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The Ant Larvae of the Myrmicine Tribe Solenopsidini[1]

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We define this tribe to include the following 26 genera: *Vollenhovia, Gauromyrmex, Heteromyrmex, Huberia, Monomorium, Epixenus, Trichomyrmex, Hagioxenus, Wheeleriella, Phacota, Paraphacota, Xenomyrmex, Allomerus, Megalomyrmex, Liomyrmex, Epoecus, Anergates, Anergatides, Bruchomyrma, Tranopelta, Tranopeltoides, Carebarella, Carebarelloides, Diplomorium, Bondroitia, Solenopsis.* Only nine of these genera are represented in our collection, which includes a total of 21 species. References from the literature for three additional genera and eleven additional species make a total of 12 genera and 32 species treated in this article.

Included in the Solenopsidini are some very interesting ants. *Allomerus* nests in natural plant cavities in humid neotropical forests; the sexual larvae are markedly different from the worker larvae. Several genera are workerless social parasites: *Anergates, Anergatides, Bruchomyrma, Epixenus, Epoecus, Hagioxenus, Trichomyrmex* and *Wheeleriella.* The largest genus in the tribe is *Monomorium;* next is *Solenopsis.* These two genera have provided mankind with several of its annoying pests. Three are common household pests in the United States: *Monomorium minimum, M. pharaonis* and *Solenopsis molesta.* Concerning the polymorphic species, *Solenopsis geminata* and *S. saevissima,* Creighton[2] has written: [See Footnote]

Fire ants of another species (*Solenopsis xyloni*) are similarly injurious and sometimes also become house pests. Several of the small monomorphic species of *Solenopsis* are known to be thief ants; they nest near the galleries of larger ants and steal the food and brood of the latter.

Wheeler[3] once wrote that the tribe Solenopsidini was "very unsatisfactorily defined." After studying the larvae, we heartily agree, for they are a very heterogeneous lot. To be sure, the larvae of *Monomorium s. str.* can scarcely be distinguished from those of *Solenopsis;* but aside from these two, we can detect no affinities. The nine genera studied might just as well be in eight different tribes. We have not been able to find any characters common to all the genera; hence we have not even attempted a characterization of the tribe.

[1] The research on which this article is based was aided by a grant-in-aid from the Sigma Xi-Resa Research Fund.

[2] Bull. Mus. Comp. Zool. Harvard 104:227. 1950.

"The workers forage actively and are pugnacious in the extreme. They have a particularly painful sting which accounts for their popular name of 'fire ant.' Wherever they occur they are a dominant note in the environmental picture and they are among the few species of ants which can justifiably be regarded as serious pests. Because of their omnivorous habits they are always turning up in unexpected situations. They have been known to damage the buds and tender twigs of young fruit trees and kill quail which are too young to leave the nest. In certain areas they are a chronic nuisance because their unsightly nests disfigure lawns."

[3] Bull. Amer. Mus. Nat. Hist. 45:659. 1922.

VOLLENHOVIA Mayr

Comparatively slender; thorax stout and curved ventrally to about 90°; no neck; abdomen nearly straight. Body nearly naked; hairs exceedingly few; anchor-tipped hairs absent. Antennae small. Head hairs few; no hairs on clypeus. Labrum short and broad, slightly curved; posterior surface spinulose, the spinules minute and in short transverse rows. Mandibles rather long and slender; apex forming a rather long slender tooth which is slightly curved medially and posteriorly; medial teeth near the anterior surface, moderately large and curved posteriorly; posterior and medial surfaces with a few denticles. Maxillary palp a slightly raised disc; galea subcylindrical, with the end rounded. Labium broad and feebly trilobed; the anterior surface spinulose, the spinules minute and in short transverse rows. Dorsal portion of hypopharynx with sublongitudinal ridges; ventral portion spinulose, the spinules minute and in short transverse rows.

VOLLENHOVIA sp.

Pl. I, figs. 1-6

Comparatively slender; thorax stout and curved ventrally to about 90°; no neck; abdomen nearly straight. Dorsal profile curved, ventral nearly straight. Posterior end round. Anus ventral. Leg and wing vestiges present. Spiracles small, the first slightly larger. Segmentation distinct. The ventral surface of the thorax and first abdominal somite sparsely spinulose, the spinules minute and in short transverse rows. Body nearly naked; hairs exceedingly few. Of two types: 1) short (about 0.072 mm), with bifid tip, limited to the ventral surface of the prothorax (six hairs) and of the mesothorax (four hairs); 2) a very few widely scattered simple minute hairs, 0.001-0.009 mm long. Head subpyriform in anterior view; breadth of cranium equal to length. Antennae small, with three sensilla, each of which bears a spinule. Head hairs few, rather long (about 0.072 mm), with the tip bifid; however, as many as 3-4 long hairs may be replaced by minute simple hairs about 0.009 mm long; no hairs on the clypeus. Labrum short (breadth 3x length); length uniform; slightly curved; anterior surface with six minute sensilla; ventral border with two isolated sensilla and two clusters of three sensilla each; posterior surface of each half with three isolated sensilla and a cluster of three sensilla; posterior surface spinulose, the spinules minute and in short transverse rows. Mandibles moderately sclerotized, rather long and slender; apex forming a rather long slender tooth which is slightly curved medially and posteriorly; medial teeth near the anterior surface, moderately large and curved posteriorly; posterior and medial surfaces with a few denticles. Maxillae with apex conoidal; palp a slightly elevated disk with three sensilla bearing each a spinule and two encapsulated sensilla; galea subcylindrical with two sensilla on a rounded end. Labium broad and feebly trilobed, with the anterior surface spinulose, the spinules minute and in short transverse rows; between each palp and the opening of the sericteries is an isolated sensillum; palp a low elevation with five sensilla; opening of sericteries a short transverse slit. Dorsal portion of hypopharynx with sublongitudinal ridges; ventral portion spinulose, the spinules minute and in short transverse rows.

Young larva.—Length about 1.3 mm. Both ends bent ventrally at right angles, remainder of body straight; ventral surface of mesothorax, metathorax and first abdominal somite abruptly depressed below the level of the other somites. Hairs somewhat more numerous and a trifle longer than in the mature larva.

Material studied: A dozen larvae from Mt. Poi, Sarawak, Borneo, collected by E. Mjöberg; identified by Dr. W. L. Brown as *V.* sp. near *simoides* Emery.

VOLLENHOVIA OBLONGA PEDESTRIS (F. Smith)

Pl. I, fig. 7

Very similar to *Vollenhovia* sp. but differing in the following details: Body hairs of one type—simple, minute (about 0.001 mm long). Head hairs all simple and minute (about 0.009 mm long). Ventral border of the labrum with a few minute spinules. One of the sensilla on the maxillary palp bears a very long spinule. (*Material studied*: Five damaged integuments from the Solomon Islands.)

HUBERIA Forel

HUBERIA STRIATA (F. Smith)

Emery, 1899: "Il labbro inferiore ha un solo paio di tubercoli conici" (p. 8). Pl. II, Fig. 9, head of larva in side view.

MONOMORIUM Mayr

Athias-Henriot, 1947; Internal anatomy pp. 256, 257, 259, 261, 263, 264, 266, 267.
Gantes, 1949, p. 88: Four sensilla on each maxillary and labial palp.

Subgenus MONOMORIUM Mayr

Plump, chunky and subellipsoidal. Head ventral near the anterior end, on a short stout neck, or neck lacking. Body hairs numerous (or moderately so), uniformly distributed and short; mostly bifid, with long branches, each with a recurved tip; branches frequently denticulate; there may also be a few hairs with bifid tip. Anchor-tipped hairs absent. Head moderately large. Antennae small. Head hairs few, short, bifid, with the branches denticulate; above the antennal level the branches are longer and recurved. Labrum apparently without spinules on the posterior surface. Mandibles of two parts, a stoutly sickle-shaped body and a straight medial blade with several blunt teeth. Maxillary palp a small low knob; galea a short frustum.

MONOMORIUM (MONOMORIUM) PHARAONIS (Linnaeus)

Pl. I, figs. 8-15

Length about 1.9 mm. Plump, chunky and subellipsoidal; diameter greatest at the fourth abdominal somite; ends broadly rounded; dorsal profile C-shaped; ventral profile feebly sinuous. Head on the ventral surface near the anterior end; no neck. Anus posteroventral. Leg vestiges present. Somites indistinct. Spiracles small, the mesothoracic larger than the rest. Integument of the ventral surface of the thorax with a few rows of minute spinules. Body hairs moderately abundant, uniformly distributed and short (about 0.042 mm); bifid, with long branches, each with a recurved tip; branches frequently with a few denticles; rarely much shorter or a little longer or with 3-4 branches; without alveolus and articular membrane (except for a few hairs on the ventral surface). Head moderately large; cranium subtrapezoidal, narrowed ventrally. Antennae small, each with three sensilla, each of which bears a minute spinule. Head hairs few, short (0.027-0.054 mm), bifid (rarely trifid), with denticulate branches; above the antennal level the branches are longer and recurved. Labrum short and broad (breadth 3x the length), ventral border feebly concave; each half of anterior surface with 3-4 hairs with bifid tip; ventral border with four sensilla; each half of posterior surface with two isolated and a cluster of three sensilla. Mandibles moderately sclerotized; of two parts, a stoutly sickle-shaped body and a straight blade projecting medially from the anterior surface; medial border of blade with 2-3 blunt teeth, otherwise variable. Maxillae with the apex paraboloidal; palp a small low knob with four apical sensilla, two of which bear each a rather long spinule; galea a small frustrum with two sensilla, each bearing a rather long spinule. Labial palp a slight elevation with four sensilla, two of which bear a rather long spinule each; an isolated sensillum between each palp and the opening of the sericteries; the latter a moderately long transverse slit.

Very young larva.—Length about 0.41 mm. Plump, fusiform; head ventral, at the anterior end. Body hairs very few, widely scattered, very short (0.006-0.018 mm) and simple. Head hairs few, short (0.009-0.018 mm) and simple.

Young larva.—Length about 0.89 mm. Moderately stout; diameter nearly uniform, greatest at the middle; prothorax inclined ventrally; dorsal profile arched, ventral nearly straight. Integument of dorsal surface of posterior somites sparsely spinulose, the spinules minute and in short rows. Body hairs moderately numerous, uniformly distributed, very short (0.009-0.027 mm), bifid or with denticulate tip. Head hairs few, very short (0.009-0.018 mm), simple or with denticulate tip.

Material studied: Numerous larvae from Panama.

Donisthorpe (1915): "Short and compact, broadest posteriorly, white. *Head* transparent, shining, the rest of the body rugose longitudinally, clothed with short, slightly curved, scattered hairs. The whole larva looks superficially like a bit of broken camphor" (p. 97). Plate II includes a very small and unsatisfactory photograph of a larva in side view. (Repeated 1927, pp. 104-105 and Pl. II.)

MONOMORIUM (MONOMORIUM) FLORICOLA (Jerdon)

Very similar to *pharaonis* but differing in the following details: Integument of dorsal surface of posterior somites also bearing a few rows of minute spinules. Body hairs of two types: 1) a few hairs on the ventral surface of the thorax and first abdominal somite, 0.012-0.036 mm long, with denticulate or bifid tip; 2) elsewhere, deeply bifid, 0.018-0.054

mm long, each branch with the tip recurved; a few branches bear 1-2 denticles. Each half of anterior surface of labrum with 2-3 minute hairs. (*Material studied*: Numerous larvae from Panama.)

MONOMORIUM (MONOMORIUM) MINIMUM (Buckley)

Back, 1937: See below under Marlatt, 1916.

Howard, 1901, fig. 22: A small crude figure of a larva in side view.

Marlatt, 1898, Fig. 2f on p. 2: A small crude figure of a larva in side view. Repeated in the 1907 revision and in several textbooks.

Marlatt, 1916, Fig. 1f: A good figure of a larva in side view. Fig. 1 is an excellent illustration of all castes and developmental stages of this species, which probably accounts for its being one of the most often repeated of myrmecological illustrations. It appeared not only in the 1930 revision but also in the replacing leaflet (Back, 1937) and its revision (1946). It has been repeated in so many textbooks, etc. that it doesn't seem worth while citing any of them.

MONOMORIUM (MONOMORIUM) sp.

Worker larva.—Length about 1.7 mm. Similar to *pharaonis* but differing in the following particulars: Anterior portion of the prothorax forming a very short stout neck; thorax somewhat less stout than in *pharaonis*. Integument of the dorsal surface of the posterior somites also spinulose. Body hairs more numerous. Of two types: 1) on the ventral surface of the thorax and the first two abdominal somites are a few hairs, 0.027-0.054 mm long, with the tip bifid; 2) elsewhere the hairs are 0.024-0.054 mm long, deeply bifid, with very few denticles on the branches. Cranium subrectangular in anterior view, slightly broader than long. Head hairs more numerous. Labrum with four simple hairs on each half of the anterior surface. Labium with a few coarse isolated spinules on the anterior surface at either side.

Young larva.—Length about 0.88 mm. Body and head hairs with the tip simple, bifid or denticulate. Otherwise as in *pharaonis* of the same size.

Sexual larva.—Length about 2.9 mm. Plump, chunky and turgid. On each lateral surface of each somite from the mesothorax through abdominal somite X there are two conical depressions separated by a transverse ruffled welt. Integument rather densely spinulose, the spinules rather coarse and mostly isolated. Body hairs very few and widely scattered (except rather numerous on the prothorax); minute (about 0.009 mm long), slender, simple. Head hairs few, minute (about 0.009 mm long), simple. Otherwise as in the worker larva.

Material studied: numerous larvae from five North Dakota colonies preserved in our collection and bearing field numbers Davis 52, Goldsberry 10, Schonberger 158, Schonberger 175, Uhlmann 251. These all key to *minimum* but Dr. M. R. Smith has kindly examined number 52 for us and has written us as follows: "At one time almost every small black *Monomorium* in North America was called *minimum*, often erroneously. We shall not know the exact taxonomic status of these ants until someone undertakes a careful revision based on large series (especially females, males, associated with workers) from all parts of the United States."

MONOMORIUM (MONOMORIUM) sp.

Similar to *pharaonis* but differing in the following particulars: Thorax more slender. Body hairs more numerous. Hairs on the anterior surface of labrum minute and simple; ventral border with two isolated sensilla. Labium with a few spinules on the anterior surface. (*Material studied*: Numerous larvae from three colonies in our collection—Oklahoma No. 42, Texas No. 10 and Texas No. 150. Dr. M. R. Smith has kindly examined these for us and written as follows: "Although the worker of 150 keys well to *peninsulatum*, a comparison of its female with that of *peninsulatum* clearly indicates that the ants in 150 are not this form.")

Subgenus NOTOMYRMEX Emery

Abdomen greatly inflated and sac-like; thorax forming a rather stout neck which is arched ventrally. Antennae minute. Head hairs few and long; those above the antennal level with the tip bifid; those below with the tip denticulate. Posterior surface of labrum sparsely spinulose, the spinules rather coarse and isolated. Mandibles of two parts, a slender sickle-shaped body and a straight blade projecting medially; medial border of

blade with one or two sharp teeth, otherwise variable. Maxillae with the apex spinulose; palp a short frustum; galea a short subcylinder.

MONOMORIUM (NOTOMYRMEX) ANTARCTICUM (F. Smith)

Pl. I, figs. 16-21

Length about 3 mm. Abdomen greatly inflated and sac-like; thorax forming a rather stout neck which is strongly arched ventrally. Anus ventral. Leg, wing and gonopod vestiges present. Spiracles small, the first pair larger than the rest. Segmentation distinct only on the thorax. Integument with a few short rows of minute spinules on the ventral surface of the thorax. Cranium subtrapezoidal, narrowed ventrally; breadth equal to length; all corners rounded. Antennae minute, each with three sensilla each of which bears a minute spinule. Head hairs few, long (0.027-0.09 mm), those above the antennal level with the tip bifid, those below with the tip denticulate. Labrum distinctly bilobed; breadth 2x the length; lateral borders sinuate, ventral border impressed at the middle; anterior surface of each half with 5-6 minute hairs and/or sensilla; ventral border of each half with two sensilla and a few spinules; posterior surface of each half with 3-4 isolated and a cluster of 2-3 sensilla; posterior surface sparsely spinulose, the spinules rather coarse and isolated. Mandibles moderately sclerotized; of two parts, a slender sickle-shaped body and a straight blade projecting medially; medial border of blade with 1-2 sharp teeth, otherwise variable. Maxillae with the apex paraboloidal and spinulose, the spinules minute and in short subtransverse rows; palp a short frustum with one subapical and four apical sensilla; galea a short subcylinder with two sensilla. Labium with a sparse covering of spinules on the anterior surface; each palp a slight elevation with five sensilla; an isolated sensillum between each palp and the opening of the sericteries; the latter a moderately long transverse slit.

Young larva.—Length about 1.2 mm. Shape similar to that of mature larva, except that the abdomen is less swollen and its ventral profile is nearly straight. Body hairs long and moderately numerous. Of three types: 1) 0.054-0.13 mm, bifid, with flexible shaft and long flexible branches, the tip of each branch with a single or double hook, the most abundant type; 2) a few anchor-tipped, with tortuous shaft, about 0.13 mm long, on the dorsal surface; 3) a few nearly straight with denticulate tip, 0.027-0.13 mm long, on the ventral surface of the thorax and abdominal somites I-IV.

Material studied: Numerous larvae from New Zealand; all the hairs have been broken off the mature larvae.

Subgenus PARHOLCOMYRMEX Emery

MONOMORIUM (PARHOLCOMYRMEX) GRACILLIMUM (F. Smith)

Gantes, 1949: "♀ 2 mm. 2. Ces larves sont petites, 2 mm. 25 chez l'adulte. Le corps a toujours le même aspect, avec la tête aplatie sur le ventre. Tout autour de la tête, le prothorax est garni d'une couronne de poils longs et simples, rigides: ce sont des poils 'défensifs' de 0 mm. 10. Sur le corps on trouve des poils bifurqués de 0 mm. 040 dont l'extrémité souple des branches s'enroule en crosse ou bien se bifurque. Des poils simples ou fourchus de 0 mm. 05 de long, sont plantés très serrés sous la tête et sur le prothorax. La tête, toujours pyriforme, porte vingt-deux poils, simples ou fourchus. Le labre court, à deux lobes, couvre à peine les mandibules; ventralement on voit une sensille et, sur le dos, trois petits poils. Les mandibules ont la forme de celles de *Pheidole* et mesurent 0 mm. 069. Les palpes maxillaires sont de petits cônes. Le palpe proximal n'a que quatre sensilles dont les soies sont longues et pointues: un sensille est sans soie" (pp. 82-83). Pl. V, fig. VII, larva in side view; Pl. VI, fig. 7 includes mandible, labrum, maxillary palp and galea. Growth, pp. 86 and 87.

Subgenus XEROMYRMEX Emery

Body hairs few, short, variable; simple or branched, mostly two-branched, the main branches smooth or with secondary branches; anchor-tipped hairs absent. Cranium subrectangular in anterior view. Antennae minute, each with 2-4 (usually 3) sensilla. Head hairs few, short, varied in number, location and shape; simple or with the tip denticulate, bifid or trifid. Posterior surface of labrum apparently without spinules. Mandibles of two parts, a stoutly sickle-shaped body and a straight blade projecting medially from the anterior surface; medial border of blade with two distinct teeth, the distal subequal to the

apical tooth, the proximal much smaller. Maxillary palp a small low knob; galea a short frustum.

MONOMORIUM (XEROMYRMEX) AFRUM Em. André
Pl. I, figs. 22-25

Integument with long rows of minute spinules in a large patch on the ventral surface of the thorax. Body hairs sparse, short (0.036-0.072 mm); variable, simple or branched, mostly 2-branched, the main branches smooth or with secondary branches; with alveolus and articular membrane. Cranium subrectangular, but with the corners rounded. Antennae minute, each with 2-4 sensilla (usually three), each of which bears a short spinule. Head hairs few, short (0.036-0.072 mm), varied in number, location and shape; simple or with the tip denticulate or bifid or trifid. Labrum with the ventral border feebly concave, ventral corners rounded, lateral borders sinuate; breadth 2x the length; anterior surface of each half with two minute hairs and 1-2 sensilla; ventral border of each half with one isolated and two contiguous sensilla; posterior surface of each half with two isolated and two contiguous sensilla. Mandibles heavily sclerotized; of two parts, a stoutly sickle-shaped body and a straight blade projecting medially from the anterior surface; medial border of blade with two distinct teeth, the distal subequal to the apical tooth, the proximal much smaller. Maxillae with the apex paraboloidal; palp a small low knob with four apical sensilla, two of which bear each a rather long spinule; galea a small frustrum with two sensilla. Labial palp a slight elevation with four sensilla, two of which bear a rather long spinule each; an isolated sensillum between each palp and the opening of the sericteries; the latter a moderately long transverse slit. (*Material studied*: Several damaged larvae from the Congo; the specimens are labelled var. *fultor* Forel.)

MONOMORIUM (XEROMYRMEX) SALOMONIS (Linnaeus)

Athias-Henriot, 1947: internal anatomy, pp. 260 and 264; of subspecies *subopacum* pp. 260, 264, and 266 and Fig. 2 on p. 255.

Bernard, 1948: "D'ailleurs, un autre phénomène doit intervenir pour la protection des larves: leur vitesse de transport par les ouvrières en cas de vent de sable, inondation ou autre variation nuisible. J'ai souvent noté la rapidité extrême avec laquelle *Monomorium Salomonis* cachait ses larves une fois le nid ouvert. Il n'en est pas de même pour d'autres espèces, dont les larves ont peut-être alors davantage besoin d'organes bien adaptés?" (p. 107). Internal anatomy, p. 107.

Gantes, 1949: "Ressemble beaucoup à [*gracillimum*]. On note cependant quelques différences: les poils du corps qui sont du même type sont plus longs, 0 mm. 050. Ceux du tour de tête sont plus courts: 0 mm. 069. Les mandibules, de même forme, sont plus grandes, 0 mm. 11" (p. 83). Pl. V, fig. VIII, larva in side view; Pl. VI, fig. 8, mandible, maxillary palp and galea.

MONOMORIUM (XEROMYRMEX) SALOMONIS INDICUM Forel

Dutt, 1912, pp. 251-252: "One morning (3rd July 1909) I observed the inmates of a nest marching out with young ones. Close to the nest was sitting a Muscid fly (*Ochromyia* sp.) which attacked from time to time the larvae and pupae that were being carried by the workers. The fly never snatched the victim from the grasp of the ant, but simply 'licked' it from its place with the proboscis, which when withdrawn left the larva or pupa quite shrivelled up." (Quoted by Wheeler, 1928, p. 256 and in French 1926, p. 309.)

ALLOMERUS Mayr

Comparatively slender; prothorax forming a short thick neck perpendicular to the rest of the body, which is subcylindrical, nearly straight and slightly attenuated to the round-pointed posterior end. Body hairs few, short, uniformly distributed, with the tip denticulate; extremely varied; most are sharply curved near the middle; anchor-tipped hairs absent. Head hairs few, short; angulate or curved; with the distal half denticulate. Labrum small, trilobed; most of the posterior surface densely spinulose, the spinules minute and in numerous subtransverse rows. Mandibles small and short, with the distal fourth strongly bent medially to form a long stout round-pointed apical tooth; apparently without denticles, spinules or medial teeth. Maxillae prominent and appearing adnate to the labium; palp a low elevation; galea a small short knob. Labium prominent and adnate to gula; a small median patch of minute spinules on the anterior surface; palp a slightly raised cluster

of five sensilla. Dorsal portion of hypopharynx with a few longitudinal ridges, the ventral with a few rows of minute spinules.

Sexual larva.—Short, very stout, plump, bean-shaped, curved ventrally; ends large, subequal and broadly rounded; head ventral near the anterior end; no neck. Body mostly naked. Hairs of four types: Type I—extremely long; base stout, straight and heavily sclerotized; attenuating rather rapidly to a slender apical portion, which is slightly curved anteriorly; distal ⅔ denticulate; restricted to posterior ¾ of the ventral surface and arranged in four longitudinal rows. Type II—a few moderately long slender hairs, with the distal half denticulate; curved ventrally; restricted to a small area at the posterior end, dorsal to the anus. Type III—a single pair of moderately long simple slender strongly curved hairs, at the anterior end, one a short distance in front of each mesothoracic spiracle. Type IV—a few minute simple hairs, on the prothorax near the head.

ALLOMERUS DECEMARTICULATUS OCTOARTICULATUS Wheeler

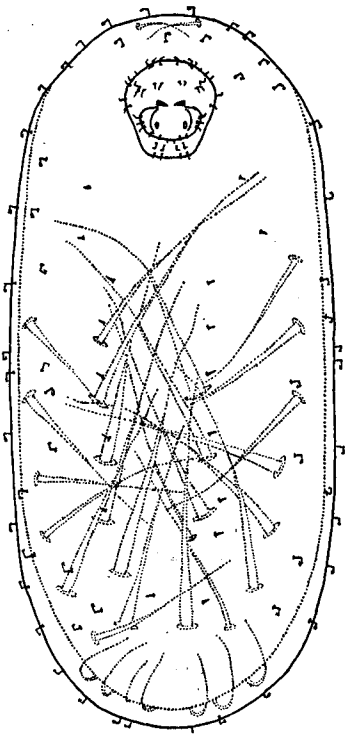
Pl. II, figs. 1-21 and text fig. 1

Mature worker larva.—Length about 1.67 mm. Comparatively slender. Prothorax forming a short thick neck perpendicular to the rest of the body, which is subcylindrical, nearly straight and slightly attenuated to the round-pointed posterior end. Anus terminal. Leg vestiges indistinct. Somites indistinct. Spiracles small, the mesothoracic largest, the others diminishing gradually toward the posterior end. Integument thin, with minute spinules in short transverse rows on the ventral surface of the thorax and the dorsal surface of the posterior abdominal somites. Body hairs few, short (0.009-0.072 mm), uniformly distributed and arranged (at least on the abdomen) in a row around the middle of each somite; tip denticulate; extremely variable; most hairs sharply curved near the middle; usually slenderest and straightest toward the posterior end of the body, longest on the dorsal surface. Head moderately large, subpyriform in anterior view. Antennae rather large with three (rarely two) sensilla, each of which bears a short spinule. Head hairs few and short (0.012-0.018 mm); angulate or curved, with apical half denticulate. Labrum small, width about 2x the length; trilobed, the middle lobe more prominent; anterior surface of each lateral lobe with 1-2 short hairs and 2-3 sensilla; ventral border of each lateral lobe with two isolated and two contiguous sensilla; posterior surface of each half with two isolated sensilla and a cluster of 3-4 sensilla; most of posterior surface densely spinulose, the spinules minute and in numerous subtransverse rows. Mandibles small and rather feebly sclerotized, short, with the distal fourth strongly bent medially to form a long stout round-pointed apical tooth; apparently without denticles, spinules or medial teeth. Maxillae prominent and appearing adnate to the labium; palp a low elevation with five sensilla, three bearing a spinule each; galea a small short knob bearing two sensilla, with a spinule each. Labium prominent and adnate to gula; a small median patch of minute spinules on the anterior surface; palp a slightly raised cluster of five sensilla, three bearing a spinule each; a minute sensillum between each palp and the opening of the sericteries; the latter a short curved transverse slit. Dorsal part of hypopharynx with a few longitudinal ridges, ventral part with a few minute spinules.

Young worker larva.—Length about 1.0 mm. Similar to mature worker larva but more slender.

Sexual larva.—Half-grown (?). Length about 2.35 mm. Short, very stout, plump, bean-shaped, curved ventrally; ends large, subequal and broadly rounded; dorsal profile C-shaped, ventral sinuate; diameter greatest at the middle, decreasing slightly toward each end. Head ventral near the anterior end; no neck. Anus terminal. Somites indistinct. Body mostly naked. Hairs of four types: Type I—extremely long (0.4-0.6 mm); base stout, straight and heavily sclerotized; attenuating rather rapidly to a slender apical portion, which is slightly curved anteriorly; distal ⅔ denticulate; restricted to posterior ¾ of the ventral surface and arranged in four longitudinal rows, 5-8 in each outer row and 4-6 in each inner row. Type II—a few (about 10) moderately long (0.17-0.25 mm) slender hairs, with the distal half denticulate; curved ventrally; restricted to a small area at the posterior end, dorsal to the anus. Type III—a single pair of simple slender strongly curved hairs, about 0.15 mm long, at the anterior end, one a short distance in front of each mesothoracic spiracle. Type IV—a few minute (about 0.009 mm long) simple hairs, on the prothorax near the head. Head and mouth parts like those of mature worker larva.

Young sexual (?) larva.—Length about 1.5 mm. Differs from the mature worker



Text fig. 1.—*Allomerus decemarticulatus octoarticulatus* Wheeler. Larva ready to molt to definitive sexual form; the hairs of the latter are easily seen through the transparent integument of the younger form. Ventral view. × 68.

larva of the same size only in being stouter and in having the abdomen enlarged at the middle, so that the dorsal profile is more convex.

Material studied: numerous larvae from British Guiana, labelled var. *demararae* Wheeler.

The mature worker larva and the older sexual larva are so very different that they might be regarded as belonging to different genera (at the very least). That such is not the case is shown by the fact that we have found young sexual larvae still encased in a worker-like integument (Text fig. 1). Furthermore, a worker pupa enclosed in a worker-larval integument shows that worker larvae do not attain the definitive sexual form before pupating.

In spite of the fact that all larvae of *Allomerus* are alike in the early instars, nevertheless, some slight differentiation does occur previous to the molt to the definitive form. The bodies of small (i.e., worker) semipupae are still about as slender and subcylindrical as are those of most of the young larvae. We have found, however, a few of the size of mature worker larvae, which differ from the latter only in being stouter, and these we have designated as "young sexual (?)" forms.

The descriptions and figures for this species are revised from those of G. C. Wheeler (1935).

MEGALOMYRMEX Forel

Stout; slightly constricted at the first abdominal somite; prothorax stout and turned ventrally at right angles. Body hairs sparse, more numerous and more conspicuous anteriorly and dorsally; ventral and lateral surfaces of abdomen practically naked. Of two types: 1) short, with heavy base tapering to a long fine tip, on the dorsal and lateral surfaces; 2) a few simple and exceedingly minute, on the ventral and lateral surfaces. Anchor-tipped hairs absent. Head hairs few, simple and minute. Mandibles small. Maxillary palp a low irregular elevation; galea a short stout frustrum.

MEGALOMYRMEX (CEPOBROTICUS) SYMMETOCHUS Wheeler

Pl. III, figs. 7-11

Stout; slightly constricted at the first abdominal somite; diameter increasing anteriorly to the mesothorax and posteriorly to the fourth and fifth abdominal somites, then decreasing gradually to VII and thence rapidly to X, which is quite small and directed posteroventrally; prothorax stout and turned ventrally at a right angle; rest of body slightly curved ventrally; anterior end formed from the dorsa of prothorax and mesothorax; posterior end rounded; lateral longitudinal welts present. Anus terminal. Leg vestiges present. Segmentation distinct. Spiracles small. Integument of ventral surface of thorax and first abdominal somite and of dorsal surface of several posterior somites sparsely beset with

minute spinules. Body hairs sparse, more numerous and more conspicuous anteriorly and dorsally; ventral and lateral surfaces of abdomen practically naked. Hairs of two types: 1) with heavy base tapering to a long fine tip, 0.036-0.14 mm long, on the dorsal and lateral surfaces; 2) a few simple and exceedingly minute (0.001-0.009 mm long), on the ventral and lateral surfaces. Cranium subhexagonal in anterior view, slightly broader than long. Antennae drumlin-shaped, each with three sensilla, each of which bears a spinule. Head hairs few, simple and minute (about 0.004 mm long). Labrum short (breadth 2 × length); bilobed; anterior surface of each lobe with four sensilla; ventral border of each lobe with three sensilla; posterior surface of each lobe with a cluster of 2-3 sensilla and five isolated sensilla; posterior surface sparsely spinulose, the spinules minute and isolated or in very short rows. Mandibles small and moderately sclerotized; subtriangular in both anterior and lateral views; apical tooth rather slender and curved medially; a medial blade arises from the anterior surface and bears two subapical teeth and a denticle on the medial border. Maxillae large and prominent; apex paraboloidal; palp a low irregular elevation with three sensilla (bearing a spinule each) and two encapsulated sensilla; galea a short stout frustrum bearing two apical sensilla. Labium with the anterior surface sparsely spinulose, the spinules exceedingly minute and in short transverse rows; palp a low irregular elevation bearing four sensilla; a minute sensillum between each palp and the opening of the sericteries; the latter a transverse slit on the anterior surface. (*Material studied*: Numerous larvae from the Panama Canal Zone.)

This species is a guest-ant of the fungus-growing ant, *Sericomyrmex amabilis* Wheeler. Wheeler (1925, p. 162) observed that "the guest ants kept their brood in small clusters scattered through the garden and each cluster was cared for by a few workers. Although the ants and their brood were thus intermingled, the workers of each species lavished their attention exclusively on their own eggs, larvae and pupae and were never seen even to transport the progeny of the other species from one part of the garden to another." (Quoted by G. C. Wheeler, 1948, p. 673).

"The larvae and pupae of the *Cepobroticus* can readily be distinguished from the *Sericomyrmex* brood. The larvae are more slender and more cylindrical and have smaller heads, with flat, 3-toothed mandibles. The hairs on the body are more numerous, shorter and stouter, though rapidly tapering at their tips. [Quoted by G. C. Wheeler, 1948, p. 673.] I was unable to determine whether the larvae are nourished by regurgitation or feed directly on the fungus hyphae. The fact that they usually lie in the crypts in small clusters and in less intimate contact with the fungus than the *Sericomyrmex* larvae would seem to indicate that they are fed by their nurses with regurgitated liquids" (Wheeler, 1925, p. 163).

G. C. Wheeler, 1948, fig. 1 on p. 672: D, head in anterior view; E, mandible; F, larva in side view. Compared with similar drawings of the host larva.

LIOMYRMEX Mayr

Thorax and first abdominal somite forming a rather long stout neck, which is curved ventrally; rest of abdomen swollen. Body hairs moderately numerous. Of three types: 1) very short, with the tip denticulate, uniformly distributed; 2) long, denticulate from the tip to about the middle, a few on the prothorax and mesothorax and a few on the ventral surface of the metathorax and the first two abdominal somites; 3) long, anchor-tipped, with slender sinuous shaft and feeble hooks, arranged in a band around the middle of most somites. Head small; cranium subquadrate, with the angles rounded. Head hairs short, with denticulate tip; a naked area just above the clypeus. Anterior surface of labrum spinulose; ventral outline broadly curved. Mandibles long, narrow and curved medially; medial portion thin and blade-like, with 8-11 long sharp denticles on or near the middle third of the medial border; with a rather stout blunt subapical tooth on the medial border. Maxillae large, lobose and spinulose; palp a frustrum; galea digitform. Labium bilobed. Hypopharynx spinulose.

LIOMYRMEX AURIANUS Emery
Pl. III, figs. 1-6

Shaped somewhat like a short-neck gourd; thorax and first abdominal somite forming a rather long stout neck which is slightly curved ventrally; rest of abdomen swollen; diameter greatest at the fifth abdominal somite; posterior end broadly rounded. Anus terminal. Segmentation indistinct. Leg vestiges present. Spiracles small, the mesothoracic the largest, diameter of others decreasing posteriorly. Integument of the posterior abdominal somites and of the ventral surface of the mesothorax and metathorax with a few short transverse rows of minute spinules. Body hairs moderately numerous. Of three types: 1) very short (0.018-0.07 mm), with the tip denticulate, uniformly distributed; 2) long (0.105-0.245 mm), denticulate from the tip to about the middle, a few on the prothorax and mesothorax and a few on the ventral surface of the metathorax and the first two abdominal somites; 3) anchor-tipped, with slender sinuous shaft and feeble hooks, long (0.15-0.32 mm), in a band around the middle of most somites, shorter and fewer posteriorly; the first two types lack alveolus and articular membrane. Head small, cranium subquadrate in anterior view, with the angles rounded. Antennae small, each with three sensilla, each of which bears a spinule. Head hairs rather numerous, short (0.018-0.045 mm), with denticulate tip; a naked area just above the clypeus. Labrum broad (2½× the length), ventral outline broadly rounded; anterior surface with 10 minute sensilla and rather numerous short subtransverse rows of minute spinules; ventral border spinulose, the spinules minute and in transverse rows; posterior surface with 5-6 sensilla; posterior surface spinulose, the spinules minute and mostly in rather long subtransverse rows. Mandibles rather heavily sclerotized, long, narrow and curved medially; medial portion thin and blade-like, with 8-11 long sharp denticles on or near the middle 1/3 of the medial border; with a rather stout blunt subapical tooth on the medial border. Maxillae large and lobose, with numerous minute spinules arranged in rows and a few coarser isolated spinules near the base of palp and galea; palp a frustrum with one subapical (bearing a spinule) and four apical (three papilliform and one with a spinule) sensilla; galea digitiform with two apical sensilla, each bearing a spinule. Labium bilobed; anterior surface with numerous short rows of minute spinules; palp a slight elevation with five sensilla; a minute sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx with rather numerous short rows of spinules. (*Material studied*: Seven larvae from the Philippine Islands, courtesy of Dr. J. W. Chapman.)

ANERGATES Forel

Stout; slightly constricted at the first and second abdominal somites; thorax very stout and curved ventrally at right angles; abdomen slightly curved ventrally; posterior end broadly rounded. Body hairs sparse, more numerous and more conspicuous anteriorly and dorsally. Of three types: 1) generally distributed, short, dendritic, with stout trunk and dense compact branching, the tips of the branches converging; 2) longer denticulate hairs, with the tip simple or branched, a few on the dorsal and lateral surfaces; 3) long anchor-tipped hairs, with tortuous shaft, on the dorsum of abdominal somites I-IV (or I-V). Cranium subhexagonal with the genae bulging slightly. Labrum small, feebly trilobed; only two sensilla on the posterior surface. Mandibles small; distal third narrowed, slightly turned medially, with the apex broadly rounded; without teeth, denticles or spinules. Palps and galeae are slight elevations. Labium long, prominent and feebly bilobed; a few coarse spinules on each lobe; a few short rows of minute spinules dorsal to the opening of the sericteries.

ANERGATES ATRATULUS (Schenck)
Pl. II, fig. 22-30

Stout; slightly constricted at the first and second abdominal somites; diameter increasing anteriorly to the metathorax and posteriorly to the fifth and sixth abdominal somites, then decreasing to either end; thorax very stout and curved ventrally at right angles; abdomen slightly curved ventrally; posterior end broadly rounded; anterior end formed from the dorsa of the prothorax and mesothorax. Anus posteroventral, with a prominent posterior lip. Leg, wing and gonopod vestiges present. Segmentation indistinct on the posterior half. Spiracles small, the first slightly larger than the rest. Body hairs sparse, more numerous and more conspicuous anteriorly and dorsally. Of three types: 1) generally distributed, short (0.036-0.11 mm), dendritic, with stout trunk and dense compact branch-

ing, the tips of the branches converging; 2) longer (0.135-0.22 mm) denticulate hairs, with the tip simple or branched, a few on the dorsal and lateral surfaces; 3) anchor-tipped hairs, about 0.4 mm long, with tortuous shaft, four in a row across the dorsum of each abdominal somite I-IV, and frequently two such hairs on abdominal somite V; occasionally there are also a few hairs that appear to be intergrades between types 2 and 3. Head moderately large; cranium subhexagonal in anterior view, with the genae bulging slightly. Antennae each with three (rarely two) sensilla, each of which bears a minute spinule. Head practically naked but furnished with a few minute (about 0.004 mm long) hairs. Labrum small, breadth 1⅔× length, feebly trilobed; anterior surface with 6-8 minute hairs and/or sensilla; ventral border of each lateral lobe with 2-3 sensilla; posterior surface with two sensilla and numerous transverse rows (of exceedingly minute spinules?). Mandibles small and feebly sclerotized; distal third narrowed, slightly turned medially, with the apex broadly rounded; without teeth, denticles or spinules. Maxillae with the apex paraboloidal; palp a slight elevation with five sensilla; galea a slight elevation with two sensilla. Labium long, prominent and feebly bilobed; a few coarse spinules on each lobe; a few short rows of minute spinules dorsal to the opening of the sericteries; palp a slight elevation bearing five sensilla; a minute sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. (*Material studied*: Numerous larvae from Switzerland.)

Four larvae of this species from Delaware resemble closely those described above but differ in the following details: Constriction of the body more pronounced. Hairs twice as numerous and much more conspicuous because the dendritic hairs are longer (the denticulate and anchor-tipped hairs, however, are shorter). Integument spinulose on the posterior portion of the abdomen, the spinules minute and in very short rows. Labrum twice as broad as long; its ventral border evenly convex.

These differences are of more than usual interest because of the differences between the adults of the European and American forms of *Anergates*. In 1934 Creighton[4] described as a new species (*A. friedlandi*) a single female taken in New Jersey. In 1950 he reduced the name to a synonym of *atratulus* but added, "there is a very strong probability that it will later prove to be a North American subspecies of that form."

Adlerz, 1886: "The larvae are distinguished by coarse, thick and crowded branched hairs with branches bent together at the ends, which are especially well developed on the ventral surface. On the back and sides are found scattered longer aculeate or short-branched hairs as well as anchor-tipped hairs ["ullhår"] with very long double barbs at the end" (p. 274). "*Anergates* larvae have very characteristic coarse hairs which are compactly branched, with the branches crowded together at the ends" (pp. 51-52). Some hairs are deeply forked (p. 268). (Translations from the Swedish by Professor Edith Larson.) Pl. VII, Fig. 5, long denticulate hair; Fig. 5a, short tree-like hair from the dorsal surface. Internal anatomy, p. 58.

Donisthorpe, 1915: "Yellowish white; when young, hairy; more narrow anteriorly than posteriorly; when older, less hairy and nearly as broad anteriorly as posteriorly, but somewhat attenuate in the middle; head naked; the first four somites of the abdomen furnished with long anchor-tipped hairs; the whole body clothed with both long serrate hairs, and short densely and compactly branching hairs" (p. 89). Pl. II includes a small photograph of a larva in side view. (Repeated 1927, p. 96 and Pl. II).

Escherich (1906, Fig. 32 = 1917, Fig. 38) repeated Adlerz's figures.

Hölldobler, 1928, p. 142: "Eine *Anergates-Tetramorium-cespitum*-Kolonie nahm den Keulen-Käfer [*Claviger testaceus*] auch gerne auf, aber hier zeigte er sich als verheerender Bruträuber, der alle Tage eine Larve oder Puppe auffrass."

Wheeler (1909, pp. 181-183) stated that the larvae were of a peculiar gray color, that those in a colony were all of the same size and uniformly developed and that they adhered to the lower surface of the stone that covered the nest by means of their hooked dorsal hairs. "I give a figure (Fig. 2*A*) of a larva . . . and also of a mature worker larva of *Tetramorium* (Fig. 2*B*) for comparison. It will be seen that though both larvae possess pairs of long anchor-tipped dorsal hairs, the head of the *Anergates* larva is naked, and its short dorsal and ventral hairs (*b*) are much more densely and compactly branching, while the longer hairs (*a*) are serrate are not branched at their tips like the homologous structures (*d*) of the *Tetramorium* larva. The anchor-tipped hairs (*c*) with sigmoid basal

[4] Bull. Mus. Comp. Zool. Harvard Coll. 104:241-242. 1950.

flexure are used in both species for fastening the larvae to the lower surfaces of stones, the roots of plants and the walls of the galleries and chambers of the nest."

ANERGATIDES Wasmann

Elongate-subellipsoidal, with the head on the anterior end. Body hairs moderately numerous and uniformly distributed. Of two types; 1) short, dendritic (with open branching); 2) long, anchor-tipped, with tortuous shaft. Head subtriangular in anterior view. Antennae protuberant and drumlin-shaped, with two sensilla each. Head hairs few, short, with bifid tip. Only two sensilla on posterior surface of labrum. Mandibles small, plump, slightly curved medially; apex paraboloidal and surmounted by a single denticle; on the medial surface are a few transverse rows of minute spinules. Palp a small frustum; galea a short curved protuberance. Anterior surface of labium sparsely spinulose.

ANERGATIDES KOHLI Wasmann

Pl. II, figs. 31-32)

Elongate-subellipsoidal, with the head on the anterior end. Leg and wing vestiges present. Spiracles small. Body hairs moderately numerous and uniformly distributed. Of two types: 1) about 0.1 mm long, dendritic (with open branching), the base stout and slightly curved, the branches acuminate; 2) about 0.25 long, anchor-tipped, with tortuous shaft. Head subtriangular in anterior view; cranium subpentagonal, breadth nearly twice the length, narrowed ventrally, with the occipital corners rounded. Antennae protuberant, drumlin-shaped; each with two sensilla, each of which bears a spinule. Head hairs few, short (about 0.02 mm), with bifid tip. Labrum subtrapezoidal, narrowed ventrally; breadth twice the length; anterior surface with four minute hairs; ventral border with two sensilla; ventral and lateral surfaces with a few spinules; posterior surface with two sensilla and with minute spinules arranged in numerous, long subtransverse rows. Inside the labrum is a heavily sclerotized triangular structure, with the base of the triangle along the ventral border of the labrum. Mandibles small and heavily sclerotized, plump, slightly curved medially, apex paraboloidal and surmounted by a single small denticle; on the medial surface are a few transverse rows of minute spinules. Maxillae small; palp represented by a small frustum bearing three sensilla and two contiguous sensilla; galea a short curved protuberance bearing two apical sensilla. Labium with the anterior surface bearing a few subtransverse rows of minute spinules; palp represented by a low elevation bearing three sensilla; on the anterior surface near each palp is a conspicuous hair; opening of the sericteries a rather long transverse slit. (*Material studied*: Two badly damaged larvae from the Belgian Congo. As far as we can learn *Anergatides* has been collected only once, hence these larvae are probably from the type nest. They were probably sent by Wasmann to W. M. Wheeler, who handed them over to G. C. Wheeler for study.)

This is one of the most extraordinary ant larvae we have studied; they are no more remarkable, however, than the adults, which are workerless social parasites of *Pheidole megacephala melancholica* Santschi.

BRUCHOMYRMA Santschi

BRUCHOMYRMA ACUTIDENS Santschi

Bruch, 1931: "Muy semejante a la larva de las mismas *Pheidole* (st. *Strobeli*) en cuanto a forma y pilosidad; pero se distingue de ésta de inmediato, por la visibilidad de los vasos de Malpighi, que se destacan muy nítidamente en el fondo obscuro del tubo digestivo. Su cuerpo es apenas más encorvado; la cabeza apenas más pequeña; la pilosidad bífida es algo más abundante y apenas más gruesa que en las *Pheidole*. Completamente crecidas, las larvas tienen 2,3 a 2,7 milímetros de largo; el tegumento es liso, de brillo aceitoso, la pilosidad amarillenta, pálida está formada por cilias cortas con ganchitos terminales bífidos, apenas encorvadas; también llevan, como las larvas de *Pheidole*, los cuatro pares de pelos dorsales largos, semienroscados en la base (*spring hairs*) y también bífidos en el ápice. Como de costumbre, luego de alcanzado el crecimiento máximo, evacua el tubo digestivo y adquiere entonces un color uniforme amarillento, de aspecto ceroso y de consistencia más dura" (pp. 46-47). Fig. 5 on p. 51, larva in side view. Pl. I, fig 2; Pl. IV; Pl. VI, fig. 2: photographs of larvae.

TRANOPELTA Mayr

Stout; head ventral, near the anterior end. Body hairs rather numerous, uniformly distributed, short and deeply bifid; anchor-tipped hairs absent. Antennae with two sensilla each. Head hairs few, short and deeply bifid. Labrum small and short. Mandibles small, apex curved medially and acuminate; with one small medial tooth, or none. Maxillary palp a low knob; galea a frustum.

TRANOPELTA GILVA Mayr

Pl. III, figs. 12 and 13

Length about 2.3 mm. Stout; head ventral, near the anterior end. Leg and wing vestiges present. Spiracles small. Body hairs rather numerous, uniformly distributed, short (about 0.054 mm); deeply bifid, the branches ⅔ of the total length and strongly divergent; without alveolus or articular membrane. Antennae each with two sensilla, each of which bears a spinule. Head hairs few, short (0.018-0.045 mm), shaped like body hairs but with alveolus and articular membrane. Labrum small and short (breadth 4× the length), subtrapezoidal, narrowed ventrally; anterior surface with eight sensilla; ventral border with two sensilla and a few spinules; posterior surface spinulose, the spinules minute and in numerous subtransverse rows. Mandibles small, moderately sclerotized, subtriangular in anterior view; apex curved medially and acuminate; with one small medial tooth, or none. Maxillary palp a low knob with five sensilla; galea a frustum with two sensilla. Labial palp a low knob; opening of sericteries a short transverse slit. (*Material studied*: Six damaged integuments from British Guiana.)

Young larva.—Length about 1.1 mm. Head and prothorax curved ventrally, abdomen with the ventral profile nearly straight and the dorsal profile strongly curved; diameter greatest at the fourth and fifth abdominal somites. Hairs similar to those of mature larva. (*Material studied*: a dozen larvae from the Panama Canal Zone.)

CAREBARELLA Emery

CAREBARELLA BICOLOR var. PUNCTATO-RUGOSA Emery

Eidmann, 1936: "Die riesigen, fast kugeligen Larven der Geschlechtstiere . . . Während die Arbeiterlarven auch in den ältesten Stadien mit einem dichten Pelz tiefgegabelter Haare bedeckt sind, zeigen jene nur eine sehr spärliche Behaarung. Ihre Haut ist glatt gespannt, so dass die Segmentierung verwischt ist, und der weisse, segmental angeordnete Fettkörper schimmert durch die Körperoberfläche hindurch. Sie sind so gross, dass man sich kaum vorstellen kann, dass die kleinen Arbeiter diese riesigen Gebilde fortbewegen können, was wahrscheinlich auch nicht oder nur in beschränktem Masse stattfinden dürfte. In starkem Missverhältnis zu dieser Grösse steht der winzig kleine Kopf, der nicht grösser ist als bei einer Arbeiterlarve" (p. 44). Fig. 2c on p. 43, a mature sexual larva in side view.

SOLENOPSIS Westwood

Stout; prothorax bent ventrally at right angles to form a very short stout neck; rest of body straight; both ends broadly rounded. Body hairs numerous, short, uniformly distributed. Five types of body hairs occur: 1) simple and slightly curved; 2) simple, with the tip sharply recurved; 3) with denticulate tip; 4) with short-bifid tip; 5) deeply bifid, the branches usually perpendicular to the base, the tips recurved. A species usually has two of these types, but some have three. Anchor-tipped hairs absent. Head large and subpyriform. Head hairs few and rather long. Four types occur: 1) simple; 2) with denticulate tip; 3) with short-bifid tip; 4) bifid. Every species has the bifid type and also one or two of the other types. Mandibles of two parts, a stoutly sickle-shaped body and a medial blade, the medial edge of the latter forming several teeth. Maxillary palp peg-like; galea a short frustum. Labium with a patch of spinules dorsal to each palp. *Queen larva* generally similar to worker but more voluminous, with the head and hairs relatively smaller; no neck, the head being applied to the ventral surface near the anterior end. The *immature sexual larva* differs from the mature worker larva of the same length in having the large head on the end of a short stout neck formed from the prothorax, which is inclined ventrally; remainder of body sac-like.

Clausen, 1940, p. 221: The eucharid wasps of the genus *Orasema* appear to be most frequently associated with *Pheidole* and *Solenopsis*. (Eucharid larvae are parasitic on ant larvae.)

Gantes, 1949: Sexual larvae are quite different from worker larvae (p. 88). "La croissance est uniformément faible, à peine plus marquée au stade V" (p. 85).

Stärcke (1948, p. 28) describes the soldier larva as follows: "Body still more swollen, of a short oval or nearly globose shape, with a small head projecting on the ventral side."

SOLENOPSIS (SOLENOPSIS) GEMINATA (Fabricius)

Pl. III, figs. 14-24

Worker larva.—Length about 2.6 mm. Stout; prothorax bent ventrally at right angles to form a very short stout neck; rest of body straight; diameter greatest at the fourth abdominal somite, both ends broadly rounded; dorsal profile curved, ventral profile nearly straight. Anus ventral. Leg and wing vestiges present. Segmentation indistinct. Spiracles small, the first larger than the others. Integument of the ventral surface of the thorax and the first three abdominal somites with a few short transverse rows of minute spinules. Body hairs numerous, short, uniformly distributed. Of two types: 1) simple, slightly curved, 0.054-0.108 mm, with alveolus and articular membrane, 6-12 in a transverse row on the ventral surface of each thoracic somite and on each of the three anterior abdominal somites; 2) elsewhere the hairs are bifid, about 0.07 mm long, the base about half the length, the branches more or less perpendicular to the base, the tips recurved; hairs on the ventral surface with alveolus and articular membrane. Head large, subpyriform in anterior view; cranium slightly broader than long. Antennae each with three sensilla, each of which bears a spinule. Head hairs few; those above the antennal level are moderately long (about 0.054 mm) and bifid; those below are long (0.09-0.126) mm) and simple. Labrum small, short (breadth 2× the length), slightly narrowed dorsally, ventral border feebly concave, ventral corners rounded; anterior surface of each half with five minute sensilla; ventral border with a few coarse isolated spinules; each half of posterior surface with 2-3 isolated and two contiguous sensilla and with a few coarse isolated spinules near each ventrolateral corner. Mandibles heavily sclerotized; of two parts, a stoutly sickle-shaped body and a straight medial blade, the medial edge of the latter forming 2-5 teeth which decrease in size dorsally. Maxillae with the apex conoidal; palp a peg with five sensilla, one of which bears a spinule; galea a short frustum with two apical sensilla. Labium with a patch of spinules dorsal to each palp, the spinules rather coarse and isolated or in short rows of 2-3; palp a slight elevation with five sensilla, one of which bears a spinule; opening of sericteries a rather long transverse slit.

Soldier larva.—Length about 5.2 mm. Stouter; anterior end more broadly rounded; head relatively smaller, on the ventral surface near the anterior end, i.e., no neck. Integument of the ventral surface of the mesothorax, metathorax and first two abdominal somites with a few spinules. Body hairs longer; all with alveolus and articular membrane. Otherwise similar to worker larva.

Very young larva.—Length 0.63-0.69 mm; probably first instar. Anterior end recurved; head relatively quite large, its diameter almost as great as that of the body which is nearly uniform. Integument of the dorsal surface of posterior somites sparsely spinulose, the spinules minute and in very short subtransverse rows. Body hairs sparse, stout, short (0.006-0.018 mm), longest on the prothorax and ventral surface. Of three types: 1) simple; 2) with the tip curled; 3) with the tip bifid. Head hairs few, short (0.009-0.018 mm) and stout, similar to body hairs. Labrum short (breadth 3× the length); subtrapezoidal, narrowed ventrally; anterior surface with six sensilla; posterior surface with two contiguous sensilla on each half and a few minute spinules near the ventral border. Mandibles feebly sclerotized, short and stout, breadth equal to length; terminating in a small cone; blade represented by a rounded medial projection. Maxillae with the apex paraboloidal; palp a slight elevation with five minute sensilla; galea represented by two sensilla. Labium with the anterior surface sparsely spinulose, the spinules minute and in short subtransverse rows; each palp represented by a cluster of five sensilla, one of which bears a spinule; opening of sericteries a short transverse slit.

Material studied: Numerous larvae from Texas.

Eidmann, 1944, p. 451: "Die Larven fallen durch ihr dick aufgetriebenes Abdomen auf und besitzen einen dichten Pelz ankerförmiger Haare, der sie leicht zusammenballen lässt."

Wheeler (1900, Fig. 10) labelled a drawing as *Solenopsis geminata;* but the same

figure reproduced in 1910 (Fig. 43 on p. 77) was labelled *Pheidole instabilis*. We have this note in Dr. Wheeler's handwriting referring to the 1900 figure: "erroneously described and figured as *Solenopsis geminata!*" Escherich (1906, Fig. 30 and 1917, Fig. 36D) copied Wheeler's figure of the mature larva and labelled it *Solenopsis geminata*.

SOLENOPSIS (SOLENOPSIS) GAYI (Spinola)

Goetsch, 1937, p. 807: Giant forms are produced where the larvae are fed on chewed seeds ("Ameisenbrot"), as in the north of Chile, while in the south where this species uses crop feeding polymorphism practically disappears.

SOLENOPSIS (SOLENOPSIS) SAEVISSIMA (F. Smith)

Wheeler (1928, p. 253 = 1926, p. 305): "Borgmeier has found that the larvae of a Brazilian species [of *Microdon*] actually devours the larvae of its host." But upon examining the reference we find that Borgmeier reported the *Microdon* larvae as feeding on a coccid, not upon ant larvae.

SOLENOPSIS (SOLENOPSIS) XYLONI McCook

Worker larva.—Length about 2.9 mm. Very similar to *geminata* except in the following details: Some of the body hairs of type 1 may have the tip recurved or denticulate; there are intergrades between types 1 and 2. Head moderately large. Bifid head hairs are few, short and restricted to the occipital border; the others have the tip simple or finely denticulate. Near the base of the anterior surface of the labium is a low welt furnished with coarse isolated spinules.

Queen larva.—Length about 5.6 mm. Body voluminous, somewhat stouter posteriorly. Head relatively smaller; on the ventral surface near the anterior end. Otherwise similar to the worker larva.

Material studied: Numerous larvae from Texas.

SOLENOPSIS (DIPLORHOPTRUM) BASALIS Forel

Eidmann, 1936, p. 45: "Die Larven sind dicht behaart mit tief gegabelten Acrochaeten, deren Enden hakenförmig gekrümmt sind, und die überragt werden von sehr zahlreichen Oncochaeten, die in eine einfache gekrümmte, oft geradezu eingerollte Spitze auslaufen."

SOLENOPSIS (DIPLORHOPTRUM) FUGAX (Latreille)

The body hairs are slightly longer, and the hairs on the ventral surface of the thorax may have either simple or denticulate tip. Anterior surface of the labium apparently without spinules. Otherwise the larvae of this species seem to be similar to *molesta*. (*Material studied*: 16 damaged larvae from Japan and Switzerland.)

Donisthorpe, 1915: "Pyriform, though somewhat narrowed at the extreme base, covered with short curved hairs. The smaller larvae (☿) are yellow, smooth and shining, the larger ones (♂ ♀?) are white, duller and more rugose" (p. 103). Pl. I includes small photographs of larvae in side view. (Repeated 1927, p. 111 and Pl. I.)

Forel, 1874: "Très courtes, épaisses aux deux bouts, raides et indistinctement annelées. . . . Extrêmement raides, presque incapables de remuer même leur tête" (p. 388). In the 1920 edition (p. 265) the first sentence reads: "Très courtes, épaisses aux deux bouts, entièrement raides"; the second sentence (p. 266) is unchanged. "Certaines larves, sorties de l'oeuf en automne, ne deviennent nymphes qu'au mois de juillet de l'année suivante" (p. 389; =1920, p. 266; cited by Adlerz, 1886, p. 53).

Gösswald (1929, p. 204) recorded *Mermis*-like larvae in the larvae of this ant. In 1930 he reported finding larvae of this ant parasitized by *Mermis* (Nematoda). (Cited by Vandel, 1930, p. 470.) In 1934-35 he cited (p. 125) it as a mermithid host.

Hölldobler (1927) has reported two larvae of this ant as parasitized by something.

Hölldobler, 1928, pp. 136-137: "In den anderen Nestern begann die Eiablage Ende Mai. Nach etwa 16 Tagen zeigten sich die ersten Larven. Diese pflegten zu überwintern, stiessen dann Ende Mai des nächsten Jahres den Kotsack aus, verpuppten sich Anfang Juni, und Mitte Juli hatte ich die ersten jungen Ameisen. Larven die noch in Spätherbst (November) den Kotsack ausstiessen, sich also zur Verpuppung rüsteten, wurden regel-

mässig von den Ameisen gefressen. Die Bruthäufchen sind sehr sauber geschichtet. Zu unterst liegen die grossen Larven, dann die Puppen und die vor der Verpuppung stehenden Larven, zu oberst liegt die Jungbrut. Auch die Fähigkeit, feste Nahrung aufzunehmen, beobachtete ich an Diebsameisenlarven. Als ich meine Nester schlecht fütterte, hatten zahlreiche Larven kleine weisse Stückchen vor der Mundöffnung, die ich als Reste eigenen Brut erkannte. Diebsameisen griffen in schlechten Zeiten häufig den eigenen Larvenbestand an."

SOLENOPSIS (DIPLORHOPTRUM) MOLESTA (Say)

Pl. III, figs. 25-27

Worker larva.—Length about 1.5 mm. Generally similar to *geminata* except in the following details: Mesothoracic spiracle the largest; metathoracic and first abdominal nearly as large; the others only half as large. Integument of ventral surface of thorax furnished with rather coarse spinules arranged in moderately long transverse rows; there are also a few scattered spinules on the dorsal surface of the posterior somites. Body hairs relatively shorter; type 1—0.018-0.045 mm long; type 2—0.018-0.036 mm long; type 1 hairs all have denticulate tip; intergrades between the two types occur where their ranges meet; some of the intergrades have alveolus and articular membrane, which all other body hairs lack. Head moderately large. The longer head hairs may have the tips either simple or denticulate. No spinules on the posterior surface of the labrum. The teeth on the blade of the mandible highly variable. Anterior surface of the labium sparsely spinulose, the spinules isolated or in very short rows.

Very young larva.—Length about 0.54 mm. Head relatively very large. Head and prothorax inclined ventrally. Abdomen somewhat slenderer than in the mature larva. Integument of dorsal surface spinulose, the spinules minute and in short transverse rows. Body hairs simple, minute (0.006-0.012 mm long), restricted to about ten longitudinal rows, apparently without alveolus and articular membrane. Head hairs simple and minute (0.006-0.009 mm long).

Young larva.—Length about 0.83 mm. Head relatively larger and abdomen slenderer than in the mature larva. Body curved ventrally. Integument of the dorsal surface of the posterior somites spinulose, the spinules minute and isolated or in very short transverse rows. Body hairs moderately numerous, uniformly distributed, minute (0.006-0.018 mm long), mostly with long shaft and short bifid tip, without alveolus and articular membrane. Head hairs short (0.012-0.018 mm), with the tip bifid.

Queen larva.—Length about 3.5 mm. Voluminous; head relatively very small, on the ventral surface near the anterior end; dorsal profile C-shaped. Anus ventral. Body hairs very scarce and relatively very short, with alveolus and articular membrane; body practically naked except for the prothorax, mesothorax and the dorsal surface of the remaining somites. Of two types: 1) simple, 0.018-0.054 mm long, on the prothorax and mesothorax; 2) about 0.036 long, bifid, with short base and long flexible branches, limited to the dorsal surface. Otherwise similar to the worker larva.

Immature sexual larva.—Length 1.4-1.7 mm. Head large, on the end of a short stout neck formed from the prothorax, which is inclined ventrally; remainder of body sac-like; dorsal profile C-shaped; ventral profile nearly straight. Anus ventral. Integument of ventral surface of prothorax and mesothorax with a few coarse spinules in very short transverse rows; a few isolated spinules on the metathorax; the dorsal surface of the posterior somites sparsely spinulose, the spinules minute and mostly isolated. Body hairs numerous, short, uniformly distributed, all with alveolus and articular membrane. Of three types: 1) about eight relatively long (0.036-0.063 mm), stout hairs with the tip simple or denticulate, on the ventral and lateral surfaces of the prothorax; 2) on the ventral surface of mesothorax, metathorax and first abdominal somite are a few shorter (0.027-0.045 mm), bifid hairs, with base and branches about equal in length; 3) elsewhere the hairs are about 0.018 mm long and deeply bifid. Otherwise similar to the worker larva.

Material studied: Numerous larvae from Arkansas, Connecticut, North Dakota, Oklahoma and Texas.

Hayes, 1920: "The larvae of this species resemble superficially the larvae of any of the other Myrmicine ants except, perhaps, in size. They are white in color and covered with double-hooked hairs which enable them to cohere in packets and so be carried by the workers. The posterior end is large and tapers toward the anterior end, which is considerably curved. This curvature becomes less pronounced as the larva grows older, but

is never entirely obliterated. When first hatched the young larvae are scarcely larger than the eggs from whence they came. The length of the larval stage is highly variable, depending on weather conditions to a marked degree. During midsummer, larvae were reared to the semipupal stage in 21 days. In another instance, a single larva was under observation from October 10 to May 12 when it transformed to the semipupal stage. Larvae are fed regurgitated food by the workers. Workers, in artificial nests, were often seen to place small bits of crushed kafir seeds and torn parts of their larvae and pupae on the bodies of the young near the mouthparts where the larvae were seen to bite them. Larvae were frequently observed, while lying on their back, to straighten out their curved body. These movements are repeated at short intervals and the mandibles open at each up-movement and close on the down-movement. These moving larvae were generally fed at once, or soon after making these apparent supplications. As the larva becomes full grown, a large undigested meconium is voided from the alimentary tract. Workers were seen at times aiding the larva to get rid of this mass by tugging at it while it was being cast off. This change marks the end of larval development and the beginning of the semipupal stage. Large larvae have often been encountered in nests of this species, which were, undoubtedly, either larvae of males or queens. . . . Except for their much greater size, they resemble the worker larvae, and upon reaching their final stages of growth undergo similar changes to the semipupal stage. In this stage, they are not greatly unlike the larvae except for the absence of the black mass in the abdomen. The semipupal stage was found in midsummer to vary from 2 to 11 days" (pp. 31-32). Fig. 7, a worker larva in side view.

McColloch & Hayes, 1916, pp. 28-29: Quoted almost verbatim by Hayes, 1920 (see above). Pl. 2, fig. 2, photograph of five worker larvae at different stages of growth.

SOLENOPSIS (DIPLORHOPTRUM) MOLESTA VALIDIUSCULA Emery

Scarcely distinguishable from *molesta*. The body hairs of this form are slightly longer and the posterior surface of the labrum bears a few spinules on or near each ventrolateral corner. *Material studied*: a dozen larvae from Colorado.

Wheeler (1907, p. 12) recorded the eucharid wasp *Orasema coloradensis* Ashmead from the nest of this ant. Presumably the wasp larva had been parasitic on an ant larva.

SOLENOPSIS (DIPLORHOPTRUM) PICEA Emery

Pl. III, figs. 28-31

Length about 1.4 mm. Body hairs of three types: 1) on the dorsal surface of the thorax are a few hairs 0.045-0.063 mm, with sharply recurved tip; 2) on the ventral surface of the thorax, 0.027-0.036 mm, with long base and denticulate or short-bifid tip; 3) elsewhere bifid, 0.027-0.054 mm, with short base and long flexible branches. The larger head hairs may have either denticulate or short-bifid tips. Each antennal sensillum bears a relatively long flexible hair. Each maxillary and labial palp with four sensilla, two of which bear a spinule each. Otherwise similar to *molesta*.

Very young larva.—Length about 0.64 mm. Slender; diameter nearly uniform throughout; head on the anterior end, which is curved ventrally. Body hairs numerous and uniformly distributed, simple, with the tip recurved, 0.009-0.027 mm; on the prothorax a few hairs are about 0.018 mm long and have a short-bifid tip. Head hairs 0.009-0.027 mm long, with the tip recurved; a very few have the tip bifid.

Young larva.—Length about 0.8 mm. Body shape similar to that of the younger larva; otherwise similar to the mature larva.

Material studied: Numerous larvae from Costa Rica.

SOLENOPSIS (DIPLORHOPTRUM) SCHMALZI Forel

Eidmann, 1936, p. 46: "Die Larven waren von einem dichten Pelz grosser, gegabelter Haare bedeckt."

SOLENOPSIS (DIPLORHOPTRUM) TENUIS Mayr

Length about 1.6 mm. Body hairs of three types: 1) a few 0.036-0.054 mm long, simple with flexible shaft and recurved tip, on the dorsum of the thorax; 2) on the venter of the thorax are a few hairs 0.036-0.045 mm long, simple, with flexible shaft; 3) elsewhere bifid, 0.018-0.036 mm long. Head hairs of two types: 1) mostly bifid, 0.027-0.036 mm long, with short trunk and flexible branches; 2) a few on the ventral part of the

cranium are simple and about 0.027 mm long. Each maxillary and labial palp with four sensilla, one of which bears a rather long spinule. Labium apparently without spinules. Otherwise similar to *molesta*.

Young larva.—Length about 0.71 mm. Head and thorax bent ventrally, rest of body curved ventrally. Anus ventral. Mouth parts directed posteriorly. Body hairs numerous, short (0.006-0.018 mm), stout, with the tip recurved.

Next instar.—Length about 0.75 mm. Body hairs of three types: 1) most of the hairs on the dorsal surface of the prothorax and mesothorax simple, with flexible shaft and recurved tip, 0.054-0.063 mm long, shorter and sparser on the rest of the dorsal surface. 2) on the ventral surface of the thorax and first abdominal somite are a few hairs 0.018-0.045 mm long, with curved shaft and simple or denticulate tip; 3) elsewhere bifid and 0.036-0.045 mm long. Otherwise similar to mature larva.

Material studied: 14 specimens from Costa Rica.

G. C. & E. W. Wheeler (1937) have recorded the larvae of the eucharid *Orasema sixaolae* G. C. & E. W. Wheeler as parasitic in the larvae of this ant. (Referred to by Clausen, 1940, p. 227).

SOLENOPSIS (DIPLORHOPTRUM) TEXANA Emery

Length about 1.6 mm. Scarcely distinguishable from *molesta*. The body hairs of *texana* are somewhat longer, the ventral head hairs have denticulate tips only and the labium is apparently without spinules.

Very young larva.—Length about 0.78 mm. Rather slender, diameter practically uniform throughout. Head and prothorax bent ventrally; rest of body curved ventrally. Anus terminal. Body hairs numerous, short (0.009-0.027 mm), with long shaft and simple recurved or short-bifid tip; without alveolus and articular membrane.

Material studied: 17 larvae from Oklahoma.

SOLENOPSIS (subgenus?) ROBUSTA Bernard

Gantes, 1949: "Le corps a le même aspect que la larve d' ♀ de *Pheidole*. Elle est légèrement plus petite, 1 mm. 75. Les segments sont bien visibles; la première paire de stigmates légèrement plus grande. Tout le corps est couvert de petits poils de 0 mm. 05, qui se divisent en deux branches à la moitié de leur hauteur. Ils sont très souples et leurs extrémités se recourbent en crosse. La tête est bien différenciée, en forme de coeur plutôt que de poire. Elle est couverte de vingt poils simples ou fourchus. Le labre a la forme d'un demi-cercle. Ventralement, en avant et latéralement, nous avons un groupe de quatre sensilles, trois accolées et une à côté. Les mandibules de même forme que les précédentes mesurent 0 mm. 069. Les palpes maxillaires ont des sensilles dont les soies sont longues et aiguës et ont l'air ainsi de petits chapeaux pointus. Le palpe maxillaire est garni de cinq sensilles dont deux plus grosses sans soies. Le palpe labial a cinq sensilles toutes à soies. La larve de sexué n'en diffère que par sa taille" (p. 81). Pl. IV, Fig. IV: Larva in side view, mandible, hairs, maxillary palp and galea. Growth data are to be found on p. 86.

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EXPLANATION OF PLATES

PLATE I.

Vollenhovia sp. Figs. 1-6—1, head in anterior view, ×95; 2, left mandible in anterior view, ×235; 3 and 4, two types of body hairs, ×235; 5, young larva in side view, ×20; 6, larva in side view, ×20.

Vollenhovia oblonga pedestris (F. Smith). Fig. 7.—Right maxillary palp in anterior view, ×432.

Monomorium (*Monomorium*) *pharaonis* (Linnaeus). Figs. 8-15.—8, head in anterior view, ×95; 9, right maxillary palp in anterior view, ×680; 10, left mandible in anterior view, ×185; 11, mature larva in side view, ×32; 12, young larva in side view, ×32; 13, very young larva in side view, ×32; 14 and 15, two types of body hairs, ×370.

Monomorium (*Notomyrmex*) *antarcticum* (F. Smith). Figs. 16-21.—16, head in anterior view, ×86; 17-19, three types of body hairs of young larva, ×185; 20, outline of young larva in side view, ×18; 21, outline of larva in side view, ×18.

Monomorium (*Xeromyrmex*) *afrum fultor* Forel. Figs. 22-25.—22, head in anterior view, ×76; 23, left mandible in anterior view, ×185; 24 and 25, two types of body hairs, ×242.

PLATE II.

Allomerus decemarticulatus octoarticulatus Wheeler. Figs. 1-21.—1, head in anterior view, ×121; 2, left mandible in anterior view, ×433; 3-14, twelve body hairs, ×185; 15, larva in side view, ×45; 16, immature sexual larva in side view, ×33; 17, Type I body hair of sexual larva, ×185; 18, Type III body hair of sexual larva, ×185; 19, Type IV body hair of sexual larva, ×185; 20, Type II body hair of sexual larva, ×185; 21, outline of bodies of mature worker and sexual larvae, ×8.

Anergates atratulus (Schenck) from Switzerland. Figs. 22-30.—22, head in anterior view, ×95; 23, left mandible in anterior view, ×185; 24, left mandible in medial view, ×185; 25, anchor-tipped hair, ×56; 26 and 27, denticulate hairs, ×56; 28, dendritic hair, ×56; 29, dendritic hair further enlarged, ×443; 30, larva in side view, ×20.

Anergatides kohli Wasmann. Figs. 31-32.—31, head in anterior view, ×95; 32, left mandible in anterior view, ×467.

PLATE III.

Liomyrmex aurianus Emery. Figs. 1-6.—1, head in anterior view, ×86; 2, left mandible in anterior view, ×185; 3-5, three types of body hairs, ×95; 6, larva in side view, ×20.

Megalomyrmex (*Cepobroticus*) *symmetochus* Wheeler. Figs. 7-11.—7, head in anterior view, ×86; 8 and 9, two types of body hairs, ×185; 10, left mandible in anterior view, ×235; 11, larva in side view, ×15.

Tranopelta gilva Mayr. Figs. 12 and 13.—12, right mandible in anterior view, ×470; 13, body hair, ×235.

Solenopsis (*Solenopsis*) *geminata* (Fabricius). Figs. 14-24.—14, head in anterior view, ×76; 15, left mandible in anterior view, ×185; 16, left mandible in medial view, ×185; 17 and 18, two types of body hairs, ×235; 19, mature larva in side view, ×20; 20, first (?) instar larva (hairs too small to show), ×20; 21, left mandible of first (?) instar larva in anterior view, ×185; 22-24, three types of body hairs of first (?) instar larva, ×470.

Solenopsis (*Diplorhoptrum*) *molesta* (Say). Figs. 25-27.—25, profile of mature sexual larva, ×10; 26, profile of immature sexual larva, ×10; 27, profile of mature worker larva, ×10.

Solenopsis (*Diplorhoptrum*) *picea* Emery. Figs. 28-30.—28, left antenna in anterior view, ×428; 29-31, three types of body hairs, ×235.

PLATE I.

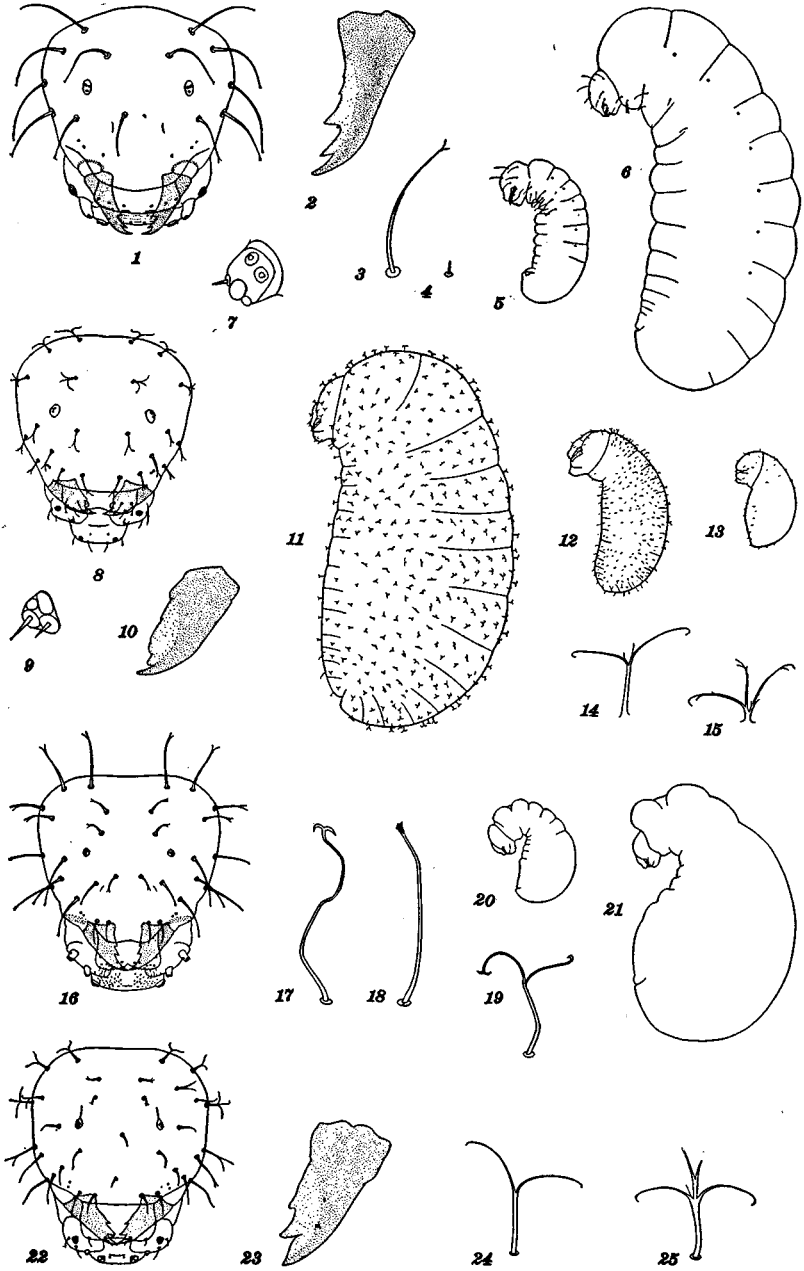

PLATE II.

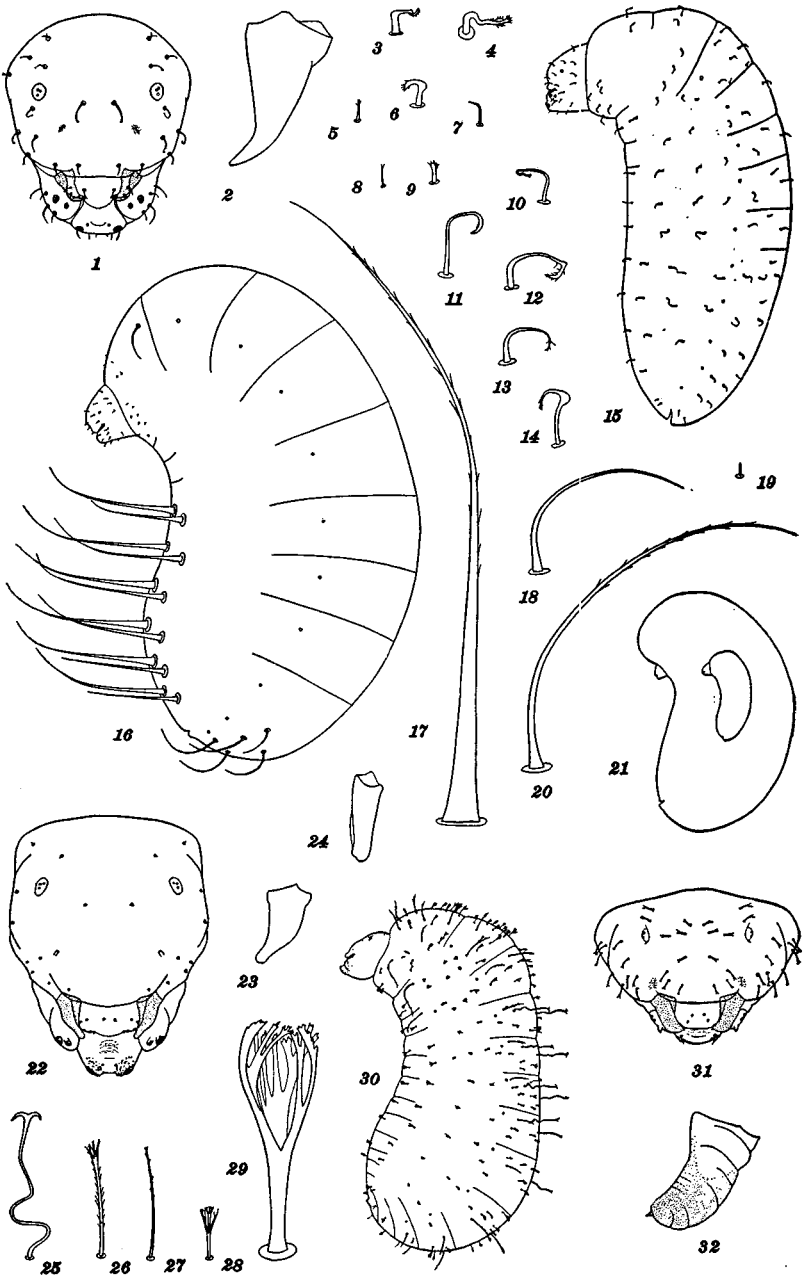
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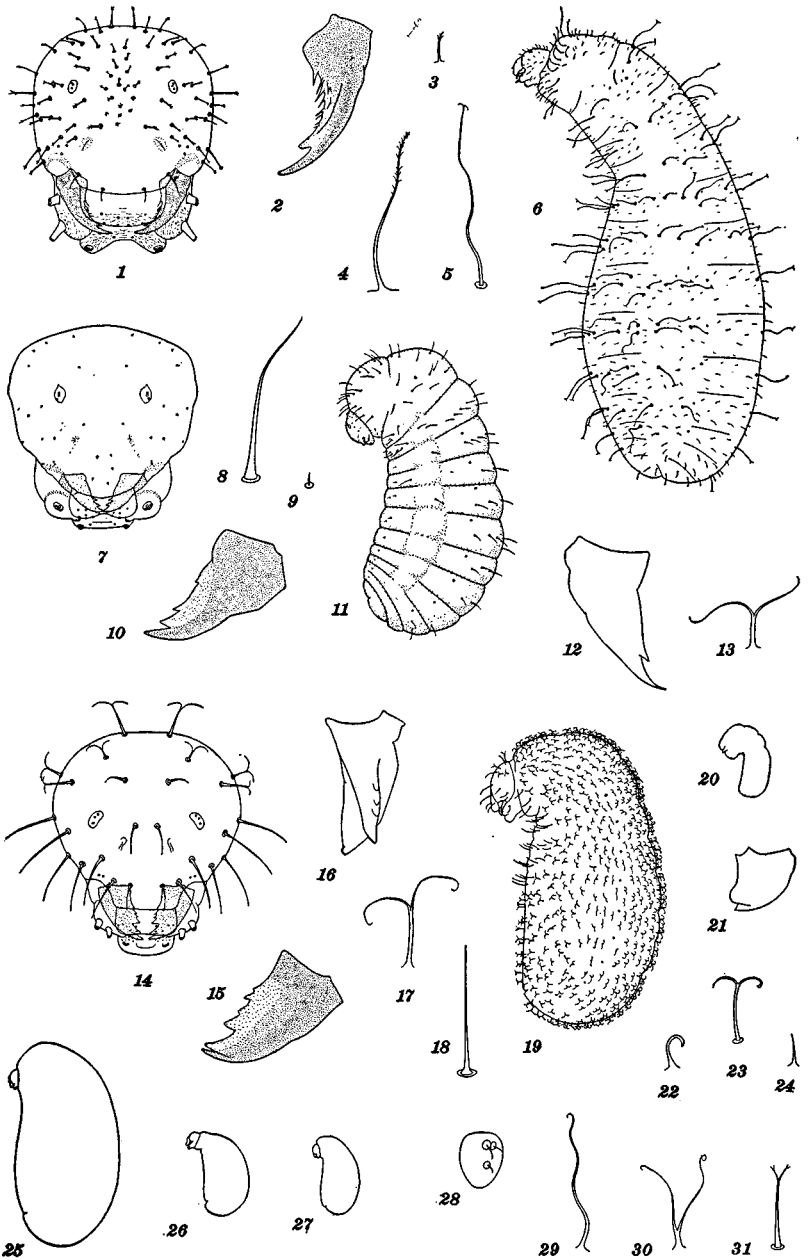
PLATE III.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