

The larva has been described, as *lugubris*, by Wheeler and Wheeler (1968). The description was based on material from the type nest originally misidentified by me.

*Myrmecocystus (Eremnocystus) hammettensis* Cole

Figures 221–229, 263–266

*Myrmecocystus yuma*, Cole 1934. Psyche 41:225. ♀ (misidentification).

*Myrmecocystus hammettensis* Cole 1938. Amer. Midl. Nat. 19:678–681. ♀♀♂♂; Creighton 1950. Bull. Mus. Comp. Zool. 104:443.

**Diagnosis. Worker:** Scape, malar area and propodeum with abundant erect hairs; petiolar scale erect but not compressed; erect pronotal hairs abundant, acuminate; hind femur with abundant erect hairs on inner face. **Female:** Mesoscutum polished, with scattered coarse, piligerous punctures; occiput shiny, with scattered fine punctures; mid and hind femora with abundant erect hairs on all faces; forewing with abundant fine, erect, very short hairs on membrane. **Male:** Forewing with fringe hairs along costal margin to vein A; hindwing with fringe on posterior margin; membrane with inconspicuous erect hairs or none; scape, hind femur and tibia with erect hairs; petiolar crest with broad, shallow median emargination.

**WORKER. Measurements.** HL 0.66–1.10 (1.08); HW 0.60–1.10 (1.07); SL 0.73–1.16 (1.13); WL 0.80–1.43 (1.33); PW 0.40–0.70 (0.70).

**Head:** Varying from distinctly longer than wide in smallest workers to as long as wide in largest, CI 85–100 (99); in full face view, sides nearly straight and slightly convergent toward mandibular base in smallest, gently convex in largest; occiput flat, broadly rounded at sides; shorter than scape, SI 103–117 (105). Eye small, only slightly longer than first flagellomere; OMD 1.43–1.88 (1.73) × EL. Mandible septententate, sometimes with intercalary denticle between basal and penultimate basal teeth.

**Thorax:** Moderately robust, PW 0.44–0.53 (0.53) × WL. Mesonotum, in profile, gently and evenly convex from front to back. Basal face of propodeum distinct, juncture with posterior face subangulate to narrowly rounded.

**Petiole:** Scale, in profile, erect, about twice higher than thick, somewhat compressed above; crest narrowed above in frontal view, without median emargination or with shallow, broad one; from above about twice wider than thick.

**Vestiture:** Pubescence sparse on head, a little denser on occiput than elsewhere; long and dense, but not concealing surface, on thorax; dense on first two terga, sparse on third and following segments, except in some large workers which may possess a dilute sheen on third.

Erect hairs numerous on all head surfaces, with 10+ on malar area; scape and all surfaces of femora and tibiae with abundant erect hairs; promesonotum with abundant erect hairs, metanotum with few or none; propodeum with abundant erect hairs on summit of declivity and usually a few along sides of declivity. Petiolar scale with erect hairs along sides and on crest. Terga with numerous discal hairs, becoming progressively longer on succeeding segments.

**Integument:** Clypeus shiny, with scattered coarse and fine piligerous punctures; remainder of head less shiny, very lightly and irregularly shagreened, with scattered piligerous punctures; frontal lobes without conspicuous dense, fine punctures. Thorax slightly shiny, with obvious, dense shagreening. Gaster slightly shiny, with fine, often obscure shagreening.

**Color:** Light brownish to blackish brown, appendages lighter; mandibles, sides of clypeus and adjacent portion of malar area yellowish, mandibular teeth dark.

**FEMALE. Measurements.** HL 1.30; HW 1.43; SL 1.26; EL 0.36; OMD 0.53; WL 2.90; PW 1.56.

**Head:** Broader than long, CI 110; in full face view sides very slightly convex and slightly narrowed toward mandibular bases; occiput flat in frontal view, broadly rounded at sides; slightly longer than scape, SI 98. EL 1.57 × length of first flagellomere; OMD 1.45 × EL. Lateral ocelli slightly smaller than anterior ocellus; IOD and OOD 3.0 × OD. Mandible septententate. Penultimate maxillary palpal segment nearly parallel sided, but margins slightly convergent in apical fourth; fourth segment evenly broadened from base, broadest preapically, narrowed toward apex, greatest width about twice basal width.

**Thorax:** Robust, PW 0.68 × WL. Posterior half of mesoscutum flattened and continuous with scutellum, forming an even plane, abruptly rounded toward metanotum along posterior margin. Basal portion of propodeum sloping and broadly rounded onto declivitous face.

**Petiole:** In profile, somewhat compressed above, crest narrowly rounded; in frontal view, sides a little convergent above; median emargination angulate, deep, broad; from above about 3 times wider than long.

**Vestiture:** Pubescence sparse, decumbent on head and most of thorax, dense, long, appressed on propodeum, first three terga with pubescence sparse, but sufficiently dense to impart a feeble sheen, virtually absent from following segments.

Scape, femora and tibiae with abundant erect hairs on all surfaces. Malar area with numerous erect and suberect hairs in frontal view; short, erect hairs present on all remaining head surfaces, occipital hairs longest, at least a few as much as 0.5 × MOD. Scutum with scattered erect hairs, longest less than 0.5 × MOD; scutellum with scattered erect hairs, some more than twice longer than longest scutal hairs; pleura with scattered erect hairs; propodeum with erect hairs on base

and at sides of declivity; petiolar scale with erect hairs on crest and sides. All terga with sparse fully erect hairs, longer and coarser caudad.

Membrane of forewing with numerous very short erect hairs; fringe hairs present to apex of apical cell on forewing, present on posterior margin of hind wing.

*Integument:* Clypeus polished and shiny basally, apical half slightly shiny and closely shagreened, with coarse setigerous punctures; frontal lobes and frons polished, shiny, frontal lobes with fine, close punctures in middle and scattered coarse punctures at sides; frons with scattered setigerous punctures; occiput moderately shiny, shagreened, with variably spaced, coarse setigerous punctures; malar area moderately shiny and lightly shagreened above, duller and closely shagreened below, with scattered elongate, coarse, setigerous punctures above, these becoming obscured by shagreening below.

Mesoscutum polished, with scattered coarse setigerous punctures and a few dense fine punctures posteromedially; parapsis shiny, with sparse setigerous punctures. Scutellum polished and shiny, with scattered coarse setigerous punctures over disc and a narrow transverse band of dense punctures anteriorly. Pleura moderately shiny, but with irregular polished and shiny areas and with scattered coarse setigerous punctures. Propodeum densely shagreened and slightly shiny, with scattered obscure punctures. First tergum shiny, with sparse, fine piligerous punctures; second tergum shiny over much of disc but with irregular areas of light shagreening laterad and basad, with sparse piligerous punctures, especially sparse in middle; third tergum shiny, with sparse fine piligerous punctures, sparser than on first tergum.

*Color:* Medium brown, sides of scutum and pleura darker; appendages light brown; mandibles and clypeus yellowish; wings whitish hyaline, veins and stigma light brown.

*MALE. Measurements.* HL 0.70; HW 0.66; EL 0.26; SL 0.70; OMD 0.16; WL 1.33; PW 0.86.

*Head:* Mandible with preapical cleft and two teeth on cutting margin. Margins of head, in frontal view, distinctly convergent toward mandibular bases; head a little longer than broad, CI 95; as long as scape, SI 100; occiput distinctly convex, with poorly indicated lateral angles. Eye large, OMD  $0.63 \times$  EL; lateral ocelli slightly larger than anterior, IOD  $3.0 \times$  OD; OOD  $2.0 \times$  OD.

*Thorax:* Stout, PW  $0.65 \times$  WL. Mesoscutum broad, anterior face convex in profile, posterior half of dorsal surface flattened; scutellum, in profile, strongly convex, its anterior margin rising above posterior margin of scutum, not abruptly declivitous behind. Basal portion of propodeum broadly rounded onto oblique posterior face.

*Petiole:* In profile, cuneate, crest thin; crest, seen from front, with broad shallow median emargination; in dorsal view, about twice wider than long.

*Vestiture:* Pubescence sparse on head, noticeably denser on occiput, on malar area and behind eye; abundant on pronotum and anterior declivity of mesoscutum; long and dense on propodeum; long and moderately dense on first two terga, sparse on remainder.

Scape with numerous fine erect hairs; femora and tibiae with numerous coarser erect hairs on all surfaces; all head surfaces with fine erect hairs; thorax with sparse, short erect hairs, a few present on propodeum; petiolar scale with short, fine erect hairs; first tergum with a few short, fine erect hairs; second tergum with erect hairs similar but a little more abundant; third and following segments with hairs long, but sparse. Forewing with a few short erect hairs in costal cell; forewing with fringe along costal margin to apex of apical cell; hindwing with fringe along posterior and apical margins.

*Color:* Head brownish, thorax darker, gaster concolorous with head; appendages light brown. Wings whitish hyaline, veins and stigma yellowish brown.

*Terminalia:* Figures 264–266.

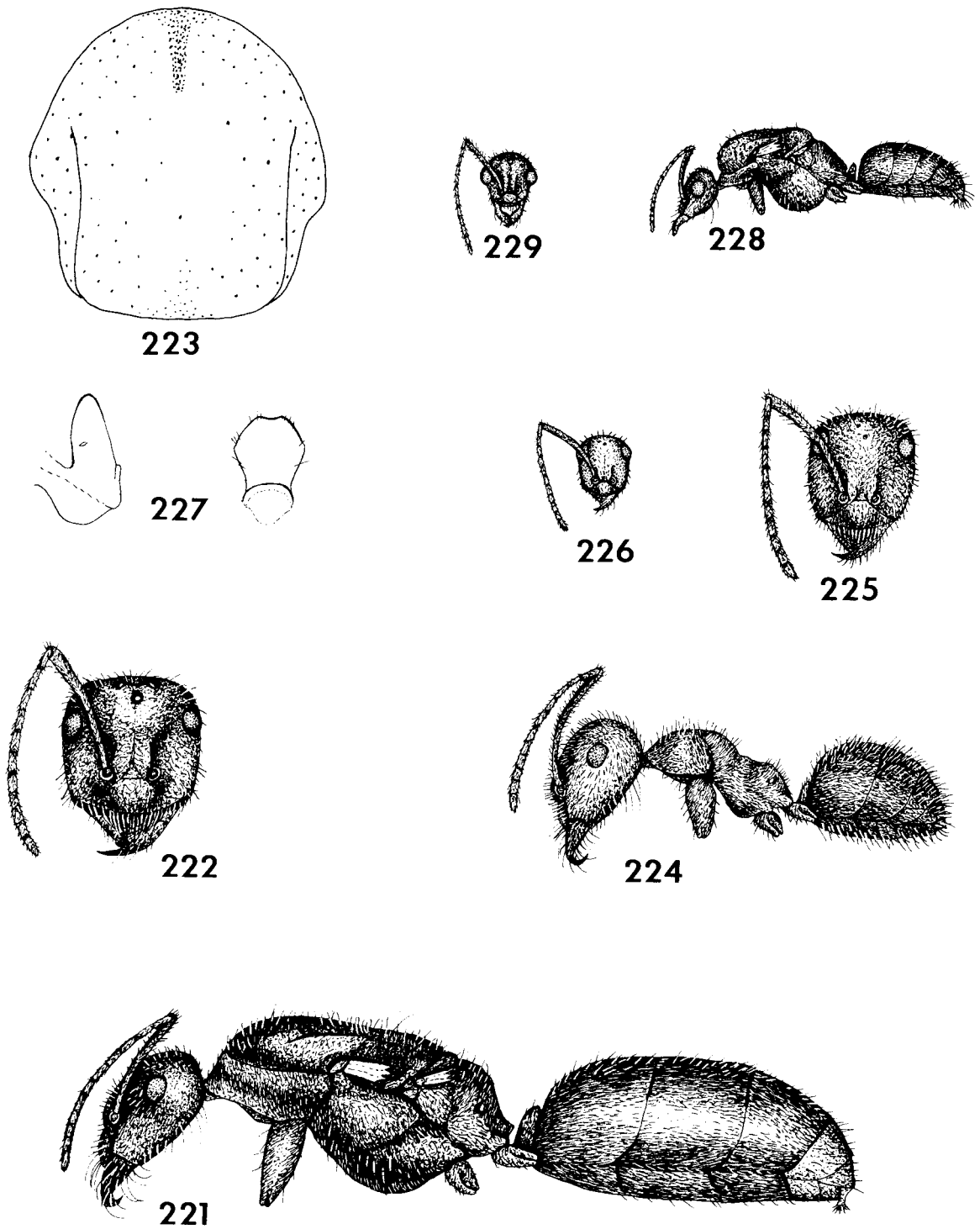
*Type Material.* Idaho: Elmore Co.: Hammett, 30 May 1932 (A. C. Cole, Jr.), holotype worker and paratypes of all castes. Holotype and most paratypes in LACM, paratypes in AMNH, MCZ, and USNM.

*Distribution.* Southwestern Idaho to central Nevada and east central California (Fig. 368).

*Localities.* UNITED STATES. Idaho: Owyhee Co.: 3.3 mi S Given's Hot Springs, 20 June 1967 (R. R. Snelling, No. 67-170; LACM). Elmore Co.: Hammett, 30 May 1932 (A. C. Cole; AMNH, LACM, MCZ, USNM.; types of *hammettensis*); 12 mi W Mountain Home, 19 June 1953 (W. F. Barr; USNM). Nevada: White Pine Co.: 2 mi N McGill, 6000', 15 July 1970 (G. C. and J. Wheeler, No. Nev. 1338; GCW). California: Mono Co.: 16 mi N Bishop, 4600', 2 May 1971 (R. J. Hamton, et al.; LACM, RJH).

*Ecology.* The type series was collected on a plain of mixed *Artemisia* and *Bromus*, in an area of deep sand. The nests were noted to be populous and possessed crateriform tumuli 8–15 cm in diameter. The presence of repletes was noted, as was that of males and females on 30 May 1932 (Table 6).

The colony found near Given's Hot Springs was in an area of Saltbush-Greasewood Semidesert, the soil very compact and clayey. The tumulus was crateriform and consisted of fine soil particles. At 1000 hrs the ambient temperature was approximately 85°F; *hammettensis* workers were located outside of the nest. These were foraging on nearby vegetation; some were seen taking nectar. A few workers were also seen removing debris from the nest. This may be a species in which diurnal activity is usual. The presence of



FIGURES 221–229. *M. hammettensis*. 221, female, lateral view; 222, head of female, frontal view; 223, mesoscutum of female, distribution of punctures; 224, major worker, lateral view; 225, head of major worker, frontal view; 226, head of minor worker, frontal view; 227, petiole of major worker, lateral (left) and posterior (right) views; 228, male, lateral view; 229, head of male, frontal view.

abundant erect body hairs and dense pubescence suggests this may be so. These hairs presumably function to radiate excess heat and stabilize body temperatures.

*Discussion.* The worker of this species is readily recognized by the abundance of erect hairs on the dorsal body surfaces and all appendages. The only other abundantly hairy species is *colei*, in which there are seldom more than two or three erect hairs on the malar area and the scape has only scattered erect hairs.

The female differs from those of all species of *Eremnocyclus*, as far as known, in the polished, very sparsely punctate areas of the first and second terga. The polished and sparsely punctate pleura appear also to be unique.

The lack of fringe hairs on the apical margin of the forewing will separate the male of *hammettensis* from that of *creightoni*, as will the presence of a number of erect hairs on the scape. The male of *colei* also lacks erect hairs on the scape and the scutum and scutellum are uniformly closely punctate, rather than with extensive impunctate areas.

*Myrmecocystus (Eremnocyclus) lugubris* Wheeler

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*Myrmecocystus lugubris* Wheeler 1909. Jour. N. Y. Entomol. Soc. 17:98. ♀; Wheeler 1912. Psyche 19:176; Creighton 1950. Bull. Mus. Comp. Zool. 104:443; Creighton 1956. Amer. Mus. Novit. 1807:1–4 (*in part*); Cole 1966. B. Young Univ. Sci. Bull. 7:21; La Rivers 1968. Occ. Papers, Biol. Soc. Nev. 17:9.

*Diagnosis. Worker:* Scape and propodeal dorsum without erect hairs; malar area without erect hairs or with fewer than 5 on each side; pronotum and mesonotum with at least 8 conspicuous fully erect hairs; hind femur without erect hairs on upper surface. *Female:* unknown. *Male:* unknown.

**WORKER. Measurements.** HL 0.72–0.97 (0.78); HW 0.62–0.97 (0.68); SL 0.75–1.02 (0.85); WL 0.82–1.42 (1.15); PW 0.42–0.65 (0.46).

*Head:* Distinctly longer than broad in smallest workers to as broad as long in largest, CI 86–100 (87); usually shorter than scape, rarely slightly longer, SI 97–113 (109); in frontal view, sides of head straight, little narrowed toward mandibular insertions, slightly convex in largest workers; occiput, in frontal view, flat, broadly rounded at sides. Eye small, slightly longer than first flagellomere; OMD 1.22–1.75 (1.46) × EL. Mandible septedentate.

*Thorax:* Moderately stout, PW 0.40–0.51 (0.40) × WL. Mesonotum, in profile, nearly straight in smallest workers to moderately convex in largest, but not abruptly declivitous behind. Basal face of propodeum flat, narrowly rounded into posterior face, latter about twice as long as basal face.

*Petiole:* Scale, in profile, about twice higher than thick, crest narrowly rounded; from front, sides con-

vergent above, emargination shallow, angulate; from above, about twice wider than thick.

*Vestiture:* Cephalic pubescence short, scattered, a little denser on occiput; thoracic pubescence abundant but not concealing surface even on pleura and propodeum; first three terga with abundant pubescence, producing sheen; third and following segments with scattered pubescence.

Cephalic hairs restricted to clypeus, frontal lobes and occiput; rarely, one or two erect hairs on malar area near mandibular insertions; longest occipital hairs less than 0.5 × MOD. Pronotum and mesoscutum with eight or more erect hairs each; metanotum and summit of propodeal declivity without erect hairs. Crest and sides of petiolar scale usually without erect hairs, rarely one or two very fine erect hairs. First and second terga with scattered short, erect, discal hairs, third and following with longer erect hairs.

Scape without erect hairs or, rarely, fewer than eight very fine short reclinate hairs; fore femur without erect hairs on inner face; all femora without erect hairs on upper surface; tibiae usually without erect hairs on outer face, rarely with up to eight fine reclinate hairs.

*Integument:* Clypeus polished and shiny, with scattered setigerous punctures; frontal lobes moderately shiny, finely shagreened and with sparse fine setigerous punctures; frons and occiput shinier, with scattered fine, setigerous punctures; malar area moderately shiny, with scattered elongate, setigerous punctures, denser near eyes and mandibular insertions. Thorax slightly shiny, densely shagreened; propodeum a little duller. Terga slightly shiny, finely and densely shagreened and with abundant fine, obscure piligerous punctures.

*Color:* Light brownish to blackish brown, appendages paler; mandibles and sides of clypeus often yellowish.

**FEMALE:** *Unknown.*

**MALE:** *Unknown.*

*Type Material.* Described from an unspecified number of worker specimens from Otis, San Bernardino Co., CALIF., collected 16 Sept. 1908 by J. C. Bradley. Cotype material in AMNH and MCZ. Lectotype, by present designation, agreeing with above basic description, parenthetical data and label data in AMNH, lectoparatypes in AMNH, MCZ.

*Distribution.* Mojave Desert of California and Nevada (Fig. 368).

*Localities. UNITED STATES. Nevada:* Nye Co.: AEC Nevada Test Site, Mercury, 19 Apr. 1971 (LACM). *California:* Inyo Co.: Mesquite Spg., 1600', Death Valley Natl. Mon., 30 Apr. 1952 (W. S. Creighton; AMNH, LACM, USNM); Ashford Mill, 0', Death Valley Natl. Mon., 23 Apr. 1952 (W. S. Creighton; AMNH, LACM); same locality, 2 Nov. 1970 (J. P. Donahue; LACM); same locality, 5 Nov. 1967 (R. R. Snelling, No. 67–282, LACM); Beatty Jct., –200', Death Valley Natl. Mon., 25 Jan. 1968 (G. C. and J. Wheeler, No. Calif. 294; GCW); Shorty's Well, –100',