

mately arrive there, but there are no foraging "trails" as such.

This is a species of the Sonoran and Transition Zones, with most records from areas in the Sonoran. Within the Sonoran Zones, it appears to be about equally abundant in Lower and Upper Sonoran habitats. In Colorado, Gregg (1963) recorded this species (as *mexicanus hortideorum*) from Piñon-Juniper Woodland, Piñon-Cedar-Oak Woodland, Sagebrush Desert, Sagebrush-Greasewood Desert and Saltbush Desert. The elevational amplitude in Colorado was noted to be a little over two thousand feet, but Gregg correctly noted that over the entire range of the species it would be much greater. In southern California, the lowest elevation is below sea level (-225 feet) at Salton Sea Beach and the highest is 5185 feet above sea level at Salton View in Joshua Tree National Monument, less than 45 miles to the north. The greatest elevation record is 8000 feet, 6 mi NE Santa Fe, New Mexico.

McCook (1882), Wheeler (1908) and Gregg (1963) have noted that the tumulus marking the entrance of the nest is crateriform and is constructed of coarse gravel and pebbles (Fig. 350). Occasionally, nests may be situated in fine, deep sand, in which case the tumulus consists of much finer particles, though even then the coarsest particles available are used. Nests of this species seem always to have but a single entrance which may be as much as 2.3 cm diameter at the surface.

Flight activities of the sexual forms are not well documented and most of the available reproductives have been removed from nests. The mating flights occur during summer or fall rainy seasons, apparently in late afternoon or early evening following an afternoon rain. Seasonal activity is given in Table 7.

*Discussion.* The traditional interpretation of *mexicanus*, and that which is continued here, is probably not correct. I believe Wesmael's specimens most likely belonged to the species here called *melanoticus*. Since the lack of authentic *mexicanus* renders this assumption beyond proof, it seems least disruptive to continue established usage.

The northern populations, extending from Colorado to the Pacific Coast have usually been recognized as a more uniformly yellowish subspecies. I have here synonymized that "subspecies" because I do not believe its continued recognition is defensible. One reason for so doing is based on the broadly clinal nature of the color pattern; because of the existence of such a pattern, it is not possible to define the color forms in such a way as would permit their recognition. An attempt to continue recognition of these color forms results in about one-half the material being impossible of assignment.

More important, however, is the fact that the populations of the "subspecies" *hortideorum* are not equiv-

alent to one another. Workers from Colorado and Utah are, as a rule, more densely hairy than some from California and Lower California. Workers from many western populations have about 16 erect and suberect hairs per 0.50 mm of scape length, a condition about the same as in specimens from Colorado. Specimens in other samples have about half that number. In some areas, such as Pearblossom, Los Angeles Co., Calif., the inhabitants of adjacent nests may differ widely in this regard.

Males from California and Lower California usually possess fringe hairs along the apical margin of the forewing. Those from Colorado do not, a trait which they share with those of "typical" *mexicanus* from southern New Mexico and Arizona and central Mexico. Fringe hairs are wholly lacking from both fore and hind wings in males collected at Cajon Canyon, California. In this regard these males are more like the eastern males of this species. The petiole, however, is not as in the males from Colorado.

Normally the petiole in Colorado males, in profile, is cuneate and sharply crested. Those from California are inconsistent and while it may be as sharply cuneate as in the Colorado males, the petiole is often broadly rounded in profile, but males from any single locality seem to be extremely variable in this character. The few males available from central Mexico consistently possess a broadly rounded petiolar node.

*Myrmecocystus (Myrmecocystus) navajo* Wheeler

Figures 282-289, 322, 323, 334, 335

*Myrmecocystus mexicanus* subsp. *navajo* Wheeler 1908. Bull. Amer. Mus. Nat. Hist. 24:360, ♀♀; Wheeler 1913. Psyche, 19:173, 179; Cole 1942. Amer. Midl. Nat. 28:386; Fautin 1946. Ecol. Monogr. 16:299, 307. *Myrmecocystus navajo*, Creighton 1950. Bull. Mus. Comp. Zool. 104:449; Gregg 1963. The Ants of Colorado, 651-653; Wheeler and Wheeler 1973. Ants of Deep Canyon, 125, Fig. 48.

*Diagnosis. Worker.* Dorsum of propodeum evenly convex, with abundant erect hairs; appressed pubescence sparse on head, thorax and gaster; hind tibia with few or no erect hairs on outer face. *Female.* Penultimate maxillary palpal segment broadest in middle, femora without erect hairs on dorsal face; scape with abundant erect hairs. *Male.* HW less than 0.8 mm; apical margin of forewing without fringe hairs; scape with scattered erect hairs.

*WORKER. Measurements.* HL 0.83-1.68 (1.20); HW 0.62-1.57 (1.00); SL 1.00-1.80 (1.45); WL 1.2-2.5 (1.9); PW 0.43-1.05 (0.70).

*Head:* Distinctly longer than broad in smallest workers, as long as broad in largest, CI 70-100 (81), distinctly shorter than scape, SI 105-138 (121); in frontal view, broadest a little below eyes, sides barely convex, slightly narrowed toward mandibular bases. Occiput, in frontal view, flattened, or slightly convex in small workers, without lateral angles. Eye large, 1.09-

TABLE 7  
Activity of Reproductives of *M. mexicanus* Wesmael

Locality	Date	Activity
COLO., Garden of the Gods	2 June 1945	♂♂, ♀♀ (in nest? Gregg, 1963)
COLO., Red Rock Cyn.	16 July 1903	♂♂ in nest
COLO., Red Rock Cyn.	23 July 1903	♀♀ in nest
COLO., Colorado City	25 July 1903	♂♂ in nest
COLO., Manitou	26 July 1906	♂♂, ♀♀ in nest
COLO., Manitou	28 July 1903	♂♂, ♀♀ in nest
COLO., Manitou	18 Aug. 1903	♂♂, ♀♀ in nest
N.MEX., 13 mi NE Silver City	10 July 1964	♀ at light
N.MEX., 14 mi N Silver City	14 July 1964	♀ at light
N.MEX., Granite Pass	July 1961	♀♀ (at light?)
N.MEX., Jornada Exp. Range	July 1973	♂♂, ♀♀ (flight after rain)
N.MEX., 6 mi NE Santa Fe	2 Aug. 1964	♀ at light
N.MEX., Granite Pass	5 Aug. 1967	♀♀ at light
ARIZ., 4 mi N Prescott	19 July 1970	♀♀ at light
ARIZ., Prescott	25 July 1948	♀ at light
ARIZ., S.W.R.S.	25 July 1957	♀ at light
ARIZ., 2.5 mi NE Portal	4 Aug. 1959	♂♂, ♀♀ at light
ARIZ., Portal	18 Aug. 1966	♀ at light
UTAH, Boulder	11 July 1958	♀♀ in nest
CALIF., Joshua Tree Natl. Mon.	9 Aug. 1959	♂♂ at light
CALIF., 15 mi N Independence	24 Aug. 1961	♂♂, ♀♀ at light
CALIF., Cajon Cyn.	5 Sept. 1965	♂♂, ♀♀ in nest
CALIF., 2 mi N Pearblossom	20 Sept. 1967	♂♂ in nest
CALIF., 2 mi N Pearblossom	29 Sept. 1967	♀♀ at light after rain
COAH., Csta. La Muralla	9 July 1973	♀♀ at light after rain
CHIH., Santa Clara Cyn.	27 June 1947	♀ (at light?)
CHIH., Cañon Prieto	2 July 1947	♀ (at light?)
CHIH., 15 mi E Parral	15 July 1947	♀ (at light?)

1.57 × first flagellomere; upper margin coincident with occipital margin; OMD 0.92–1.58 (1.25) × EL. Mandible novemdentate.

*Thorax*: Slender, PW 0.33–0.43 (0.36) × WL; propodeum higher than long, basal face in profile, evenly convex and shorter than posterior face.

*Petiole*: Thick in profile, summit rounded, without sharp crest; from behind, summit evenly rounded, without median notch; from above, less than twice wider than long.

*Vestiture*: Erect hairs present on all cephalic surfaces; longest occipital hairs less than 0.5 × MOD. Thoracic dorsum with numerous erect hairs, longest pronotal hairs about equal to those of occiput, mesonotal hairs shorter; 10 or more erect hairs on propodeum; petiolar scale with six or more short erect hairs; first two terga with numerous erect discal hairs, these as long as those of mesonotum. Scape usually with numerous erect to subdecumbent hairs; tibiae with not more than three erect hairs beyond basal third; femora without erect hairs on dorsal face.

Pubescence very sparse or absent from all surfaces in some small workers, a little more abundant on pleura and propodeum.

*Integument*: Head polished, or nearly so; punctures fine, very widely scattered, even near mandibular bases. Thoracic dorsum strongly shiny, with scattered obscure

fine punctures; pleura and propodeum lightly shagreened, hence a little duller. Terga strongly shiny, very lightly shagreened and with scattered fine punctures.

*Color*: Light brownish yellow, front of head and thoracic dorsum a little darker, legs paler; mandibular margins ferruginous to brownish.

*FEMALE. Measurements*. HL 1.90–2.02; HW 1.87–1.95; SL 1.73–1.80; EL 0.60–0.63; OMD 0.66–0.73; WL 3.9; PW 2.1–2.2

*Head*: Longer than broad, CI 96–98; a little longer than scape, SI 90–91. In frontal view, head broadest at level of lower eye margin, sides straight, slightly convergent below. Occiput, in frontal view, flat, broadly rounded at sides. Eye large, about 1.4 × length of first flagellomere; EL 0.86–0.90 × OMD. OOD 2.6–2.8 × OD; IOD 1.8–2.0 × OD. Penultimate segment of maxillary palp broadest in middle, narrowed at each end.

*Thorax*: Robust, 0.53–0.56 × WL. In profile, posterior half of mesoscutum and anterior four-fifths of scutellum flat, forming a single plane; posterior one-fifth of scutellum sharply sloping.

*Petiole*: In profile, compressed, crest sharp; from behind, crest with narrow, shallow median notch; from above, about twice wider than long.

*Vestiture*: Cephalic pilosity about as described for worker, but erect hairs less abundant on malar area,

those of occiput shorter, longest hairs distinctly less than  $0.5 \times \text{MOD}$ . Pronotum with fine erect hairs on anterior margin and scattered short, erect, coarser hairs on neck and sides; scutum with sparse, short, erect hairs; scutellum with sparse erect hairs, a few about half as long as minimum eye diameter; pleura and propodeum with scattered short erect hairs, about equal to those of scutum. Petiole with sparse erect hairs, shorter than those of scutum, on crest and sides, a few finer hairs on front face. First two terga with short, sparse erect hairs on discs; hairs progressively longer and more abundant on succeeding segments. Scape with abundant erect hairs; fore femur without erect hairs on dorsal and inner faces; these abundant on outer and ventral faces; hind tibia with abundant decumbent to subdecumbent hairs; forewing without fringe hairs; hindwing with a few fringe hairs along basal half of posterior margin.

Pubescence short, fine, sparse on head, but denser and partially decumbent on malar area; very sparse on thoracic dorsum, denser on pleurae and propodeum; short and fine on first three terga, sufficiently dense to impart sheen.

*Integument*: Cephalic integument, shiny, weakly shagreened between punctures; clypeal punctures coarse, separated by 1–2 puncture diameters, closest along midline; frontal lobes finely and densely punctate and with scattered coarse punctures; frons and occiput a little more coarsely and less closely punctate; malar area with coarse, elongate punctures, interspaces duller than elsewhere on head.

Pronotum moderately shiny between dense, very fine punctures; parapsis with abundant punctures equal to those of frons, a little sparser near parapside, with scattered coarse punctures, shiny; discal area of meso-scutum shiny, with punctures distinctly more separated, a broad central portion sparsely and more finely punctate; scutellum polished, with sparse very fine punctures; pleura moderately shiny, with dense fine punctures. Propodeum slightly shiny, with fine, obscure punctures and strongly shagreened.

First three terga shiny, finely and sparsely punctate.

*Color*: Yellowish, dorsum more brownish; legs and scapes paler. Wings transparent, whitish, veins and stigma reddish.

*MALE. Measurements*. HL 0.83; HW 0.73; SL 0.96; EL 0.36; WL 1.7; PW 1.1.

*Head*: Sides distinctly convergent toward mandibular bases; head distinctly longer than broad, CI 88; shorter than scape, SI 86. OMD  $9.50 \times \text{EL}$ . Anterior ocellus smaller than lateral ocelli; IOD  $2.33 \times \text{OD}$ ; OOD  $1.66 \times \text{OD}$ . Mandible with preapical notch and two small teeth basad of notch.

*Thorax*: Robust, PW  $0.64 \times \text{WL}$ . Basal face of propodeum narrow and broadly rounded onto posterior face.

*Petiole*: In profile, distinctly higher than long, sharply cuneate; in frontal view, sides distinctly con-

vergent above, with narrow median notch; from above, about twice wider than long.

*Vestiture*: Sparse erect hairs present on head, shortest on frontal lobes; very fine short hairs on pronotal neck; mesoscutal and scutellar hairs short; pleura with scattered short hairs; propodeum with a few erect hairs at sides and base; scape with numerous erect hairs; fore femur with erect hairs on lower and outer faces only; hind tibia with decumbent hairs on outer face; first two terga with scattered fine erect discal hairs. Fringe hairs present on basal one-half of posterior margin of hind wing only.

Pubescence sparse on head and thorax, a little denser on frons and propodeum; longer and denser on first two terga.

*Integument*: Slightly shiny, densely shagreened, with a few obvious punctures on scutum and pleurae.

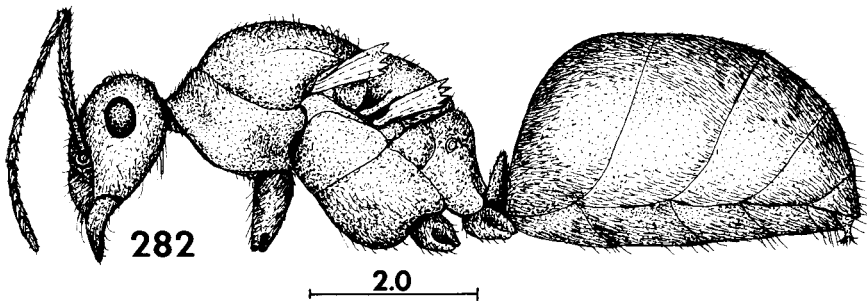
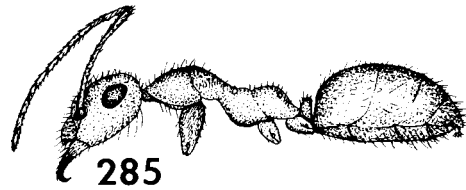
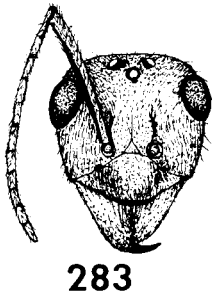
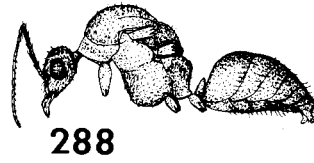
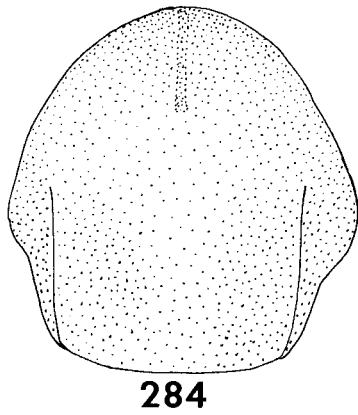
*Color*: Uniformly light brownish, appendages yellowish. Wings whitish hyaline, veins and stigma light brownish.

*Terminalia*: Figures 323, 334, 335.

*Type Material*. NEW MEXICO. Albuquerque, May 1905 (W. M. Wheeler). Lectotype worker, agreeing with above description, parenthetical measurements and type data, by present designation, in AMNH. Lectoparatypes in AMNH, LACM and MCZ.

*Distribution*. Eastern Colorado south to western Texas, westward to southern Utah, Nevada, California and northern Sonora (Fig. 371).

*Localities. UNITED STATES. Colorado: Otero Co.*: Higbee, 4400', 2 June 1947 (R. E. Gregg; REG, LACM, USNM); [5 mi N la Junta, 4100', 23 June 1950, Gregg, 1963]. *New Mexico: Bernalillo Co.*: Albuquerque, 4943', May 1905 (W. M. Wheeler; type series of *Myrmecocystus mexicanus navajo*; AMNH, LACM, MCZ). *Grant Co.*: 23 mi SW Silver City, 6100', 7 Sept. 1972 (R. R. Snelling, No. 72–67; LACM). *Doña Ana Co.*: Jornada Exp. Range, 4000', 24 Apr. 1973 (R. R. Snelling and C. A. Kay, Nos. RRS 73–49, 50; LACM); *County unknown*: "Kenedy, New Mexico, 13 Apr. 1910" (J. D. Mitchell; USNM); "Kennedy, New Mexico" (W. D. Hunter; AMNH, USNM). *Texas: Culberson Co.*: Van Horn, 4010', 10 July 1950 (R. F. Smith; AMNH); between Pecos R. and Guadalupe Mts., no date, 1920 (F. L. Odenbach; USNM). *Pecos Co.*: Ft. Stockton, 3052', no date (Judge Williams; MCZ). *Arizona: Cochise Co.*: 5 mi W Portal, 5400', 6 Aug. 1963 (C. Chesebrough; LACM); Ash Cyn., 5500', Huachuca Mts., 23 Aug. 1973 (R. R. Snelling, No. 71–43; LACM); Texas Pass [=Canyon], 4800', Dragoon Mts., 19–20 July 1917 (W. M. Wheeler; MCZ; CU); same locality, 11 Aug. 1967 (R. R. Snelling; Nos. 67–210, 211; LACM); Hereford, 18 Aug. 1958 (D. Luther; LACM). *Graham Co.*: Post Cyn., 5000–6000', Pinaleno Mts., 18–20 July 1917 (W. M. Wheeler; MCZ); Fort Grant, Pinaleno Mts., 19 July 1917 (CU). *Pima Co.*: Tucson, 2370', 21–23 July 1916 (USNM). *Yavapai Co.*: Granite Dells, 5300', 4 mi N Prescott, 18 July 1971 (L. M. Martin; LACM). *Utah: Millard Co.*: 60 mi W Delta, 19 July 1939 (R. W. Fautin; USNM); Millard, 29 June 1945 (V. E. Shelford; USNM). *Juab Co.*: 9 mi E Trout Creek, 17 Aug. 1933 (A. G. Richards; LACM). *Nevada: Nye Co.*: Fairbanks Spgs., 2200', 15 Apr. 1964 (R. C. Bechtel; NDA). *Lincoln Co.*: 5 mi NE Caliente, 4800',



FIGURES 282–289. *M. navajo*. 282, female, lateral view; 283, head of female, frontal view; 284, mesoscutum of female, distribution of punctures; 285, major worker, lateral view; 286, head of major worker, frontal view; 287, head of minor worker, frontal view; 288, male, lateral view; 289, head of male, frontal view.

17 May 1970 (G. C. & J. Wheeler; No. Nev. 892; GCW). *Esmeralda Co.*: Lida, 6500', 28 May 1970 (G. C. & J. Wheeler; No. Nev. 1007; GCW). *California: San Bernardino Co.*: 2 mi N Essex, 3–5 May 1966 (P. A. Opler; UCB); Golden Crown Mine, 22 Feb. 1968 (R. J. Hamton; LACM, RJH). *Riverside Co.*: Piñon Flat, 4000', 28 Apr. 1969 (G. C. & J. Wheeler, No. Calif. 663, 668; GCW); Dos Palmas, 3700', 8 Mar. 1970 (G. C. & J. Wheeler, No. Calif. 856; GCW); Nightingale, 4100', 5 Dec. 1967 (G. C. & J. Wheeler, No. Calif. 253; GCW); T.7S, R.5E, sec. 14, 4500', 18 Sept. 1969 (G. C. & J. Wheeler, No. Calif. 838; GCW). *San Diego Co.*: 4 mi W Scissors Crossing (on San Felipe Rd.), 4 Aug. 1974 (J. Saunier; LACM). *MEXICO. Sonora*: 35 mi W Sonoita, 26 Nov. 1959 (V. Roth; USNM); Sonoita R., near Gulf [of California], 26 Nov. 1959 (V. Roth; USNM).

*Ecology.* Gregg (1963) found this species in Short Grass Prairie of the Upper Sonoran of Colorado. The type material came from an area of Saltbush-Greasewood Desert near Albuquerque, New Mexico. Creighton (1950), based on information from Wheeler (1908), noted that this "... species makes obscure nests in sandy soil. It does not make a crater but spreads the excavated soil out into a disc." According to Wheeler, too, the colonies are small, of about 100–150 workers.

Some data on foraging activity were reported by Fautin (1946) who studied the species in White Valley, western Utah. Here, the ant was present in the Shadscale and *Tetradymia* Communities. Fautin found that the sensitivity of the workers to heat seemed to be a factor regulating emergence from the nest: "During April they became active just before dark and the time of their activity was progressively delayed until a later hour of the night as the summer temperatures became higher. By midsummer they failed to emerge until near midnight."

The ants appeared at the entrance of the nest when air temperature dropped below 88°F. They were found to leave the mound to begin foraging when air temperature was within a reported range of 52.2°F to 70.5°F, the average being 63.5°F. Fautin found that when ants were exposed to direct sun and an air temperature of 94°F they died within 1–10 min. Unfortunately, no readings were taken of soil surface temperatures which might have yielded more precise data than air temperature can provide.

The habitats of this species range from Creosote bush Scrub in the Lower Sonoran to Upper Sonoran Chaparral; it seems to be most common in Oak-Juniper and Piñon-Juniper Woodlands. The elevational range of *navajo* is poorly known: in New Mexico it ranges from 4000' to 6100'; in Nevada from 2200' to 6500' and in California from about 700' to 4500'. West of central Arizona the distribution is sporadic, probably limited to suitable habitat elevations in the mountain ranges.

The foraging activities are nocturnal, as usual in this subgenus, and the species solicits aphids and pseudococcids for honeydew as well as foraging nec-

tar directly from plants. Workers may be attracted to sweet baits. Dead arthropods are also collected. Wheeler (1908) reported that he found no repletes in the twenty-two nests which he examined in the vicinity of Albuquerque. Creighton (1950) surmised that repletes undoubtedly are developed. A part of the series from Ft. Stockton, Texas, consists of repletes, and I took repletes from a nest studied at Texas Canyon, Arizona. Although it is possible that the colonies examined by Wheeler may all have been young colonies, I think it more likely that excavation was not complete. Mature colonies number over 1000 individuals, not 100–150.

Wheeler also commented on the lack of a tumulus about the nest entrance. It may be that the nests which he studied were without tumuli due to wind and/or rain action. All the nests which I have seen possess well developed crateriform tumuli composed of coarse grains of sand or fine pebbles.

Little is known of the activities of the sexual forms, summarized in Table 8. Alate females have been taken most commonly at lights. One collection of females made near Scissors Crossing, Calif., on 4 Aug. 1974 bears the note "crepuscular following heavy rain." The enlarged ocelli of the female suggest that mating flights regularly take place during evening or at night.

*Discussion.* Superficially this species looks like a diminutive *mexicanus*. From that species the worker is separable by smaller size, sparse cephalic pubescence and lack of erect hairs on the extensor surfaces of the femur and tibia. The female differs from that of *mexicanus* chiefly in smaller size and lack of erect hairs on the extensor surfaces of the femur and tibia, the male separable largely by its smaller size.

The node of the petiole of *navajo* workers is usually thinner and with fewer erect hairs than that of *mexicanus*, as noted by Creighton (1950) and Gregg (1963). The differences, however, require comparison and will not always hold up in material from California where some workers of *mexicanus* have narrower and less pilose petiolar nodes. Creighton also commented on the high placement of the eye of *navajo*, its upper border coincident with the occipital angles. This is not always true, even in material from New Mexico. Also, this characteristic occurs in some samples of *mexicanus*.

Populations from Nevada and California differ from those of the eastern parts of the range of the species. In the female and worker castes of these western samples the pubescence of head, thorax and gaster is very sparse and the integument is quite shiny. Specimens from the eastern parts of the range are more pubescent and therefore appear less shiny. Erect hairs are also a little more abundant, especially on the thorax, in the samples from Colorado, New Mexico and Arizona. The few samples available from Utah seem to be of an intermediate character. Some are fully as pubescent as the eastern samples; others are more like those of Nevada

TABLE 8  
Activity of Reproductives of:

Locality	Date	Activity
<i>M. ewarti</i> Snelling		
CALIF., 3 mi W Shaver's Well	1 Mar. 1964	♂♂, ♀♀ in nest
CALIF., Deception Cyn.	26 Jan. 1967	♀♀ in nest
<i>M. navajo</i> Wheeler		
COLO., La Junta	23 July 1950	♂♂ in nest
TEX., Van Horn	10 July 1950	♀♀ at light
UTAH, 9 mi E Trout Creek	17 Aug. 1933	♂♂, ♀♀ in nest
ARIZ., 4 mi N Prescott	18 July 1971	♀ at light
ARIZ., Texas Pass	19 July 1917	♀♀ in nest
ARIZ., Texas Pass	20 July 1917	♂♂ in nest
ARIZ., Tucson	21 July 1916	♀ (flight?)
ARIZ., Hereford	18 July 1958	♀ at light
CALIF., 4 mi W Scissors Cross	4 Aug. 1974	♀♀ at light after rain
<i>M. pyramicus</i> M. Smith		
IDA., Hammett	10 Apr. 1932	♂♂, ♀♀ in nest
IDA., 5 mi E Arco	15 June 1967	♀♀ in nest
IDA., Twin Falls	4 Oct. 1932	♂♂, ♀♀ in nest
ORE., 39 mi W Jordan Valley	20 June 1967	♀♀ in nest
NEV., 5 mi W Mullen Gap	27 Sept. 1966	♂♂ in nest

and California. Many, however, cannot be assigned to one or the other. Since both extremes, as well as the intermediates, may be present in the same nest sample, it is safe to assume that we are dealing with a single, variable species. This reduction in vestiture in western samples parallels the situation in the related *mexicanus*.

#### PYRAMICUS GROUP

##### *Myrmecocystus (Myrmecocystus) ewarti* Snelling

Figures 290–298, 326, 327, 338, 339

*Myrmecocystus ewarti* Snelling 1971. Contr. Sci., L.A. Co. Mus. 214:2–6. ♀♀♂; Wheeler and Wheeler 1973. Ants of Deep Canyon, 120, Fig. 42.

**Diagnosis.** *Worker.* Few or no erect hairs on malar area, scape and tibiae (except beneath); propodeum, at juncture of dorsal and posterior faces, angularly produced upward; petiolar scale compressed; erect pronotal hairs present, at least a pair exceeding apical breadth of scape. *Female.* Penultimate maxillary palpal segment narrowed basally and apically; tibiae without erect hairs; OOD 3 × OD; first tergum with erect discal hairs; mesoscutum, between parapsides, with abundant fine piligerous punctures and scattered coarse punctures. *Male.* Forewing with fringe hairs on apical margin; scape and tibiae without erect hairs.

**WORKER.** *Measurements.* HL 0.76–1.30 (1.23); HW 0.70–1.30 (1.23); SL 0.93–1.36 (1.36); WL 1.10–1.80 (1.70); PW 0.46–0.83 (0.83).

**Head:** Shape varying from longer than broad in most workers to slightly broader than long in largest work-

ers, CI 88–104 (100); a little shorter than scape, SI 102–136 (110). In frontal view head broadest at lower margin of eyes, sides slightly convex to straight, narrowed toward mandibular insertions. Occiput, in frontal view, somewhat flattened in middle, sides convex, not at all angulate. Eye large, 1.5 × first flagellomere; OMD 0.90–1.15 (0.93) × EL. Mandible with seven distinct teeth, often with a small intercalary denticle between the penultimate and basal teeth.

**Thorax:** Slender to moderately robust, PW 0.37–0.50 (0.48) × WL. Basal face of propodeum pyramidally produced upward at juncture with posterior face, about half as long as posterior face.

**Petiole:** Compressed when viewed in profile, crest thin, weakly angularly excised in middle; in dorsal view twice as wide as long.

**Vestiture:** Erect hairs sparse on head, confined to clypeus, frontal lobes and occipital areas. Erect pronotal pilosity sparse, but with at least a pair of fine, fully erect hairs which are about as long as apical width of scape; mesonotum with 3–6 erect hairs; propodeum without erect hairs at summit of declivity, or with one or two which are less than half as long as those of mesonotum. Petiolar scale with a few very short, inconspicuous erect hairs on crest. Disc of first tergum with scattered, short, fully erect blunt hairs; second and succeeding terga with progressively longer discal hairs. Tibiae with very sparse, fine, decumbent to subdecumbent hairs on outer surfaces, these shorter and finer than the row of gradated bristles on the inner surface.