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## The Oriental Termite Genus *Labritermes* Holmgren (Isoptera, Termitidae, Termitinae)

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### ABSTRACT

Two new species, *Labritermes emersoni* and *L. kistneri*, are added to the hitherto monotypic Oriental genus *Labritermes*. The genus and its type

species, *L. buttel-reepeni*, are redescribed, and the close relationship of *Labritermes* to the African genus *Foraminitermes* is shown.

### INTRODUCTION

Holmgren (1914) described the specialized genus *Labritermes*, based on a single species, *L. buttel-reepeni*, from Sumatra. The genus has remained monotypic up to the present. The purpose of this paper is to review the genus and its phylogeny, to redescribe and illustrate the previously known species, and to describe and illustrate two new species, using new material from the American Museum of Natural History, the British Museum (Natural History), and collections made by the senior author. Holotypes and paratypes of the new species are deposited in the American Museum of Natural History. Duplicate paratypes are deposited in the British Museum (Natural History), London, and the Entomology Section, Forest Department Headquarters, Kuching, Sarawak, East Malaysia.

We are indebted to Dr. David Kistner of the California State University, Chico, for sending us specimens from West Malaysia (Malaya); to Dr. Mark Collins of the Centre for Overseas Pest Research, London, for sending us material collected in East Malaysia (Sarawak, Borneo) during the Gunong Mulu Expedition of the Royal Geographical Society; to Dr. Jacqueline Kovoov for graciously providing the senior author help and facilities at the Laboratoire d'Evolution, Paris; and to Dr. Valerie Krishna for field and editorial assistance. Thanks are also extended to Mr. Joseph Yong, Director of Forests, Mr. Abang Abdul Hamid, Forest Entomologist, and the staff of the Forest Department, Sarawak, for the cooperation and facilities provided to the senior author during his fieldwork in Sarawak.

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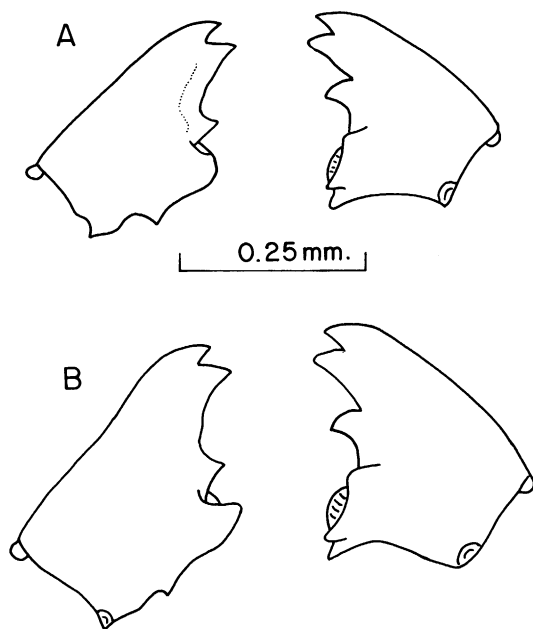


FIG. 1. Mandibles of workers. A. *Labritermes buttel-reepeni* Holmgren, from Sungei Mengiong, Sarawak. B. *Labritermes kistneri*, new species, paratype colony from Semengoh Forest Reserve, Kuching, Sarawak.

#### GENUS *LABRITERMES* HOLMGREN

Genus *Labritermes* Holmgren, 1914, pp. 269–270. Emerson, 1928, p. 407; 1955, p. 510. Snyder, 1949, p. 111. Ahmad, 1950, pp. 45, 66, 67; 1976, pp. 112, 122. Harris, 1961, p. 64 (chart). Roonwal and Chhotani, 1965, p. 86; 1966, p. 203. Krishna, 1970, p. 141, fig. 5. Sands, 1972, pp. 38, 39, figs. 25, 26.

TYPE SPECIES: *Labritermes buttel-reepeni* Holmgren.

IMAGO: See the description under *Labritermes buttel-reepeni*.

SOLDIER: Head small, cylindrical, height almost equal to width, frons sloping toward clypeus at about 45-degree angle. Frontal gland very small; fontanelle round, very small, about 0.014–0.019 mm. in diameter, situated just above frontal slope. Labrum very large and wide, wider than long, asymmetrical, tilted upward; anterior region with wide hyaline tip; underside with posterior median sclerotized protrusion pointing

downward. Mandibles rather strongly curved, asymmetrical. Left mandible slightly longer than right; inner cutting edge beginning at tip with distinct and regular serrations up to one-third or one-half the length, ending with four progressively larger teeth; posterior margin of third and fourth tooth long; small pointed projection at base of fourth tooth. Right mandible more sharply curved inward than left; inner margin smooth dorsally, narrow groove running from near base to tip, ventral margin of groove finely serrated; one or two very tiny thornlike points at base. Pronotum saddle-shaped, narrower than head. Antennae with 12 articles. Tibial spurs 3:2:2.

WORKER: Left mandible (fig. 1) with short apical tooth; posterior margin of fused first plus second marginal tooth longer than apical tooth, with almost straight cutting edge, joining evenly (without a distinct angle) with anterior margin of third marginal tooth; mandible index<sup>3</sup>  $L_A/L_1$  .28; fourth marginal tooth<sup>4</sup> small, faintly visible from above, almost hidden behind molar prominence; molar plate with a few (4–5) grinding ridges. Right mandible (fig. 1) with posterior margin of first marginal tooth longer than apical tooth or posterior margin of second marginal tooth; second marginal tooth prominent, posterior margin concave; molar plate with a few (3–4) grinding ridges.

Digestive tube (fig. 2) similar in many respects to that of *Foraminitermes*. Crop voluminous, asymmetrical (larger and symmetrical in *Foraminitermes*). Gizzard not distinctly separated from crop; larger and with much more heavily sclerotized armature than that of *Foraminitermes*. Midgut much longer than that of *Foraminitermes* (in *Labritermes* midgut about three times longer than length of crop and gizzard combined; in *Foraminitermes* midgut about same length as crop and gizzard combined). Mesenteron-proctodeum junction simple, transverse, without mixed segment. Four malpighian tu-

<sup>3</sup>  $L_A$ : distance from left apical tooth to first left marginal tooth;  $L_1$ : distance from first left to third left marginal tooth (Sands, 1972).

<sup>4</sup> Krishna (1968) refers to this tooth as the molar tooth; Sands (1975) refers to it as the fourth marginal tooth.

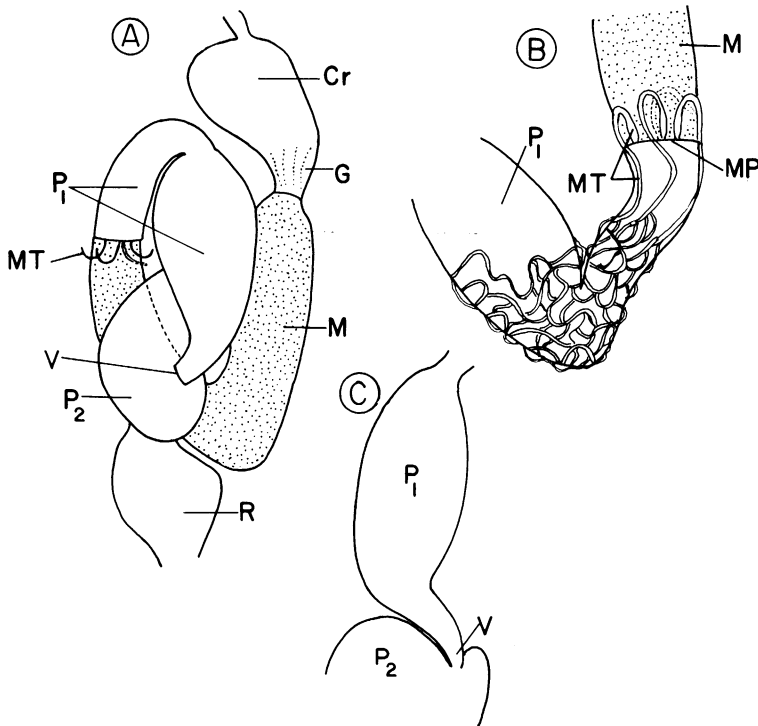


FIG. 2. Digestive tube of *Labritermes kistneri*, new species. A. Ventral view. B. Mesenteron-proctodeum junction, showing insertion of malpighian tubules. C. First proctodeal segment, enteric valve, and second proctodeal segment. *Abbreviations:* Cr, crop; G, gizzard; M, middle intestine, or mesenteron; MP, mesenteron-proctodeum junction; MT, malpighian tubules; P<sub>1</sub>, first proctodeal segment; P<sub>2</sub>, second proctodeal segment (paunch); R, rectum; V, enteric valve.

bules evenly spaced, attached at mesenteron-proctodeum junction, extending forward for a short distance and then looping around back toward hindgut, a feature similar to *Foraminitermes* and *Macrotermitinae*; basal region of malpighian tubules faintly swollen near insertion (fig. 2B) (in *Foraminitermes* distinctly swollen). First proctodeal segment (P<sub>1</sub>) similar to that of *Foraminitermes*; tubular and narrow proximally, almost same diameter as midgut; dilated, saclike distally; narrowing again into a short tube, adhering at base to wall of second proctodeal segment or paunch (P<sub>2</sub>) and entering ventrally into second proctodeal segment through an enteric valve (fig. 2C); enteric valve unarmed, conical (unarmed and flat in *Foraminitermes*). Malpighian tubules closely adhering to wall of P<sub>1</sub>, at base of proximal tubular

portion and upper dilated portion of P<sub>1</sub> forming a convoluted, jumbled mass (fig. 2B) (in *Foraminitermes* the convoluted, jumbled mass of malpighian tubules on P<sub>1</sub> beginning at mesenteron-proctodeum junction). Second proctodeal segment or paunch (P<sub>2</sub>) not so dilated as distal sac section of P<sub>1</sub>, progressively narrowing into a long, narrow tubular colon, emptying into rectum.

RELATIONSHIPS: Holmgren (1914), on the basis of the shape of the soldier head, placed the highly specialized genus *Labritermes* close to the genera *Cephalotermes* and *Cylindrotermes* in "Hamitermes Reihe," a group subsequently elevated by Kemner (1934) to the subfamily rank as *Amitermitinae*. Ahmad (1950) essentially followed Holmgren and, on the basis of the imago-worker dentition, placed *Labritermes* in the

"*Microcerotermes* Series" (of the subfamily Amitermitinae), a group of genera which includes *Microcerotermes*, *Amphidotermes*, *Globitermes*, *Prohamitermes*, *Cephalotermes*, and *Cylindrotermes*. More recently, Ahmad (1976) considered *Labritermes* to be closely related to *Protohamitermes* and to a new genus which he described as *Orientermes*.

Noirot and Noirot-Timothee (1969) and Sands (1972) have suggested a different relationship for *Labritermes*, however. Sands (1972) does not recognize the validity of the subfamily Amitermitinae, considering it a synonym of the subfamily Termitinae. He has removed *Labritermes* and other genera of the Amitermitinae (*Microcerotermes*, *Amphidotermes*, *Prohamitermes*, *Cephalotermes*, *Cylindrotermes*, *Pseudomicrotermes*, *Eremotermes*, *Synhamitermes*, *Amitermes*, *Gnathamitermes*, *Drepanotermes*, *Ahamitermes*, *Incolitermes*, *Pseudhamitermes*, *Hoplotermes*, and *Protohamitermes*), and included them in the subfamily Termitinae, mainly on the basis of the gut anatomy.<sup>5</sup> Noirot and Noirot-Timothee (1969) have pointed out that the digestive tube of *Labritermes* is the same type as that of the African genus *Foraminitermes*, a genus of the subfamily Termitinae that was earlier considered unique in having no close relatives in the subfamily (Krishna, 1963). Their observation was confirmed by Sands (1972), who proposed a close relationship between *Labritermes* and *Foraminitermes*.

Our study shows that *Labritermes* is not closely related to *Cylindrotermes*, *Cephalotermes*, and other genera of the *Microcerotermes* Series as originally suggested by Holmgren, Ahmad, and others. The genera

<sup>5</sup> Sands (1972) further places the more primitive genera of the subfamily Amitermitinae (*Anoplotermes*, *Speculitermes*, *Euhamitermes*, *Indotermes*, *Firmitermes*, *Eburnitermes*, and *Labidotermes*), along with 16 new genera (created to include the African species previously placed in *Anoplotermes*), in the Apicotermiinae—a subfamily first proposed by Grassé and Noirot (1954), reaffirmed by Noirot and Noirot-Timothee (1969), and established since its recognition by Sands (1972).

of the *Microcerotermes* Series have a different gut anatomy, with a mixed segment present and the malpighian tubules arranged in two pairs; no hyaline tip in the soldier labrum; and a less developed second marginal tooth with a straight posterior margin in the right imago-worker mandible. Also, *Labritermes* is not so closely related to *Protohamitermes* as Ahmad (1976) believes, since these two genera do not share any synapomorphic characters. Our study confirms that *Labritermes* is most closely related to *Foraminitermes*, as the two genera share several synapomorphic characters. In the soldier of each of these genera, the labrum has a hyaline tip; the upper inner cutting edge of the left mandible is finely serrated, with blunt teeth appearing as crenulations below the serrations; and the inner margin of the right mandible is smooth and without teeth, the base of its molar region with one or two very tiny, pointed, thornlike spines or projections. Also, in the digestive tube of the worker in each of these genera, the four malpighian tubules are attached at the transverse mesenteron-proctodeum junction, extending forward for a short distance and then looping around toward the hindgut; the malpighian tubules are swollen basally; the first proctodeal segment ( $P_1$ ) is tubular and narrow proximally, almost the same diameter as the midgut, and dilated and saclike distally, with the malpighian tubules forming a jumbled mass over it.

#### KEY TO THE SPECIES OF *LABRITERMES* BASED ON THE SOLDIER CASTE

1. Head narrow, with straight, parallel sides, posterior margin deeply rounded (fig. 4); head width 0.58–0.62 mm.; left mandible with almost straight outer margin (fig. 7A) . . . . .  
     . . . . . *L. buttel-reepeni* Holmgren
- Head ovoid, with rounded sides, posterior margin broadly rounded (figs. 5, 6); head width 0.64–0.82 mm.; left mandible with distinctly curved outer margin (fig. 7B, C, D) . . . . . 2
2. Head small; head length 1.00–1.08 mm.; head width 0.64–0.68 mm.; head height 0.58–0.60 mm.; left mandible 0.58–0.60 mm.; labrum roundish, narrow at base (fig. 8C, D), with sclerotized projection on underside angular;

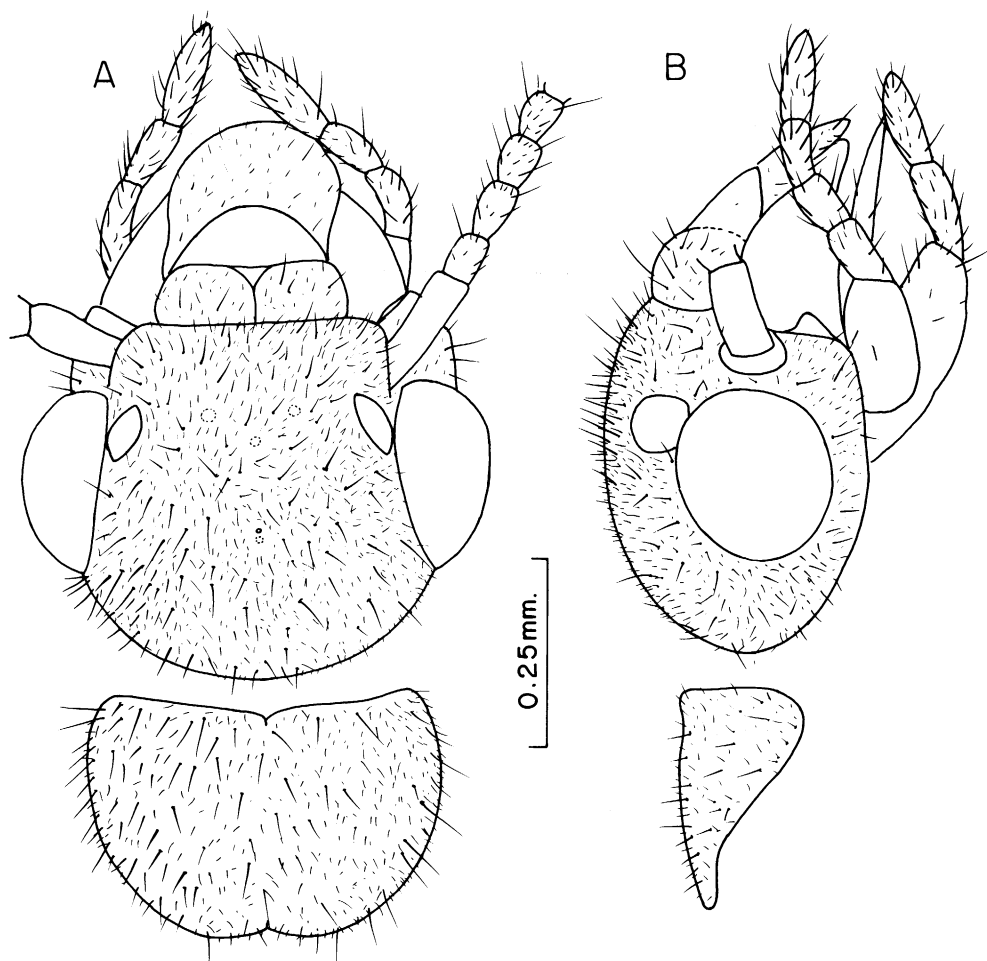


FIG. 3. Imago of *Labritermes buttel-reepeni* Holmgren, lectotype colony. A. Dorsal view of head and pronotum. B. Side view of head and pronotum.

right mandible with basal tooth area angular (fig. 7B) ..... *L. emersoni*, new species  
 Head large; head length 1.15–1.28 mm.; head width 0.70–0.82 mm.; head height 0.65–0.70 mm.; left mandible 0.64–0.72 mm.; labrum trapezoid-like, wide at base (fig. 8E, F, G) with sclerotized projection on underside broadly convex; right mandible with basal tooth area rounded (fig. 7C, D) .....  
 ..... *L. kistneri*, new species

*Labritermes buttel-reepeni* Holmgren

*Labritermes buttel-reepeni* Holmgren, 1914, pp. 270–272 (imago, soldier, worker, biology), pl.

7, fig. 8 (soldier). John, 1925, p. 406 (biology), pl. xx, fig. 15 (nest). Wheeler, 1936, p. 226 (biology). Snyder, 1949, p. 111 (systematics, locality). Ahmad, 1950, p. 67, fig. 13 (worker mandible); 1976, p. 117, fig. 8D (worker mandible), p. 121, fig. 12 (enteric valve).

DIAGNOSIS: See Key and Comparisons.

IMAGO (FIG. 3): Head yellow to light yellowish brown, three faint round spots between ocelli forming a triangle; postclypeus, anteclypeus, and labrum creamish; antennae light yellow; pronotum creamish yellow to light yellow; wing scale brownish; wings and legs yellowish. Head and pronotum densely

TABLE 1  
Measurements (in Millimeters) of Four Imagoes of *Labritermes buttel-reepeni* Holmgren

	Range	Mean	±SD
Length of head capsule	0.46–0.47	0.46	±0.005
Length of head to postclypeus	0.41–0.43	0.42	±0.006
Width of head	0.61–0.61	0.61	—
Diameter of eye	0.21–0.22	0.22	±0.006
Eye from lower margin	0.03–0.04	0.04	±0.002
Length of ocellus	0.08–0.08	0.08	±0.002
Width of ocellus	0.08–0.09	0.08	±0.006
Maximum length of pronotum	0.33–0.33	0.33	±0.003
Median length of pronotum	0.28–0.28	0.28	—
Width of pronotum	0.46–0.50	0.49	±0.012
Length of hind tibia	0.56–0.56	0.56	—
Length of forewing from suture	5.90–5.90	5.90	—
Width of forewing	1.52–1.52	1.52	—

covered with stiff bristles and hairs of varying sizes. Head small, ovoid, posterior margin broadly rounded. Y-suture not visible (in one specimen vertical bar below fontanelle faintly visible). Fontanelle very small, hardly visible, not raised on a minute projection as in *Foraminitermes*; small whitish round spot below fontanelle. Eyes moderately large, shaped as in figure 3B. Ocellus large, from side roundish, touching eye suture. Postclypeus convex, median line dividing it into two halves. Antennae broken, with 12-plus articles, second article equal to fourth, third larger than second or fourth. Pronotum of a width equal to 0.77 to 0.81 of head width, not saddle-shaped as in *Foraminitermes*, anterior margin weakly concave, sides broadly

rounded, posterior margin distinctly indented. No sclerotized ridge on coxa as in *Foraminitermes*. Tibial spurs 3:2:2.

SOLDIER (FIG. 4): Head light yellowish brown, anterior margin around mandibles brown; postclypeus yellowish brown; antennae light yellowish; mandibles shiny brown, becoming lighter (to yellow-brown) at base; labrum yellow-brown, darker than head, with white hyaline lobe; pronotum light yellow, lighter than head. Head and postmentum fairly densely covered with short, tapered, erect bristles and hairs; pronotum with a few erect bristles along margins and lobes; labrum with erect, light, tapered bristles of three lengths, longest 0.18 mm. Head rectangular, straight-sided, deeply round poste-

TABLE 2  
Measurements (in Millimeters) of Ten Soldiers of *Labritermes buttel-reepeni* Holmgren

	Lectotype	Range	Mean	±SD
Length of head capsule	1.15	1.05–1.15	1.10	±0.038
Maximum width of head	0.61	0.58–0.62	0.59	±0.018
Maximum height of head	0.58	0.54–0.59	0.56	±0.016
Length of right mandible	0.50	0.50–0.58	0.55	±0.022
Length of left mandible	0.60	0.58–0.60	0.59	±0.026
Maximum width of postmentum	0.23	0.22–0.23	0.23	±0.003
Minimum width of postmentum	0.11	0.09–0.11	0.10	±0.006
Length of postmentum	0.84	0.74–0.84	0.79	±0.034
Maximum length of pronotum	0.20	0.19–0.21	0.20	±0.006
Median length of pronotum	0.19	0.18–0.20	0.19	±0.005
Maximum width of pronotum	0.35	0.32–0.35	0.34	±0.013
Length of hind tibia	0.48	0.44–0.48	0.46	±0.012

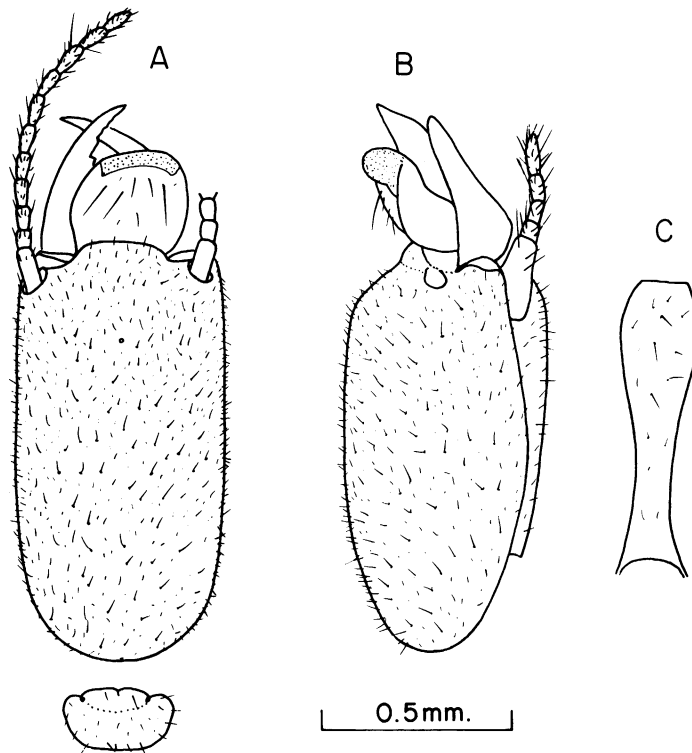


FIG. 4. Soldier of *Labritermes buttel-reepeni* Holmgren, from Sungei Buloh, Malaya. A. Dorsal view of head and pronotum. B. Side view of head. C. Ventral view of postmentum.

riorly, in profile a somewhat dorsoventrally flattened oval; fontanelle small, circular. Labrum (fig. 8A) enlarged, with crescent-shaped hyaline lobe; tilted upward; three-lobed, with margin of each lobe dorsally convex; posterior-median sclerotized protrusion on underside broadly rounded (fig. 8B). Mandibles about 0.4 as long as head. Left mandible (fig. 7A) with outer margin almost straight, curved at tip; very small pointed projection at base of inner margin, then a much larger, blunter tooth with concave surface, followed by three progressively smaller teeth, then many serrations extending to tip. Right mandible (fig. 7A) with outer margin gently curved from base to tip; inner margin even, two very small points below basal tooth. Antennae with 12 articles, second slightly shorter than third or fourth, third subequal to fourth, remaining articles longer. Postmentum broadly ovoid anteriorly, narrowing

posteriorly to its minimum width, then becoming wider, contraction index 0.40 to 0.50. Pronotum about half as wide as head, anterior lobe slightly emarginate medially.

COMPARISONS: The soldier of *Labritermes buttel-reepeni* differs from those of *L. kistneri* and *L. emersoni* in having a more nearly rectangular head, with parallel sides. It is smaller than the soldier of *L. kistneri* in all measurements. It has a thicker, less sharply curved right mandible than the soldier of *L. emersoni*.

MATERIAL EXAMINED AND TYPE LOCALITY: INDONESIA: *East Sumatra*, Tandjong Slammat (lat. 3°49'N, long. 98°20'E) type locality, one soldier (lectotype), one imago (lectomorphotype), workers, determined by N. Holmgren, redetermined by A. E. Emerson from unlabeled material, type colony number 445, collected by H. v. Buttel-Reepen. *West Sumatra*, Kota Baroe (Kota Baru) (lat.

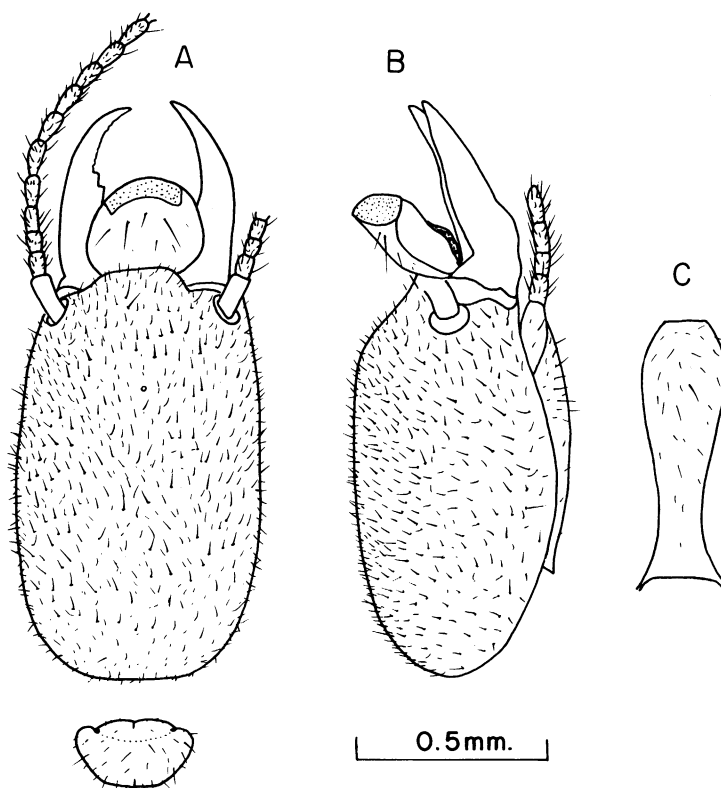


FIG. 5. Soldier of *Labritermes emersoni*, new species, paratype from type colony. A. Dorsal view of head and pronotum. B. Side view of head. C. Ventral view of postmentum.

0°14'S, long. 100°13'E), soldier, workers, collected by O. John, April 6, 1913. MALAY-SIA: *Borneo*, Sarawak, Kapit District, Nanga Tekalit Camp, Sungei Mengiong (lat. 1°38'N, long. 113°35'E), altitude 236 m., queen, soldiers, workers, collected by W. King, May 26, 1963, from nest 3.8 × 3.8 × 5.1 cm., under humus-leaf litter in soil in primary rainforest; *idem*, king, queen, soldiers, workers, collected by A. E. Emerson and Eleanor Emerson in small dirt nest 7.6 × 7.6 cm., under log. Sarawak, Kapit District (lat. 1°38'N, long. 113°33'E), soldier, workers, collected by A. E. Emerson, March 1, 1963, in dirt covering vines on ground. Sarawak, Baram District, Fourth Division, Gunong Mulu National Park (lat. 4°03'N, long. 114°56'E), altitude 220 m., soldiers, workers, collected by N. M. Collins, April 1, 1978,

field number 506 (British Museum Number 78/11), taken from soil in dipterocarp forest. *Malaya*, Sungei Buloh Forest Reserve (lat. 3°10'N, long. 101°34'E), altitude 46 m., soldiers, workers, nymphs, collected by C. M. Low and A. E. Emerson, March 18, 1963, from 5.1 cm. below soil surface.

**TYPE MATERIAL:** The unique soldier, from Type Colony 445, which was donated by N. Holmgren to A. E. Emerson for his termite collection, is designated as lectotype by Kumar Krishna and deposited in the collection of the American Museum of Natural History, New York.

***Labritermes emersoni*, new species**

**DIAGNOSIS:** See Key and Comparisons.

**SOLDIER (FIG. 5):** Head yellowish, anterior



TABLE 3  
Measurements (in Millimeters) of Eleven Soldiers of *Labritermes emersoni*, New Species

	Holotype	Range	Mean	±SD
Length of head capsule	1.04	1.00–1.08	1.04	±0.026
Maximum width of head	0.65	0.64–0.68	0.65	±0.010
Maximum height of head	0.58	0.58–0.60	0.58	±0.011
Length of right mandible	0.55	0.52–0.58	0.55	±0.022
Length of left mandible	0.60	0.58–0.60	0.59	±0.011
Maximum width of postmentum	0.25	0.22–0.25	0.24	±0.011
Minimum width of postmentum	0.13	0.13–0.14	0.13	±0.006
Length of postmentum	0.73	0.65–0.75	0.70	±0.034
Maximum length of pronotum	0.20	0.19–0.20	0.19	±0.009
Median length of pronotum	0.18	0.18–0.19	0.18	±0.006
Maximum width of pronotum	0.34	0.32–0.36	0.34	±0.012
Length of hind tibia	0.51	0.50–0.53	0.51	±0.011

margin around mandibles brown; postclypeus yellowish brown; antennae whitish to light yellowish; mandibles shiny brown, becoming lighter (to yellow-brown) at base; labrum light brown, with white hyaline medial lobe; pronotum yellowish. Head and postmentum fairly densely covered with short bristles and hairs; pronotum with a few bristles and hairs; labrum with bristles of three lengths, longest about 0.15 mm. Head with sides very faintly rounded, tapering anteriorly, broadly rounded posteriorly, in profile oval; fontanelle small, circular. Labrum (fig. 8C) enlarged, with crescent-shaped hyaline lobe; tilted upward, three-lobed, with margin of each lobe dorsally convex; sides rounded; posterior median sclerotized protrusion on underside angular (fig. 8D). Mandibles about half as long as head. Left mandible (fig. 7B) with outer margin straighter than that of right mandible, but gently curved toward tip; very small pointed projection at base of inner margin, then much larger, blunter tooth with concave surface, followed by three progressively smaller teeth and then many fine, blunt serrations extending to tip. Right mandible (fig. 7B) with outer margin sharply curved from base to tip, inner margin even dorsally; narrow groove running from near base to tip, ventral margin of groove finely serrated; one or two very small points in base below basal tooth. Antennae with 12 articles, second, third, and fourth subequal, remaining articles longer. Postmentum ovoid anteriorly, nar-

rowing posteriorly to its minimum width, then becoming wider, contraction index 0.50 to 0.56. Pronotum about half as wide as head, anterior lobe with faint median incision.

COMPARISONS: The soldier of *Labritermes emersoni* closely resembles that of *L. kistneri*, but has a smaller head, smaller mandibles, and a labrum with a narrower base (see fig. 8C). It differs from the soldier of *L. buttel-reepeni* in having a head with more rounded sides (almost parallel in *buttel-reepeni*) and a more sharply incurved left mandible.

MATERIAL EXAMINED AND TYPE LOCALITY: MALAYSIA: *Borneo*, Sarawak, Kapit District, Third Division, Batang Balleh, Sungei Mengiong, Nanga Tekalit Camp (lat. 1°38'N, long. 113°35'E) type colony, soldiers (holotype, paratypes), workers, collected by A. E. Emerson, January 26, 1963, in surface galleries on wet log in forest. Sarawak, Semengoh Forest Reserve, about 20 km. south of Kuching (lat. 1°32'N, long. 110°20'E), soldiers (paratypes), workers, collected by K. Krishna, April 14, 1978, in soil galleries. Sarawak, Baram District, Fourth Division, Gunong Mulu National Park (lat. 4°03'N, long. 114°56'E), soldiers (paratypes), workers, collected by N. M. Collins, February 2, 1978, field number 505 (British Museum Number 1978/11), taken in soil core in mixed dipterocarp forest at camp two, altitude 500 m.; *idem*, soldiers (paratypes), workers, collected by N. M. Collins, January 31, 1978, field number 504 (British Museum Number

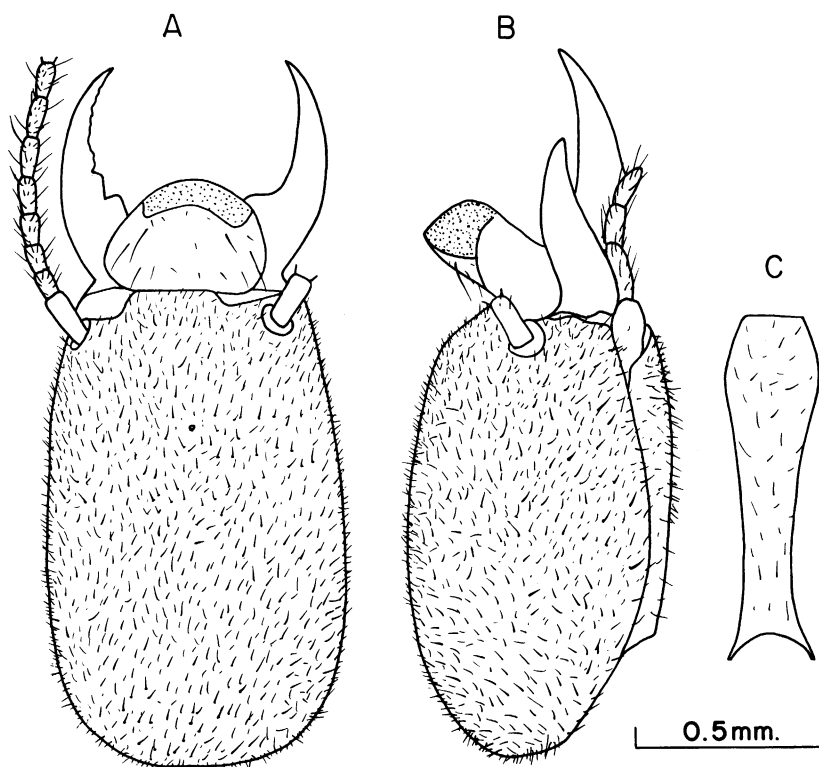


FIG. 6. Soldier of *Labritermes kistneri*, new species, paratype from Templer Park, Malaya. A. Dorsal view of head. B. Side view of head. C. Ventral view of postmentum.

1978/11), taken in soil core in mixed dipterocarp forest at camp one, altitude 130 m. SINGAPORE: Bukit Timah (lat. 1°20'N, long. 103°46'E), soldiers (paratypes), workers, collected anon., February 18, 1968, in deep forest litter.

ETYMOLOGY: This species is named in honor of the late Dr. Alfred E. Emerson, who has greatly advanced our knowledge of the systematics and biology of termites.

#### *Labritermes kistneri*, new species

DIAGNOSIS: See Key and Comparisons.

SOLDIER (FIG. 6): Head light brown, anterior margin around mandibles brown; postclypeus yellow-brown; antennae light brown; mandibles shiny brown, becoming lighter (to yellow-brown) at base; labrum yellow-brown with white hyaline medial lobe; pronotum

light yellowish. Head and postmentum densely covered with short, tapered, erect bristles and hairs; pronotum with a few erect bristles of two lengths along margins of anterior, lateral, and posterior lobes; labrum with erect, light, tapered bristles of three lengths, longest 0.23 mm. Head with sides faintly rounded, narrowing anteriorly, broadly rounded posteriorly, in profile nearly oval; fontanelle small, circular. Labrum (fig. 8E, G) enlarged, with large hyaline lobe; tilted upward; three-lobed, with margin of each lobe convex; wider than in *buttel-reepeni* and *emersoni*, sides widening toward base, trapezoid-like; posterior median sclerotized protrusion on underside broadly convex (fig. 8F). Mandibles about half as long as head. Left mandible (fig. 7C, D) with outer margin straighter than that of right mandible, but gently curving from base to tip; small,

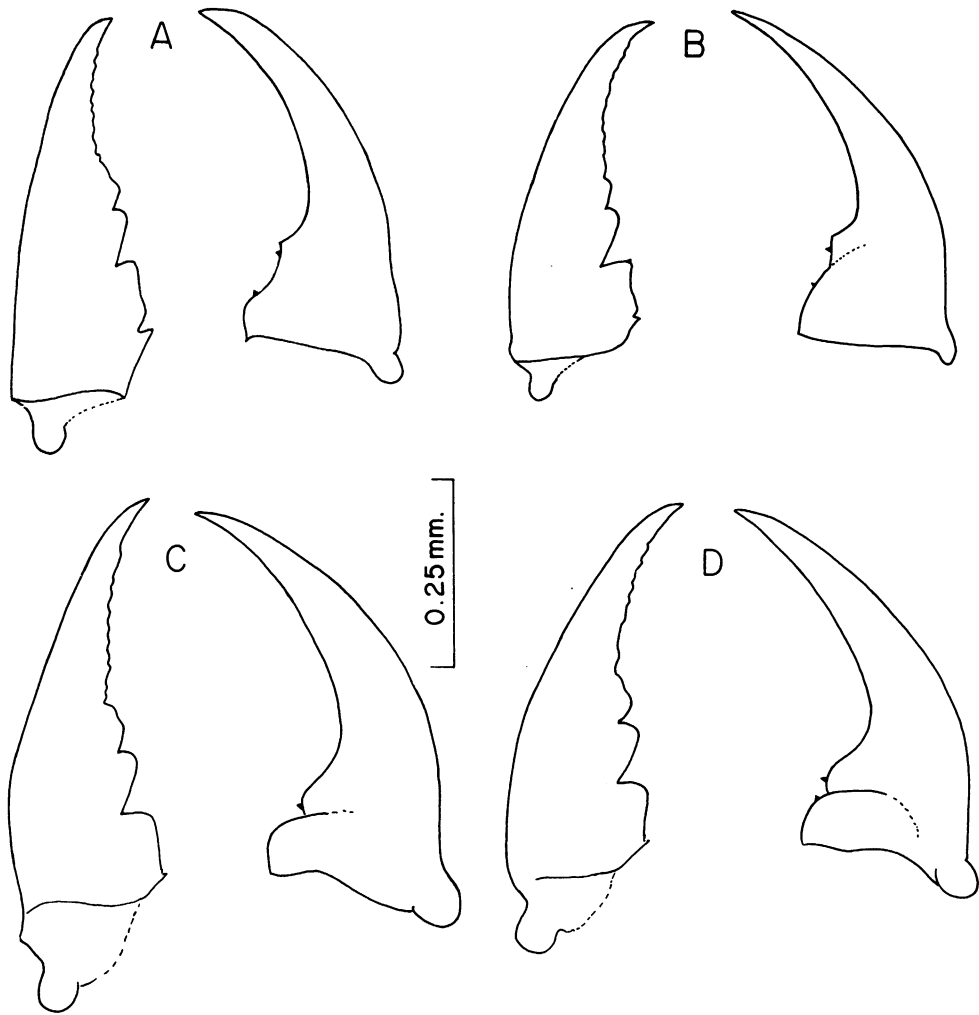


FIG. 7. Mandibles of soldiers. A. *Labritermes buttel-reepeni* Holmgren. B. *Labritermes emersoni*, new species. C. *Labritermes kistneri*, new species, from Templer Park, Malaya. D. *Labritermes kistneri*, new species, from Sarawak.

pointed projection at base of inner margin, barely separate from a much larger, blunter tooth with an almost straight margin, followed by three progressively smaller teeth, then many serrations extending to tip. Right mandible (fig. 7C, D) sharply curved from base to tip; inner margin even when viewed from above, narrow groove running from base to near tip, ventral margin of groove with very fine serrations; notch at base, one very small, thornlike point just above notch,

sometimes one below. Antennae with 12 articles, second, third, and fourth subequal, remaining articles longer. Postmentum broadly ovoid anteriorly, narrowing posteriorly to its minimum width, then becoming wider, contraction index 0.45 to 0.54. Pronotum about half as wide as head, anterior lobe slightly emarginate medially.

COMPARISONS: The soldier of *Labritermes kistneri* is larger than those of *L. buttel-reepeni* and *L. emersoni*. It differs from the sol-

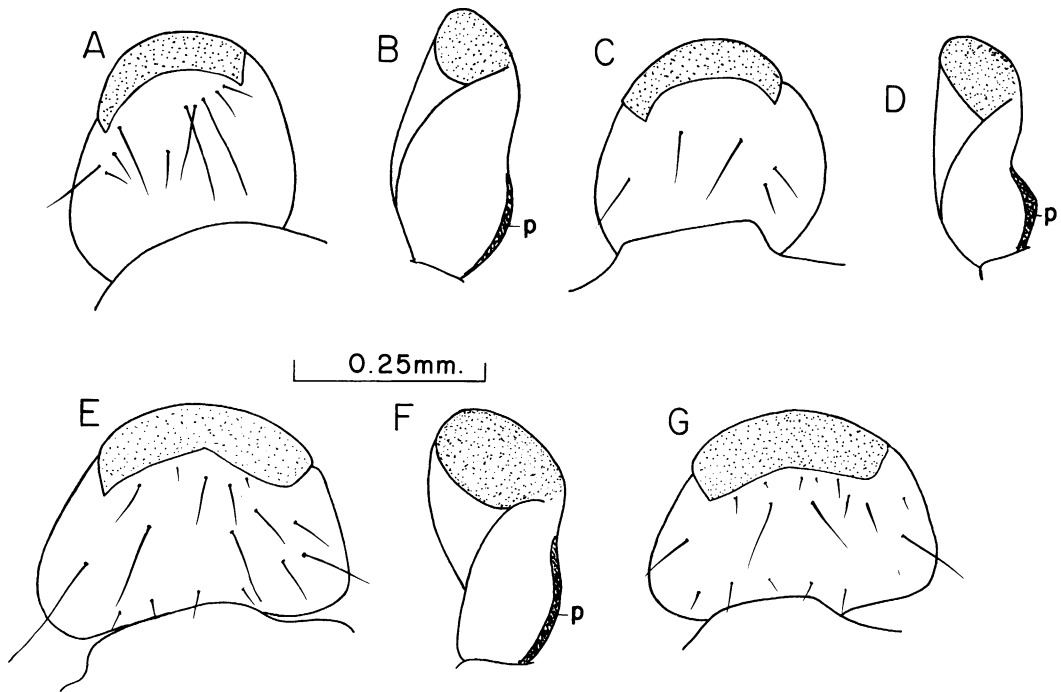


FIG. 8. Labra of soldiers. *Labritermes buttel-reepeni* Holmgren: A. Dorsal view; B. Side view. *Labritermes emersoni*, new species: C. Dorsal view; D. Side view. *Labritermes kistneri*, new species: E. Dorsal view of specimen from Templer Park, Malaya; F. Side view; G. Dorsal view of specimen from Sarawak. Abbreviation: p, posterior-median sclerotized protrusion.

dier of *buttel-reepeni* in having a head with more rounded sides (almost parallel in *buttel-reepeni*); longer, thinner, and more sharply curved mandibles, especially the right; and

a much wider labrum. It has longer mandibles than the soldier of *emersoni* and a labrum with a wider base.

MATERIAL EXAMINED AND TYPE LOCALITY:

TABLE 4  
Measurements (in Millimeters) of Fifteen Soldiers of *Labritermes kistneri*, New Species

	Holotype	Range	Mean	±SD
Length of head capsule	1.23	1.15-1.28	1.20	±0.038
Maximum width of head	0.80	0.70-0.82	0.77	±0.040
Maximum height of head	0.68	0.65-0.70	0.67	±0.015
Length of right mandible	0.65	0.60-0.65	0.64	±0.027
Length of left mandible	0.71	0.64-0.72	0.68	±0.028
Maximum width of postmentum	0.28	0.25-0.28	0.26	±0.010
Minimum width of postmentum	0.14	0.12-0.15	0.13	±0.008
Length of postmentum	0.85	0.78-0.87	0.82	±0.034
Maximum length of pronotum	0.21	0.19-0.22	0.20	±0.008
Median length of pronotum	0.20	0.18-0.21	0.19	±0.012
Maximum width of pronotum	0.40	0.35-0.40	0.38	±0.012
Length of hind tibia	0.63	0.55-0.63	0.59	±0.031

MALAYSIA: *Malaya*, Selangor, Ulu Gombak (lat. 3°15'N, long. 101°40'E), type locality, soldiers (holotype and paratypes), workers, collected by D. H. Kistner and J. A. Jacobson, July 6, 1973, nest number 726, field number 3427. Templer Park (lat. 3°17'N, long. 101°36'E), altitude 92 m., soldiers (paratypes), workers, collected by A. E. Emerson, March 17, 1963, from nest in soil galleries in bank; *idem*, soldiers (paratypes), workers, collected by A. E. Emerson, March 17, 1963, below surface of soil in bank. *Borneo*, Sarawak, Semengoh Forest Reserve, about 20 km. south of Kuching (lat. 1°32'N, long. 110°20'E), soldiers (paratypes), workers, collected by K. Krishna, April 13, 1978, in soil. Sarawak, Kapit District, Nanga Tekalit Camp (lat. 1°38'N, long. 113°35'E), altitude 305 m., soldiers (paratypes), workers, collected by A. E. Emerson and Eleanor Emerson, January 31, 1963, in dirt cells under root of small tree.

ETYMOLOGY: This species is named in honor of Dr. David Kistner, of the California State University, Chico, who has collected this species.

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