermitinae). Silvestri (1914) further stated that *Ceratotermes* was closely related to *Orthotermes*. Sjöstedt (1926) erroneously placed the genus *Ceratotermes* in synonymy with *Labiatermes*. Snyder (1949) treated *Ceratotermes* as a distinct genus and placed it near *Orthotermes* and *Tuberculitermes*. Emerson (1952) stated that *Ceratotermes* belonged to the subfamily Termitinae and was definitely distinct from *Labiatermes*, which belongs to the subfamily Nasutitermitinae; he also stated that the resemblance between the soldiers of *Ceratotermes* and those of *Labiatermes* was convergent and not homologous. Ahmad (1950), Emerson (1952, 1953), and Weidner (1961) placed the genus in close relationship with the genus *Apicitermes*.

In the American Museum collection are vials containing associated imagoes and soldiers of *Foraminitermes tubifrons* and *Ceratotermes valens*. The comparison of these type species has shown that *Foraminitermes* is congeneric with *Ceratotermes*. The imagoes of both *F. tubifrons* and *C. valens* are similar in the following respects: the fontanelle is very small and round and is situated at the tip of a short, conical projection; the tibial spurs are 3:2:2; the pronotum is saddle-shaped; and the mandibles are alike in their dentition. In the soldier of both species the head has a projection at the frontal gland opening; the labrum has a whitish tip; the basal cutting edge of the left mandible has three to four crenulations; the tibial spurs are 3:2:2; and the fore coxa has a nearly straight, even edge. *Ceratotermes* should therefore be treated as a synonym of *Foraminitermes*, as the latter is an older name.

GENUS FORAMINITERMES HOLMGREN

- = Genus *Foraminitermes* HOLMGREN, 1912, p. 125.
- > < Subgenus *Labiatermes* HOLMGREN, 1912, p. 50.
- = Genus *Ceratotermes* SILVESTRI, 1914, p. 125.
- = Subgenus *Ceratotermes* EMERSON, 1925, p. 432.
- < Genus *Ceratotermes* SJÖSTEDT, 1926, p. 150.
- < Genus *Labiatermes* SJÖSTEDT, 1926, p. 150.
- > Subgenus *Ceratotermes* EMERSON, 1928, pp. 408, 420, 502.
- > Genus *Foraminitermes* EMERSON, 1928, p. 409.
- > Genus *Ceratotermes* SNYDER, 1949, p. 173.

- > Genus *Foraminitermes* SNYDER, 1949, p. 344.
- = Genus *Ceratotermes* AHMAD, 1950, p. 69.
- = Genus *Ceratotermes* EMERSON, 1952, p. 481.
- = Genus *Ceratotermes* EMERSON, 1953, p. 103.
- = Genus *Ceratotermes* GRASSÉ AND NOIROT, 1954, p. 364.
- > Genus *Ceratotermes* EMERSON, 1955, p. 511.
- > Genus *Foraminitermes* EMERSON, 1955, p. 515.
- > Genus *Ceratotermes* WEIDNER, 1955, p. 73.
- > Genus *Foraminitermes* WEIDNER, 1955, pp. 41, 71.
- = Genus *Ceratotermes* WEIDNER, 1956, p. 65.
- = Genus *Ceratotermes* NOIROT AND KAVOOR, 1958, pp. 462-465, 468.
- = Genus *Ceratotermes* EMERSON, 1959, p. 7.
- = Genus *Ceratotermes* WEIDNER, 1961, p. 64.

TYPE SPECIES: *Foraminitermes tubifrons* Holmgren.

IMAGO: Head and pronotum brownish; forewing with costal margin yellowish brown, radial sector smoky brown near suture and yellow in middle and distal regions; wing membrane transparent, somewhat iridescent, and smoky brown near suture. Head and pronotum densely covered with both long and short bristles, interspersed with hairs of varying length; longitudinal ridge of fore coxa with approximately five to nine bristles and a few short hairs; tergites and sternites densely covered with various-sized bristles and hairs; wings finely punctate, with hairs on margins and veins only; wing scale moderately covered with bristles. Fontanelle very small and round, situated at tip of a short, conical projection. Eyes protruding. Postclypeus strongly convex, with anterior margin weakly concave. Anteclypeus with sides converging anteriorly and anterior margin two-faceted. Left mandible (fig. 7) with apical tooth longer than first plus second marginal tooth, first plus second marginal tooth undulating, and a distinct angular notch between first plus second and third marginal teeth; right mandible with apical tooth longer than first marginal tooth, second marginal tooth well developed, angle between first and second marginal tooth less than a right angle. Antenna with 15 articles. Pronotum saddle-shaped, with anterior middle portion bent upward; posterior margin indented in middle. Mesonotum and metanotum widely and deeply indented in middle; posterolateral angles obtuse. Forewing with costa and radial sector sclerotized, media and cubitus unsclerotized; subcosta absent, radius rudimentary. Fore coxa with a longitudinal ridge without protuberance. Tibial spurs 3:2:2. Arolium absent.

SOLDIER: Head and pronotum covered with a few scattered bristles; sclerotized region of labrum below white, anterior tip with four bristles; tergites and sternites densely covered with bristles. Head in dorsal outline subrectangular; sides almost parallel, converging markedly anterior to

antennal socket; conspicuous frontal projection with small frontal gland opening at tip; sharp ridge below antennal socket; labrum tongue-shaped; tip unsclerotized, whitish, without hairs or bristles. Mandibles short in proportion to head capsule; outer margins either indented at bases or almost even, curved inward toward tip; left mandible with upper inner margin either very faintly serrated or almost even and lower half with three to four blunt crenulations and a blunt, tooth-like projection; right mandible with a blunt tooth in basal region and a minute, thorn-like projection below basal region. Antenna with 13 or 14 articles. Pronotum saddle-shaped; anterior lobe strongly bent upward. Tibial spurs 3:2:2. Fore coxa with a nearly straight, even, longitudinal ridge, without protuberance.

RELATIONSHIPS: The genus *Foraminitermes* is unique in that it does not have any close relatives in the subfamily Termitinae. It is not related to *Apicotermes* and its relatives, as assumed by Ahmad (1950), Emerson (1952, 1953), and Weidner (1961), or to any other genus of the subfamily Termitinae. The unique features of this genus are as follows: The fontanelle in the imago is situated at the end of a short, conical projection. The imago-worker mandibles are more primitive than those of *Apicotermes* and its relatives. The imago pronotum is saddle-shaped, with its front region sharply turned upward. The head of the soldier has a projection at the frontal gland opening.

The soldier of *Foraminitermes*, however, superficially resembles that of *Apicotermes* in the following respects: The outer basal margins of the mandibles have faint indentations. The inner basal region of the right mandible has a thorn-like process, a characteristic found also in *Thoracotermes*, a genus that is unrelated to *Apicotermes* and belongs to a different branch of the subfamily Termitinae. The inner proximal region of the left mandible has three or four crenulations and a blunt, tooth-like projection, characteristics that not only occur in *Thoracotermes* but also have evolved convergently in *Macrotermes*, *Coptotermes*, and *Heterotermes*. The labrum has an unsclerotized, whitish tip but is without hairs or bristles, in contrast to that of *Apicotermes*.

The unique position of this genus is further corroborated by Grassé and Noirot (1954), who studied the structure of the digestive tract of *Ceratotermes* (now *Foraminitermes*) and found it to be very different from that of *Apicotermes* and other genera which they included in the subfamily Apicotermitinae; and by Noirot and Kavoov (1958), who found the digestive tube of *Ceratotermes* to exhibit certain original characteristics not found in other genera of the subfamily Termitinae (*Thoracotermes*, *Crene-termes*, *Apilitermes*, *Meganathotermes*, *Orthotermes*, *Basidentitermes*, *Fastigi-*

termes, *Proboscitermes*, *Cubitermes*, *Procubitermes*, *Noditermes*, *Tuberculitermes*, *Ophioterme*s, and *Euchiloterme*s).

Emerson (1959) states that the subfamily Termitinae as treated by Snyder (1949) and Emerson (1955) should not be broken up into smaller subfamilies. If, when the genera are revised on a world-wide basis, their relationships indicate sharp-cut groups within the subfamily Termitinae, Emerson says, the Termitinae may be broken up into tribes of related genera that constitute the major branches of the phylogenetic tree.

Following Emerson, I am placing the unique genus *Foraminitermes* in a separate branch of the subfamily Termitinae, without giving it a subfamily or tribal status.

KEY TO THE SPECIES OF THE GENUS *Foraminitermes*
BASED ON THE CHARACTERS OF THE SOLDIER

- 1. Soldier large or medium-sized. Head length, 1.95–2.72 3
 Soldier small. Head length, 1.19–1.46 2
- 2. Ridge of fore coxa with three thick bristles *F. valens*
 Ridge of fore coxa with minute hairs (fig. 3) *F. corniferus*
- 3. Height of head, 1.80–1.82 (fig. 8) *F. tubifrons*
 Height of head, 1.35–1.63 4
- 4. Width of pronotum, 1.26–1.37 (fig. 5) *F. rhinoceros*
 Width of pronotum, 0.90–1.07 5
- 5. Width of head, 1.52–1.71. Postmentum contraction index, 0.60–0.79 (fig. 2) *F. coatoni*
 Width of head, 1.78–1.80. Postmentum contraction index, 0.54–0.55 (fig. 4) *F. harrisi*

Foraminitermes coatoni, new species

IMAGO (FIG. 1): Head brown, with region around fontanelle light and light dots at bases of hairs and bristles; postclypeus yellowish; anteclypeus and labrum whitish, with tinge of yellow; antennae yellowish, with brownish tinge; eyes dark brown; pronotum yellowish, with patches of brown; wing scale brownish yellow; tergites and sternites creamy, with yellowish tinge. Head and pronotum with numerous long, stiff bristles and hairs; longitudinal ridge of fore coxa with five or six short, thick bristles. Eyes strongly convex and prominent. Ocellus ovaloid. Antenna with 15 articles; second article longer than third, third slightly longer than fourth. Pronotum saddle-shaped; anterior middle portion markedly turned upward; anterior margin sinuate, with faint median notch; posterior margin faintly emarginate or almost straight.

COMPARISONS: The imago of *Foraminitermes coatoni* is smaller in all measurements than that of *F. tubifrons*.

SOLDIER (FIG. 2): Head yellowish posteriorly, orange-brown in middle,

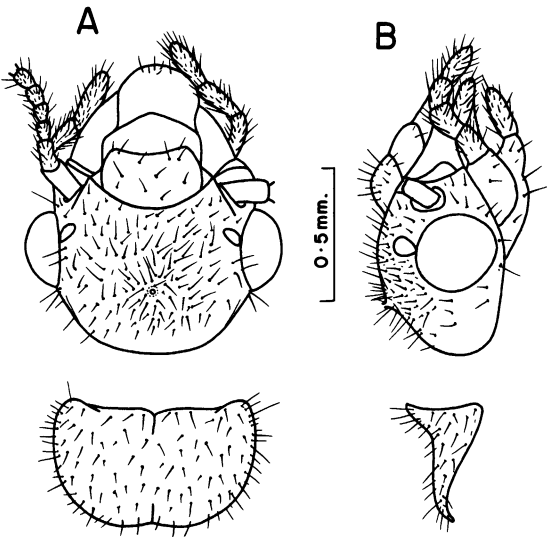


FIG. 1. Imago of *Foraminitermes coatoni*, new species. A. Head and pronotum from above. B. Head and pronotum from side. Paramorphotype from type colony.

brownish yellow in front; postclypeal region reddish brown; anteclypeus gold, with white patches; labrum yellowish brown, with white tip; mandibles shiny, dark reddish brown, slightly lighter at bases; antennae yellowish brown; pronotum creamy yellowish, brownish yellow in middle;

TABLE 1
MEASUREMENTS (IN MILLIMETERS) OF FIFTEEN IMAGOS OF
Foraminitermes coatoni, NEW SPECIES

	Range	Mean
Length of head to side base of mandibles	0.68–0.75	0.70
Width of head	0.90–1.01	0.97
Diameter of eye	0.29–1.32	0.31
Eye from lower margin	0.02	0.02
Length of ocellus	0.07–0.11	0.10
Median length of pronotum	0.34–0.41	0.38
Maximum length of pronotum	0.38–0.51	0.44
Width of pronotum	0.64–0.77	0.73
Length of hind tibia	0.98–1.13	1.11
Length of forewing from suture	7.47–8.82	8.19
Width of forewing	1.96–2.35	2.15

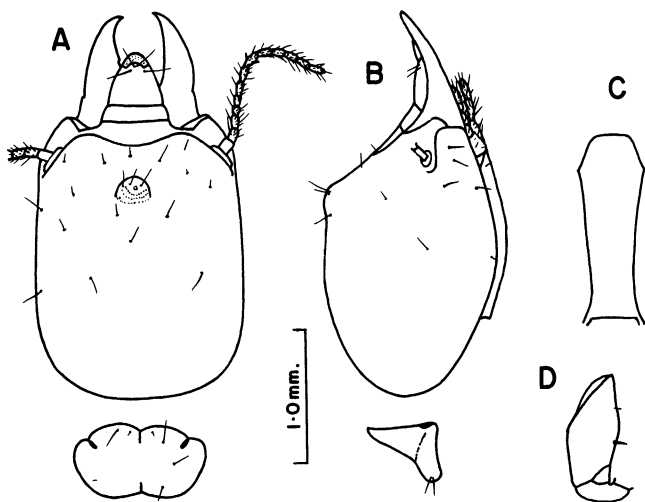


FIG. 2. Soldier of *Foraminitermes coatoni*, new species. A. Head and pronotum from above. B. Head and pronotum from side. C. Postmentum from below. D. Front coxa from below. Paratype from type colony.

legs pale yellowish; tergites dirty white. Head with a few stiff, long bristles; frontal projection with three or four long bristles; longitudinal ridge of fore coxa with a short hair in proximal half, some specimens with a thick, short bristle in distal half. Head thick; frontal projection distinct, front margin rounded in profile; frons sloping toward anteclypeus at angle of approximately 50 degrees; head in profile oval, with dorsal margin faintly

TABLE 2
MEASUREMENTS (IN MILLIMETERS) OF THIRTY-SIX SOLDIERS OF
Foraminitermes coatoni, NEW SPECIES

	Holotype	Range	Mean
Length of head to side base of mandibles	2.00	1.95-2.29	2.13
Width of head	1.54	1.52-1.71	1.60
Height of head	1.35	1.35-1.50	1.42
Length of left mandible	0.81	0.81-0.90	0.86
Maximum width of postmentum	0.53	0.48-0.56	0.53
Minimum width of postmentum	0.34	0.32-0.38	0.36
Length of postmentum	1.20	1.20-1.50	1.40
Maximum length of pronotum	0.45	0.45-0.53	0.49
Width of pronotum	0.90	0.90-1.09	0.99
Length of hind tibia	1.24	1.20-1.28	1.25

concave posterior to frontal projection. Mandibles short; outer margins at bases faintly indented; left mandible with three blunt crenulations in lower half. Postmentum contraction index, 0.69–0.79. Antenna with 13 to 14 articles; second article equal to third, fourth slightly shorter than third and equal to fifth. Pronotum with anterior margin faintly indented in middle and posterior margin slightly emarginate.

COMPARISONS: The soldier of *Foraminitermes coatoni* most closely resembles that of *F. rhinoceros* (Sjöstedt) and that of *F. harrisi*, new species. *Foraminitermes coatoni* differs from *F. harrisi* in the following respects: the head is narrower, the middle of the postmentum is less constricted, and the mandibles are less thick, with their outer margins not so strongly curved toward the apex. *Foraminitermes rhinoceros* is larger in all respects.

TYPE LOCALITY: Kalina Woods, Leopoldville (latitude 4° 18' S., longitude 15° 18' E.), the Congo (type locality), imagoes (morphotypes), soldiers (holotype, paratypes), workers, collected by A. E. Emerson, April 6, 1948, in chambers and burnt wood in loose soil mound full of fine roots in secondary woods; soldiers (paratypes), collected by A. E. Emerson, April 6, 1948, in soil galleries in woods; imagoes (paramorphotypes), soldiers (paratypes), workers, collected by A. E. Emerson, April 6, 1948, in soil galleries in 25 feet of secondary growth woods; one dealate imago (paramorphotype), soldiers (paratypes), workers, collected by A. E. Emerson, April 5, 1948, in galleries near surface of soil in sandy ground (soldiers knocked their heads slowly on the leaves, making a tapping noise). Leopoldville, the Congo, soldiers (paratypes), workers, collected by A. E. Emerson, April 14, 1948, in porous humus of black soil in second-growth woods; one soldier (paratype), worker, collected by A. E. Emerson, April 5, 1948; soldiers (paratypes), collected by A. E. Emerson, April 14, 1948.

This species is named in honor of Dr. W. G. H. Coaton of the Division of Entomology, Department of Agricultural Technical Services, Pretoria, Republic of South Africa.

Foraminitermes corniferus (Sjöstedt), new combination

Eutermes corniferus SJÖSTEDT, 1905, p. 12 (soldier).

Cornitermes (*Labiotermes*) *corniferus* HOLMGREN, 1912, p. 50.

Cornitermes (*Labiotermes*) *corniferus* HEGH, 1922, pp. 432, 690 (locality).

Labiotermes corniferus SJÖSTEDT, 1926, pp. 150–151 (systematics), fig. 30 (soldier), pl. 6, figs. H1-2, K3.

Ceratotermes corniferus SNYDER, 1949, p. 173 (systematics).

IMAGO: Unknown.

SOLDIER (FIG. 3): Head brownish yellow (in homotype specimen

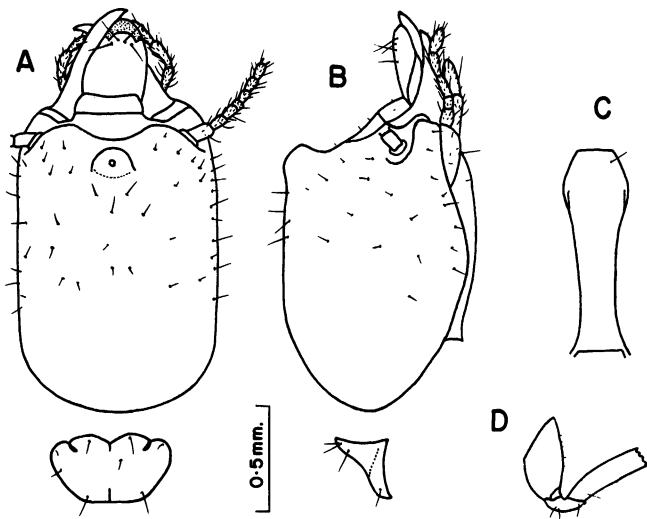


FIG. 3. Soldier of *Foraminitermes corniferus* (Sjöstedt). A. Head and pronotum from above. B. Head and pronotum from side. C. Postmentum from below. D. Front coxa from below. Cotype from type colony, Mukimbungu, the Congo.

darker), postclypeal region reddish brown; anteclypeus yellowish; labrum yellowish, with white tip; mandibles reddish brown, yellowish at bases; antennae pale yellow; pronotum pale yellow; legs creamy. Head with a few short bristles and hairs; pronotum sparsely covered with a few bristles; longitudinal ridge on fore coxa with minute hairs; tergites and sternites densely covered with stiff bristles. Head small; frontal projection

TABLE 3
MEASUREMENTS (IN MILLIMETERS) OF SOLDIERS OF
Foraminitermes corniferus (SJÖSTEDT), NEW COMBINATION

	Cotype	Homotype
Length of head to side base of mandibles	1.46	1.50
Width of head	0.99	0.98
Height of head	0.98	0.98
Length of left mandible	0.60	0.60
Maximum width of postmentum	0.32	0.35
Minimum width of postmentum	0.18	0.18
Length of postmentum	1.03	1.05
Maximum length of pronotum	0.32	0.34
Width of pronotum	0.60	0.58
Length of hind tibia	0.75	0.75

prominent, in profile tubular, blunt, slightly bent upward; frons sloping toward anteclypeus at angle of approximately 60 degrees. Mandibles short, with outer margins almost even; left mandible with three or possibly four blunt crenulations. Postmentum contraction index, 0.51–0.56. Antenna with 13 articles; second article longer than third, fourth shortest. Pronotum with anterior margin deeply indented in middle; sides straight, converging posteriorly; posterior margin straight or slightly emarginate.

COMPARISONS: The soldier of *Foraminitermes corniferus* closely resembles that of *F. valens* (Silvestri) but differs from it in having a larger head and a more prominent frontal projection.

TYPE LOCALITY AND DISTRIBUTION: Mukimbungu (latitude 5° 6' S., longitude 14° 4' E.), the Congo (type locality). Camp Putnam (latitude 1° 24' N., longitude 28° 36' E.), on the Epulu River, the Congo, one soldier (homotype), collected by A. E. Emerson, May 22, 1948, in ground under log.

***Foraminitermes harrisi*, new species**

IMAGO: Unknown.

SOLDIER (FIG. 4): Head yellowish posteriorly, shading into reddish brown anteriorly; postclypeus reddish brown; region below and in front of antennal socket brown; anteclypeus yellowish, with white patches; labrum brown-yellow, with white tip; mandibles dark reddish brown, lighter at bases; antennae brownish yellow; pronotum pale yellow, with light brownish patches; tergites and sternites creamy yellow; legs light yellow; head with a few scattered, stiff bristles, frontal projection with two or three stiff, medium-sized bristles; pronotum sparsely covered with a few bristles; longitudinal ridge of fore coxa with one long bristle and a few short hairs. Head broad and thick; posterior margin broadly rounded; frontal projection distinct, front margin rounded in profile; frons sloping toward anteclypeus at angle of approximately 55 degrees; clypeofrontal region faintly depressed. Mandibles short and robust, with outer margins indented at bases and strongly curved from indentation toward apex; left mandible with four crenulations in lower half. Postmentum contraction index, 0.54–0.55. Antenna with 13 articles; second article longer than third, fourth shortest. Pronotum with anterior margin distinctly indented in middle and posterior margin emarginate.

COMPARISONS: The soldier of *Foraminitermes harrisi* closely resembles that of *F. coatoni* but differs from it in the following respects: the head is broader, the posterolateral corners of the head are more narrowly rounded, the middle of the postmentum is more constricted, and the

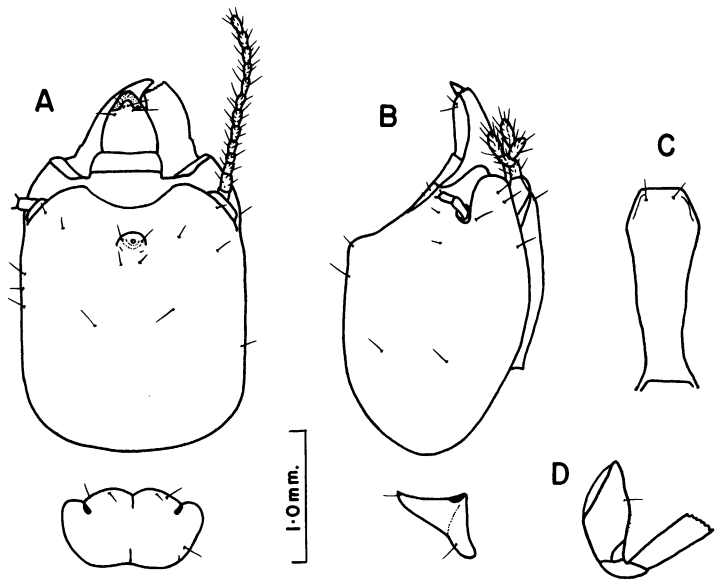


FIG. 4. Soldier of *Foraminitermes harrisi*, new species. A. Head and pronotum from above. B. Head and pronotum from side. C. Postmentum from below. D. Front coxa from below. Paratype from type colony.

mandibles are thicker, with their outer margins more strongly curved from the indentation to the apex.

TYPE LOCALITY: Keyberg, 10 kilometers south of Elisabethville (latitude 11° 47' S., longitude 27° 25' E.), the Congo, two soldiers (holo-

TABLE 4
MEASUREMENTS (IN MILLIMETERS) OF TWO SOLDIERS OF
Foraminitermes harrisi, NEW SPECIES

	Holotype	Paratype
Length of head to side base of mandibles	2.25	2.25
Width of head	1.80	1.78
Height of head	1.50	1.50
Length of left mandible	0.84	0.84
Maximum width of postmentum	0.56	0.56
Minimum width of postmentum	0.30	0.31
Length of postmentum	1.46	1.43
Maximum length of pronotum	0.66	0.60
Width of pronotum	1.09	1.09
Length of hind tibia	1.43	1.43

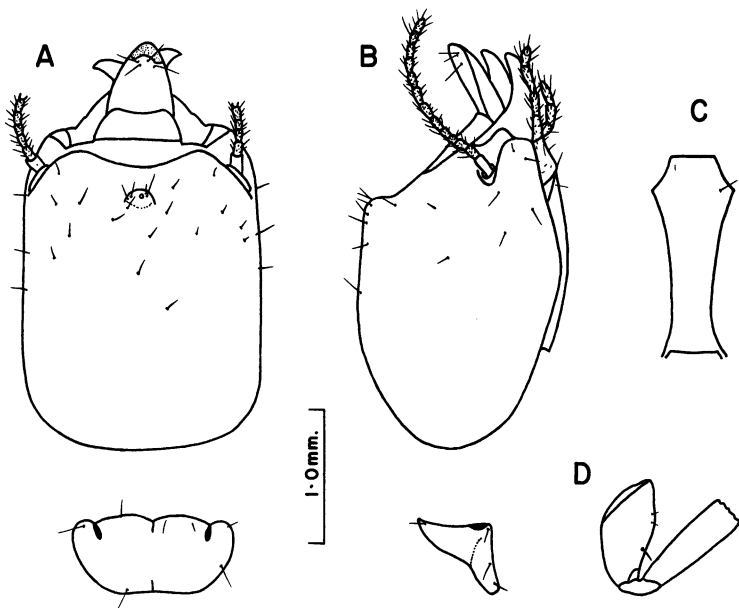


FIG. 5. Soldier of *Foraminitermes rhinoceros* (Sjöstedt). A. Head and pronotum from above. B. Head and pronotum from side. C. Postmentum from below. D. Front coxa from below. Cotype from type colony, Mukimbungu, the Congo.

type and paratype), workers, collected by A. E. Emerson, April 17, 1948, in underground tunnels in grassland.

This species is named in honor of Mr. W. V. Harris of the Termite Research Unit, British Museum (Natural History), London.

Foraminitermes rhinoceros (Sjöstedt), new combination

Eutermes rhinoceros SJÖSTEDT, 1905, p. 11 (soldier).

Cornitermes (*Labiatermes*) *rhinoceros* HOLMGREN, 1912, p. 50.

Cornitermes (*Labiatermes*) *rhinoceros* HEGH, 1922, pp. 432, 533, 691 (locality).

Labiatermes rhinoceros SJÖSTEDT, 1926, p. 150 (systematics), pl. 6, figs. K1-2 (soldier).

Ceratotermes rhinoceros WEBER, 1943, p. 286 (biology, locality).

Labiatermes rhinoceros HARRIS, 1948, p. 79 (locality, biology).

Ceratotermes rhinoceros WEBER, 1948, p. 33 (biology).

Ceratotermes rhinoceros SNYDER, 1949, p. 173 (systematics).

IMAGO: Unknown.

SOLDIER (FIG. 5): Head brown, darker patches in middle and on sides,

yellowish posteriorly; postclypeus reddish brown; anteclypeus yellowish brown, with white patches; labrum yellowish brown, with white tip; mandibles shiny dark reddish brown; pronotum with brownish patches on disc; tergites, sternites, and legs pale yellowish brown. Head with a few long bristles, frontal projection with four or five long bristles; pronotum sparsely covered with long bristles; longitudinal ridge of fore coxa with one thick bristle in distal half, two short bristles in proximal half. Head large, thick; posterior margin broadly rounded; frontal projection distinct, front margin rounded in profile; frons sloping toward anteclypeus at angle of approximately 50 degrees. Mandibles short and robust, with outer margins indented at bases; left mandible with four crenulations in lower half. Postmentum contraction index in cotype specimens, 0.53 (in other specimens, 0.47–0.55). Antenna with 13 articles; fourth article shortest, second subequal to third. Pronotum with anterior margin distinctly indented in middle; posterolateral margins broadly rounded; posterior margin emarginate.

TABLE 5
MEASUREMENTS (IN MILLIMETERS) OF SOLDIERS OF
Foraminitermes rhinoceros (Sjöstedt), NEW COMBINATION

	Cotype	Imatong Mountains	Uganda	Tanganyika
Length of head to side base of mandibles	2.38	2.63	2.59	2.52
Width of head	1.86	1.95	1.95	1.89
Height of head	1.59	1.63	1.65	1.63
Length of left mandible	1.07	1.09	1.09	1.09
Maximum width of postmentum	0.60	0.68	0.62	0.62
Minimum width of postmentum	0.32	0.32	0.34	0.34
Length of postmentum	1.52	1.76	1.65	1.65
Maximum length of pronotum	0.60	0.68	0.64	0.60
Width of pronotum	1.26	1.37	1.35	1.28
Length of hind tibia	1.43	1.58	1.50	1.48

COMPARISONS: The soldier of *Foraminitermes rhinoceros* differs from that of *F. coatoni* and that of *F. harrisi* in having a more prominent frontal projection in the head and in being larger throughout.

TYPE LOCALITY AND DISTRIBUTION: Mukimbungu (latitude 5° 6' S., longitude 14° 4' E.), the Congo (type locality). Imatong Mountains (latitude 3° 54' N., longitude 32° 52' E.), Equatoria, Sudan, elevation 6200 feet, one soldier, collected by N. A. Weber, between July 24 and August 5, 1939. Toro (latitude 0° 40' N., longitude 30° 17' E.), Uganda, soldiers and workers, collected by W. V. Harris, November 2, 1937.

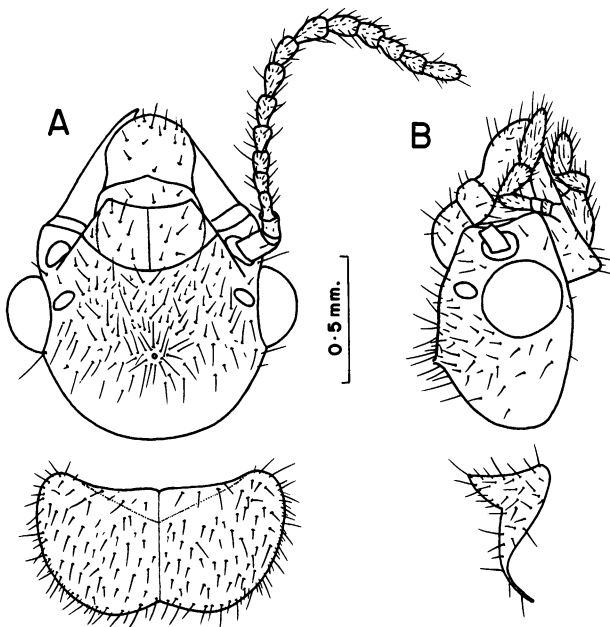


FIG. 6. Imago of *Foraminitermes tubifrons* Holmgren. A. Head and pronotum from above. B. Head and pronotum from side. Paralectotype, Lolodorf, Cameroon.

Bukoba (latitude $1^{\circ} 20' S.$, longitude $31^{\circ} 49' E.$), Tanganyika, soldiers, workers, collected by J. Ford, 1952, field no. 802.

Foraminitermes tubifrons Holmgren

Foraminitermes tubifrons HOLMGREN, 1912, p. 125 (imago), pl. 4, figs. 34, 35 (imago).

Foraminitermes tubifrons SNYDER, 1949, p. 344 (systematics).

IMAGO (FIG. 6): Head brown, with light dots at bases of hairs and bristles; postclypeus yellowish, with tinge of brown and light brown vertical line in middle; anteclypeus whitish; labrum pale yellowish; antennae light brownish yellow; eyes dark brown; pronotum yellowish brown, with faint vertical line in middle; coxae light yellowish, femur and tibia light smoky brown; tergites yellowish. Head and pronotum with numerous stiff bristles and hairs; longitudinal ridge of fore coxa with approximately six thick bristles and a few short hairs. Eyes strongly convex and prominent. Ocellus oval, approximately 0.01–0.02 mm. from eye. Antenna with 15 articles; second article longer than third, third subequal

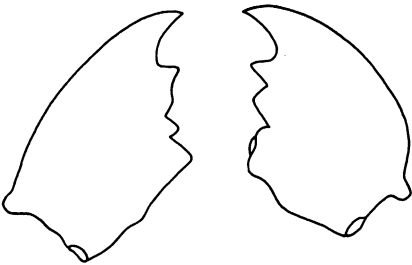


FIG. 7. Mandibles of imago of *Foraminitermes tubifrons* Holmgren. Paralectotype, Lolodorf, Cameroon.

to or slightly longer than fourth, fourth equal to fifth. Pronotum saddle-shaped; anterior middle portion markedly turned upward; anterior margin sinuate, with almost even margin or very faint notch in middle; sides rounded; posterior margin indented (in homotype series, moderately indented).

TABLE 6
MEASUREMENTS (IN MILLIMETERS) OF IMAGOS OF
Foraminitermes tubifrons HOLMGREN

	Lecto- type ^a	Paralec- totype	No.	Homotypes Range
Length of head to side base of mandibles	0.83	0.90	6	0.83–0.92
Width of head	1.13	1.18	6	1.14–1.22
Diameter of eye	0.32	0.32	6	0.32–0.35
Eye from lower margin	0.02	0.02	6	0.03–0.04
Length of ocellus	0.11	0.12	6	0.09–0.14
Median length of pronotum	0.53	0.47	6	0.45–0.53
Maximum length of pronotum	0.60	0.56	6	0.49–0.60
Width of pronotum	0.94	0.99	6	0.94–1.01
Length of hind tibia	1.28	1.26	6	1.35–1.43
Length of forewing from suture	—	—	4	10.50–12.04
Width of forewing	—	—	4	2.83–3.08
Length of hind wing	9.62	9.62	—	—
Width of hind wing	2.69	2.62	—	—

^a I have selected the lectotype and deposited it in the Zoologisches Museum, Humboldt Universität, East Berlin.

COMPARISONS: The imago of *Foraminitermes tubifrons* is larger in all measurements than that of *F. coatonii* and that of *F. valens*.

SOLDIER (FIG. 8): Head yellowish posteriorly, shading into brownish orange anteriorly, with frontal projection same color as posterior region;

postclypeus reddish brown; anteclypeus with whitish patches; labrum yellow-brown, with white tip; mandibles dark reddish brown, lighter at bases; antennae brownish yellow; pronotum light gold, with tinge of brown; tergites and sternites dirty white; legs pale yellow. Head with a few scattered bristles, frontal projection with four or five long bristles; pronotum sparsely covered with long bristles along margins and on

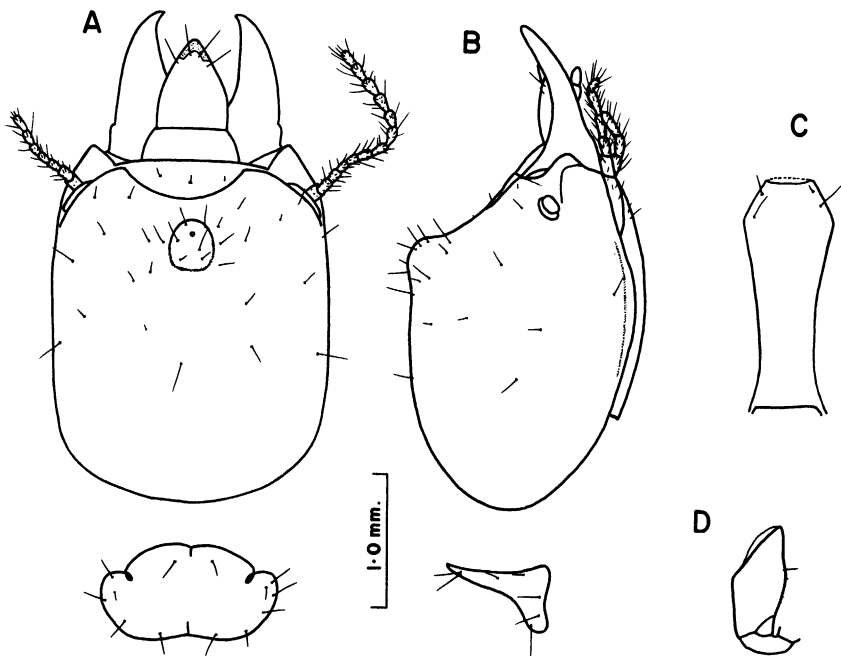


FIG. 8. Soldier of *Foraminitermes tubifrons* Holmgren. A. Head and pronotum from above. B. Head and pronotum from side. C. Postmentum from below. D. Front coxa from below. Morphotype colony from Vogel Park area, Gangoro village, Northern Cameroons.

disc; longitudinal ridge of fore coxa with one long bristle on proximal half. Head large, thick; posterior margin rounded; frontal projection prominent, knob-like, with margin rounded in profile; frons broadly concave, sloping toward anteclypeus. Mandibles short, robust, indented at outer bases; left mandible with four crenulations in lower half. Postmentum contraction index, 0.56–0.60. Antenna with 13 articles; fourth article shortest, second equal to third. Pronotum with anterior margin faintly indented in middle or almost even; sides rounded; posterior margin distinctly emarginate.

TABLE 7
MEASUREMENTS (IN MILLIMETERS) OF TWO MORPHOTYPE
SOLDIERS OF *Foraminitermes tubifrons* HOLMGREN

	Range
Length of head to side base of mandibles	2.66–2.72
Width of head	2.06–2.10
Height of head	1.80–1.82
Length of left mandible	1.08
Maximum width of postmentum	0.68–0.69
Minimum width of postmentum	0.38–0.41
Length of postmentum	1.73–1.80
Maximum length of pronotum	0.68–0.70
Width of pronotum	1.39
Length of hind tibia	1.50–1.54

COMPARISONS: The soldier of *Foraminitermes tubifrons* differs from the soldiers of all the presently known species in being of larger size and having a more prominent frontal projection of the head.

TYPE LOCALITY AND DISTRIBUTION: Lolodorf (latitude 3° 15' N., longitude 10° 40' E.), Cameroon (type locality), three imagoes (lectotype and paralectotypes), collected by Giemann. Vogel Park area, Gangoro village, Northern Cameroons, imagoes (homotype), soldiers (morphotypes), collected by W. A. Sands, May 25, 1957, from nest under rock, alates emerging at 6.30 P.M., semi-montane grassland with scattered trees, field no. S.1578. Bamenda (latitude 5° 58' N., longitude 10° 4' E.), Cameroons, imagoes (homotypes), collected by W. Wilkinson, May 25, 1957, at light near rest house at 7.15 P.M., montane grassland, field no. WW.708. Thirty-two miles from Bamenda, on Mamfe Road, the Cameroons, imagoes (homotypes), collected by W. Wilkinson, May 25, 1957, elevation 3000 feet, alates emerging at 6.45 P.M., hillside with bush-grass cultivation, field no. WW.710.

REMARKS: Holmgren in 1912 described this species from the imago caste alone. The soldier of this species is described here for the first time.

Foraminitermes valens (Silvestri), new combination

Ceratotermes valens SILVESTRI, 1914, p. 126 (soldier, worker), fig. 74.
Ceratotermes valens HEGH, 1922, pp. 500, 501, 701 (locality), fig. 354F (soldier).
Labiotermes valens SJÖSTEDT, 1926, pp. 150, 151 (soldier).
Ceratotermes valens SNYDER, 1949, p. 174 (systematics).

Silvestri in 1914 described this species from the soldier caste alone. The imago of this species is described here for the first time.

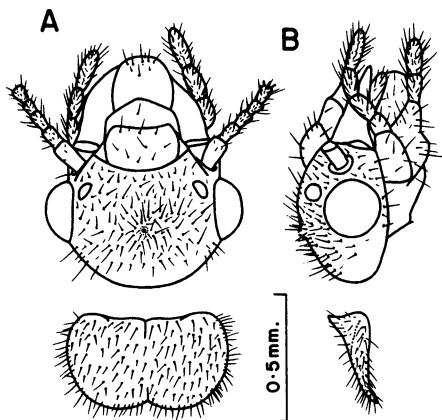


FIG. 9. Imago of *Foraminitermes valens* (Silvestri). A. Head and pronotum from above. B. Head from side. Morphotype colony from Mt. Nimba, Guinea.

DEALATE IMAGO (FIG. 9): Head brown-yellow, lighter around fontanelle, with light dots at bases of hairs and bristles; postclypeus light yellowish; anteclypeus and labrum creamy yellowish; antennae pale brownish yellow; eyes black; pronotum light yellow; tergites and sternites creamy yellow; legs yellowish, with a brown tinge. Head and pronotum densely covered with various-sized bristles and hairs; longitudinal ridge of fore coxa with six to eight thin bristles and some minute hairs. Head small, with margin posterior to eyes broadly rounded. Eyes large, with

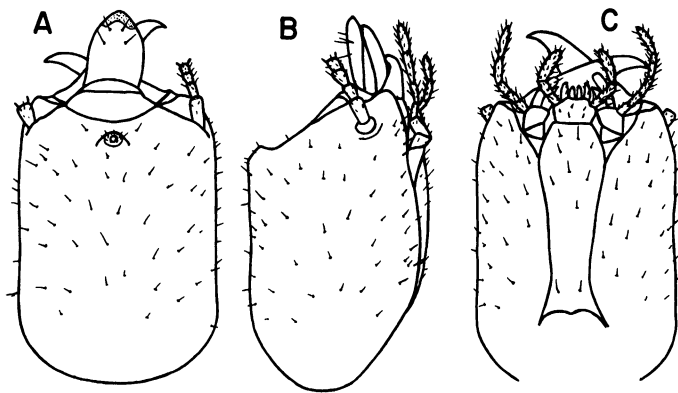


FIG. 10. Unique type soldier of *Foraminitermes valens* (Silvestri). A. Head from above. B. Head from side. C. Head from below. Mamou, Guinea. Drawn by A. E. Emerson.

margin strongly convex. Ocellus almost circular, approximately 0.03 mm. from eye. Pronotum saddle-shaped, with anterior middle portion raised, but not so much as in *F. coatoni* and *F. tubifrons*; anterior margin sinuate, faintly notched in middle; sides rounded; posterior margin distinctly emarginate.

TABLE 8
MEASUREMENTS (IN MILLIMETERS) OF A SINGLE DEALATE MORPHOTYPE
IMAGO OF *Foraminitermes valens* (SILVESTRI), NEW COMBINATION

Length of head to side base of mandibles	0.57
Width of head	0.79
Diameter of eye	0.23
Eye from lower margin	0.02
Length of ocellus	0.07
Median length of pronotum	0.32
Maximum length of pronotum	0.36
Width of pronotum	0.64
Length of hind tibia	0.75

COMPARISONS: The imago of *Foraminitermes valens* is smaller in all measurements than that of *F. coatoni* and that of *F. tubifrons*.

Emerson in 1927 examined the unique type soldier of this species in the Silvestri collection, Istituto di Entomologia, Agraria Universita, Portici, Italy, labeled "*Ceratotermes valens* Silv., cotypi, Guinea Francea: Mamou. F. Silvestri- 26 Ag. 1912." In the following description I have incorporated some of the notes taken by Emerson.

SOLDIER (FIG. 10): Head brown to brownish yellow, lighter posteriorly; postclypeus darker than head; anteclypeus with whitish patches; labrum brownish yellow; mandibles reddish brown, yellowish brown at bases; antennae light brownish yellow; pronotum same color as posterior region of head or creamy yellowish; tergites, sternites, and legs pale yellow. Head with a few bristles, frontal projection with approximately eight or nine bristles; pronotum sparsely covered with a few bristles; longitudinal ridge of fore coxa with three short, thick bristles. Head small; postero-lateral margins broadly rounded; frontal projection conspicuous, tubular; top of head in profile rather straight or somewhat concave; frons sloping toward anteclypeus at angle of approximately 45 degrees. Mandibles with outer margins almost even; left mandible with four crenulations in lower half. Postmentum contraction index, 0.56–0.66. Antenna with 13 articles; third article equal to second, fourth shorter than third. Pronotum with anterior margin slightly indented in middle; sides rounded, converging posteriorly; posterior margin faintly emarginate or almost straight.

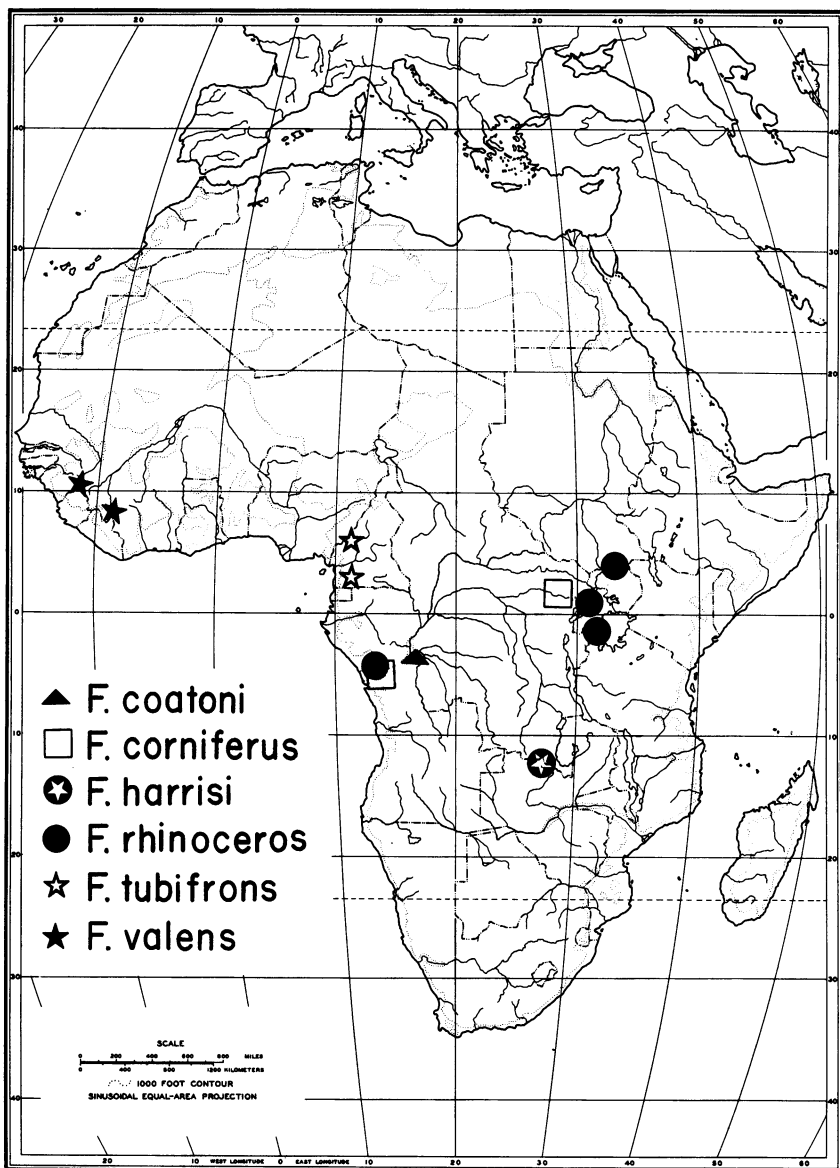


FIG. 11. Distribution of the species of the genus *Foraminitermes*.

COMPARISONS: The soldier of *Foraminitermes valens* closely resembles that of *F. corniferus*, but differs from it in the following respects: the head is

TABLE 9
MEASUREMENTS (IN MILLIMETERS) OF SOLDIERS OF
Foraminitermes valens (SILVESTRI), NEW COMBINATION

	Type	No.	Mt. Nimba Range	Mean
Length of head to side base of mandibles	1.19	20	1.28–1.43	1.36
Width of head	0.87	20	0.90–0.98	0.94
Height of head	0.77	20	0.83–0.86	0.85
Length of left mandible	0.58	20	0.56–0.60	0.59
Maximum width of postmentum	0.26	20	0.31–0.36	0.33
Minimum width of postmentum	0.16	20	0.18–0.21	0.20
Length of postmentum	—	20	0.84–0.98	0.91
Maximum length of pronotum	—	20	0.34–0.38	0.36
Width of pronotum	0.56	20	0.53–0.64	0.58
Length of hind tibia	0.65	20	0.66–0.75	0.70

smaller, the frontal projection is not so prominent, and the longitudinal ridge of the fore coxa has three short, thick bristles.

TYPE LOCALITY AND DISTRIBUTION: Mamou (latitude 10° 28' N., longitude 12° 10' W.), Guinea (type locality), unique soldier (type), collected by F. Silvestri, August 26, 1912. Mt. Nimba (latitude 7° 39' N., longitude 8° 30' W.), Guinea, near trail to the base at camp 1, elevation 850 meters, one dealate imago (morphotype), soldiers, workers, collected by M. Lamotte, October 13, 1951, *Andropogon* savanna, field no. 57b; elevation 1550 meters, soldiers, workers, collected by M. Lamotte, September, 1946, under stone in high prairie, field no. T171; at base of camp 1, elevation 1200 meters, soldiers, workers, collected by M. Lamotte, December 10, 1951, field no. 88Pb; Kéoulenta road, one soldier, workers, collected by M. Lamotte, October, 1951, *Andropogon* savanna, field no. 53Ca; on the trail to Zouguépo, elevation 1600 meters, soldiers, workers, collected by M. Lamotte, August 25, 1951, field no. 30Pb; on the trail to Zouguépo, elevation 1400 meters, one soldier, workers, collected by M. Lamotte, September 20, 1951, field no. 52Pa541; in forest, near the camp, soldiers, workers, collected by M. Lamotte, October 5, 1951, field no. 4Ge.

SUMMARY

The African termite genus *Foraminitermes* is redescribed, and its phylogeny is discussed. The genus name “*Ceratotermes*” is relegated to synonymy.

Two new species, *F. coatoni* and *F. harrisi*, are described and illustrated. The soldier of *F. tubifrons* and the imago of *F. valens* are described and

illustrated for the first time. *Foraminitermes corniferus*, *F. rhinoceros*, *F. tubifrons*, and *F. valens* are redescribed and illustrated.

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