indubitably of the original species, were not clearly marked as types and are here excluded.

Distribution. MEXICO. Known only from the States of Hidalgo and Puebla (Fig. 369).

Specimens Studied. MEXICO. Hidalgo: Pachuca, 8000′ (W. M. Mann; MCZ, USNM); Hwy. 85, ca. 6 mi W Pachuca, 8250′, 13 July 1973 (R. R. Snelling & T. W. Taylor; No. RRS 73-103; LACM). *Puebla:* 13 mi NW San Martin Texmelucan, 8600′, 29 June 1961 (L. B. Carney; KU), "at light"; 1.5 mi E Azumbilla on road to Lagunas, 6700′, 19 July 1973 (R. R. Snelling & T. W. Taylor; No. RRS 73–115; LACM).

Ecology. Little is known of this species. Elevation ranges from 6700–8600 feet. The specimens taken by L. B. Carney were "at light," indicating nocturnal foraging, as expected.

Sample No. RRS 73–103 was taken on an arid hilltop in a maguey field at the summit of Hwy. 85; the knoll, although surrounded by maguey plantings, was uncultivated, several acres in extent, and consisted largely of arborescent *Yucca* and *Acacia*. The nest was marked by a circular crateriform tumulus consisting of coarse particles of uniform size; the entrance was about 15 mm in diameter. No ants were foraging at 1530 when the nest was discovered, although the sky was cloudy and there were scattered light rain showers. Repletes, secured within 45 cm of the surface, were apparently known to local residents, who identified them as *"venitas."*

Sample No. RRS 73–115 was also taken in an area adjacent to maguey plantings, but the habitat was less severely stripped of native vegetation, especially on nearby slopes, too steep for cultivation. At 1200 hours the sky was heavily overcast; workers of *melanoticus* were foraging on nearby plants, some gathering nectar, others scavenging. The tumulus was lower than that of 73–103, composed of finer particles and the entrance smaller.

Discussion. It is my opinion that this species is the same as Wesmael's *mexicanus,* a conclusion based largely on distributional evidence. Since the problem appears insoluble, I have elected not to modify the traditional interpretation of Wesmael's name.

The relationship between *melanoticus* and *mexicanus* is a very close one and the above problem may be purely academic. It is quite possible that the two species may prove to be one when more material from central Mexico becomes available. Additional samples from western Puebla and Hidalgo, as well as from Tlaxcala, Mexico, and Querétaro may clarify the status of these names.

Although *melanoticus* is a darker form, *mexicanus* becomes darker in the southern portions of its range, and samples from near Dolores Hidalgo, in the State of Guanajuato, are nearly as dark as *melanoticus*. The size of *melanoticus* is, to judge from the material available, notably less variable than that of *mexicanus*. I also regard it as a smaller species, even though its size is completely overlapped by that of *mexicanus*. In all sizes of workers, especially among the smaller individuals, the head appears less elongate. Thus, about 75% of the *melanoticus* studied have a CI in excess of 81, while this is true of about 35% of the *mexicanus* workers. The CI of both species are plotted in Fig. 272. As will be seen, the regression zone of *melanoticus,* while contiguous with and, to some extent lapped by that of *mexicanus,* persistently presents higher values. Similarly, *melanoticus* possesses a relatively shorter scape and when SL is plotted against HL (Fig. 273) yields a consistently lower value than does *mexicanus*.

The number of mandibular teeth is variable in both species, varying from eight to ten. However, while the mandible of *melanoticus* most commonly has nine teeth, specimens with eight on one or both mandibles are common. Ten mandibular teeth is a very rare occurrence in this species. Conversely, while *mexicanus* typically also has novemdentate mandibles, individuals with ten (or even eleven) teeth are common; an eight-toothed mandible is rare. As a rule, the space between the basal and subbasal teeth is larger in area than the basal tooth in *melanoticus,* smaller in *mexicanus*.

In the length of the hairs on the eyes these ants appear to be different. In *melanoticus* there are ten or more erect hairs in the central part of the eye; these hairs are from 0.025–0.037 mm long and exceed the diameter of the eye facets. Scattered erect hairs are present on the eyes of *mexicanus,* but even in the largest individuals are less than 0.017 mm in length.

It is possible that *melanoticus* is nothing more than a geographic segregate of *mexicanus,* a subspecies. I do not believe this to be true, since *mexicanus* in the southern parts of its range, shows little demonstrable tendency to assume the characteristics of *melanoticus,* other than in color. Thus the Cephalic Index and Scape Index of *mexicanus* remain "normal" as does the length of the ocular hairs. Neither does the mandibular dentition vary toward the *melanoticus* condition. If a subspecies situation were the case, then I would expect to find such tendencies in southern populations of *mexicanus*. I have thus chosen to accord full specific status to *melanoticus* until such a time as additional material permits a complete re-evaluation of this form.

Myrmecocystus (Myrmecocystus) mexicanus Wesmael

Figures 272–281, 316, 317, 328, 329

Myrmecocystus mexicanus Wesmael 1838. Bul. Acad. roy. Sci. Belg. 5:756–761; Emery 1893. Zool. Jahrb. f. Syst. 7:666; Wheeler 1908. Bull. Amer. Mus. Nat. Hist. 24:356–358; Wheeler 1912. Psyche 19:173, 178; Mallis 1941. Bull. So. Calif. Acad. Sci. 40:81; Creighton 1950. Bull. Mus. Comp. Zool. 104:446; Cook 1953. The Ants of California, 339–340; Cole 1954. Jour. Tenn. Acad. Sci. 29:285; Cole 1966. Brigham Young Univ. Sci. Bul. 7:21, 22; Wheeler and Wheeler 1968. Ann. Entomol. Soc. Amer. 61:213 *(larva);* Wheeler and Wheeler 1973. Ants of Deep Canyon, 122–124, Fig. 47.

Myrmecocystus melliger var. *hortus-deorum* McCook 1881. Proc. Phil. Acad. Sci. 75. ♀♀♂ McCook 1882. The Honey Ant of the Garden of the Gods, Phila. :75. NEW SYNONYMY.

Myrmecocystus hortus-deorum, Forel 1886. Ann. Soc. Entomol. Belg. 30:202. ♀♀♂.

Myrmecocystus mexicanus var. *horti-deorum*, Emery 1893. Zool. Jahrb. f. Syst. 7:666; Wheeler 1908. Bull. Amer. Mus. Nat. Hist. 24:358–360; Wheeler 1912. Psyche 19:173, 178, 179; Cole 1934. Ann. Entomol. Soc. Amer. 27:396 (Fig. 4), 402; Mallis 1941. Bull. So. Calif. Acad. Sci. 40:81; Cole 1942. Amer. Midl. Nat. 28:386; Cook 1953. The Ants of California, :346–350.

Myrmecocystus mexicanus "Slave" (sic!) var., Fenner 1895. Entomol. News 5:216.

Myrmecocystus mexicanus subsp. *hortideorum*, Creighton 1950. Bull. Mus. Comp. Zool. 104:446; Cole 1954. Jour. Tenn. Acad. Sci. 29:285; Gregg 1963. The Ants of Colorado: 643, 648–651.

Diagnosis. Worker: Propodeal dorsum evenly convex, abundantly hairy; metanotal suture usually distinctly impressed; HL usually in excess of 1.3 mm; eye with few or no erect hairs, when hairs present, less than 0.017 mm long. *Female.* Penultimate segment of maxillary palp broadest basally; hind tibia with abundant fully erect hairs; HW more than 2.0 mm. *Male.* Scape and tibia with conspicuous erect hairs; occipital hairs shorter than maximum diameter of lateral ocellus; apical margin of forewing with vestiges of fringe; HW more than 0.9 mm.

WORKER. *Measurements.* HL 1.00–2.17 (1.80); HW 0.70–2.03 (1.40); SL 1.30–2.70 (2.20); WL 1.6–3.8 (2.9); PW 0.55–1.30 (1.1).

Head: Longer than broad in all sizes, CI 70–94 (78), much shorter than scape, SI 114–149 (122). In frontal view, malar margins straight and subparallel in small workers, in largest workers widest at level of antennal sockets, convergent toward mandibular insertions below; occipital margin flat or slightly convex, usually well above top of eye, sometimes barely so in smallest workers. Eye large, 1.09–1.20 (1.14) × length of first flagellomere; OMD 1.09–1.72 (1.37) × EL. Mandible usually with nine teeth, but commonly with ten, rarely with eight; space between basal and subbasal teeth not exceeding size of basal tooth.

Thorax: Slender, PW 0.30–0.37 (0.36) × WL. Basal face of propodeum gently to strongly convex, broadly rounded into posterior face. Metanotal depression sometimes weak in largest workers, but usually well defined.

Petiole: In profile, robust cuneiform, with rounded crest; crest, in frontal view, weakly or not at all notched.

Vestiture: Dorsa of head, thorax and gaster with abundant fully appressed pubescence, well separated on head and thorax, denser on propodeum and first three terga.

Head with numerous erect hairs, malar area with ten or more erect hairs; longest cephalic hairs less than 0.17 mm long in largest workers, except beneath and along clypeal margin; eye with very sparse, very short (less than 0.017 mm long) hairs, or none. Erect hairs on thoracic dorsum evenly distributed, longest (up to 0.20 mm in largest workers) on pronotum, shortest (about ⅓ length of longest pronotal hairs) on metanotum and propodeum. Petiolar node with numerous short, erect hairs. Terga with abundant erect hairs, progressively longer on succeeding segments, sparser and longer on sterna. Appendages with abundant erect hairs, including inner and lower surfaces of fore femur.

Integument: Front of head moderately shiny, with well separated micropunctures and scattered coarse, shallow punctures, micropunctures coarsest on frontal lobes. Clypeus shinier than frons, lightly shagreened, with sparse coarse punctures, with ill-defined median impunctate line. Integument otherwise lightly to moderately shagreened, moderately shiny.

Color: Highly variable, from wholly pale yellowish to light yellowish-brown with gaster darker (see *Discussion*).

FEMALE. *Measurements.* HL 1.90–2.50; HW 1.90–2.55; SL 1.85–2.50; EL 0.60–0.80; OMD 0.66–0.90; WL 4.2–5.6; PW 2.35–3.15.

Head: Slightly longer than broad to slightly broader than long, CI 91–108; a little shorter than to a little longer than scape, SI 89–109. Head broadest at level of lower eye margin, sides in frontal view straight or slightly convex, evenly narrowed toward mandibular insertions; occiput slightly convex in frontal view, broadly rounded at sides. Eye large, about 1.3 × first flagellomere; OMD 1.07–1.28 × EL; OOD 2.3–3.6 × OD; IOD 1.6–2.4 × OD. Mandible with nine or ten teeth. Penultimate segment of maxillary palp broadest a little before middle, slightly narrowed toward base, more strongly narrowed toward apex.

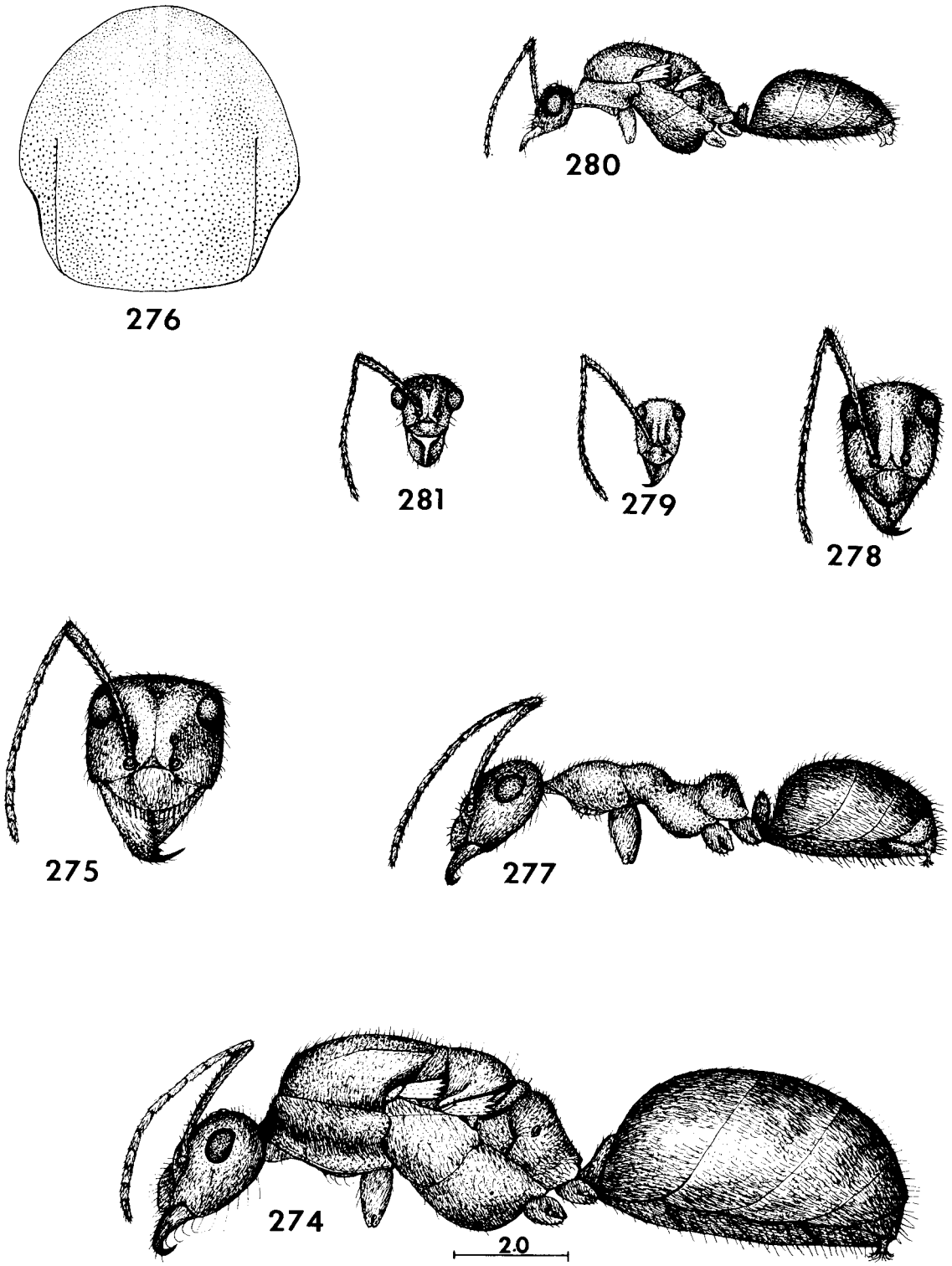
Thorax: Robust, PW 0.53–0.61 × WL. In profile, scutum flattened behind, scutellum convex, not in line with posterior part of scutum.

Petiole: In profile, compressed-cuneate; crest sharply notched in frontal view; from above, about twice wider than long.

Vestiture: Cephalic pilosity about as described for worker. Mesoscutum and scutellum with scattered, long (up to 0.23 mm) erect hairs arising from coarse punctures; pleura with scattered long erect hairs; propodeum with a few short (up to 0.10 mm) erect hairs on upper third. Petiolar scale with numerous erect hairs. Discs of terga with abundant stiff erect hairs, progressively longer on succeeding segments; sterna with hairs longer, more numerous on apical half; appendages, including inner and lower surfaces of fore femur, with abundant erect and suberect hairs of moderate length. Wings without fringe hairs on apical or posterior margins.

Pubescence general, nowhere concealing surface.

Integument: Clypeus shiny, coarsely punctate, punctures elongate, of varying size; frontal lobes, frons



FIGURES 274–281. *M. mexicanus*. 274, female, lateral view; 275, head of female, frontal view; 276, mesoscutum of female, distribution of punctures; 277, major worker, lateral view; 278, head of major worker, frontal view; 279, head of minor worker, frontal view; 280, male, lateral view; 281, head of male, frontal view.

and occiput moderately shiny, closely micropunctate. Malar area duller, coriaceous, closely punctate, punctures elongate.

Pronotum moderately shiny, micropunctate, with scattered coarser punctures. Disc of mesoscutum densely, finely punctate, with scattered coarser punctures; parapsis similar, but with coarser punctures a little more numerous. Scutellum polished between fine, dense punctures. Pleura shinier, more sparsely punctate above, punctures fine. Propodeum slightly shiny, shagreened, with fine, dense punctures.

First three terga shiny, densely and finely punctate.

Color: Yellowish to yellowish ferruginous, with variable brownish infuscations on occiput, thoracic dorsum and abdominal terga. Wings yellowish hyaline, veins and stigma ferruginous to light brownish.

MALE. *Measurements.* HL 0.90–1.23; HW 0.73–1.17; SL 1.07–1.53; EL 0.37–0.50; OMD 0.20–0.27; WL 2.05–3.10; PW 1.00–1.47.

Head: Longer than broad, CI 83–95; in frontal view, sides straight or slightly concave, convergent toward mandibular insertions; distinctly shorter than scape, SI 116–130; occiput, in frontal view evenly convex, without lateral angles. Eye large; OMD 0.50–0.67 × EL; OOD 1.07–1.53 × OD; IOD 2.05–3.10 × OD. Mandible with one or more preapical teeth.

Thorax: Robust, PW 0.45–0.53 × WL. Propodeum with distinct basal and posterior faces.

Petiole: In profile, cuneate and sharp-crested to broadly rounded above; in frontal view, crest with more or less distinct angular notch.

Vestiture: Erect hairs sparse on head and thorax; those of occiput short (up to 0.10 mm), much shorter than MOD; a few longer (up to 0.16 mm) on malar area. Scutal hairs about equal to those of occiput, longer (up to 0.16 mm) on scutellum; hairs very sparse on pleura, little, if any, longer than on scutum. Propodeum commonly without erect hairs except near valvule, but a few very short hairs may be present on basal face. Petiolar node with sparse, short erect hairs. Terga with sparse, fully erect hairs, up to 0.10 mm on disc of second segment; sterna with hairs more numerous, longer, up to 0.23 mm on second segment. Appendages with sparse to abundant erect and suberect short hairs; forewing with or without apical fringe hairs; hind wing with or without fringe hairs along apical and posterior margins.

Pubescence general but sparse, densest on occiput, propodeum and first three terga.

Integument: Head moderately shiny, lightly coriaceous, without conspicuous punctation. Mesoscutum moderately shiny, with dense micropunctures and scattered coarse punctures; scutellum shinier, punctures less distinct than on scutum; pleura moderately shiny, with scattered coarse punctures. Terga moderately shiny, with abundant micropunctures on discs.

Color: Yellowish, often with brownish infuscation of varying extent on dorsa of head and thorax, gaster often largely brownish. Wings whitish hyaline to slightly brownish, veins and stigma whitish to yellowish.

Terminalia: Figures 317, 328, 329.

Type Material. Wesmael's specimens were from an unknown locality in Mexico; no types were ever designated and no original material is known to exist. McCook's *hortus-deorum* material came from the Garden of the Gods, near Colorado Springs, Colorado. No original material is known to exist. Neotype worker and 31 neoparatype workers, here designated: MEXICO, State of Chihuahua: 21 mi SW Jimenez, 23 Dec. 1958 (A. S. Menke & L. A. Stange). Neotype and neoparatypes in LACM; two neoparatypes each in AMNH, MCZ, and USNM.

Distribution. Central Mexico north to Colorado and Utah, westward to California and Lower California (Figs. 369, 370).

Localities. UNITED STATES. Colorado: El Paso Co.: Colorado Springs and vicinity (incl. Garden of the Gods, Red Rock Cyn. and Manitou), 5900–6800′, numerous dates and collectors (AMNH, GCW, LACM, MCZ, REG, USNM); Colorado City, 6000′, 25 July 1903 (W. M. Wheeler; GCW); Bear Creek, S of Colorado City, 18 Aug. 1903 (W. M. Wheeler; GCW). *Mesa Co.:* Grand Junction, 4500′, 8 May 1949 (R. E. Gregg, No. 76; LACM, REG, USNM); Colorado Natl. Mon., 6000′, 2 July 1963 (T. C. Emmel; LACM). *Utah: Emery Co.:* [Gunnison Butte, Green River, 7 May 1932 (J. A. Rowe) Rees and Grundmann, 1940]. *Grand Co.:* Arches Natl. Mon., 23 June 1963 (A. S. Menke; UCD); [Thompson, 5150′, no date (Titus?) Cole, 1942]. *San Juan Co.:* [Bluff, 4500′, no date (A. M. Woodbury) Rees and Grundmann, 1940; betw. Bluff and Blanding, 17 Apr. 1968 (R. V. Chamberlin) Rees and Grundmann, 1940]. *Garfield Co.:* Boulder, 7 Oct. 1958 (G. F. Knowlton; LACM); Henry Mts., 18–21 Aug. 1934 (W. S. Creighton; LACM). *Millard Co.:* 30 and 32 mi S Deseret, 14 May 1970 (G. F. Knowlton and D. W. Davis; USU). *Salt Lake Co.:* Garfield, no date (A. O. Garrett; AMNH). *Nevada: Churchill Co.:* 4 mi SW Brady's Hot Spgs., 4000′, 2 June 1965 (R. C. Bechtel; NDA). *Esmeralda Co.:* Goldfield, 5800′, 17 Oct. 1952 (W. S. Creighton, No. 272; LACM). *Nye Co.:* Fairbanks Spgs., 23 June 1951 (I. La Rivers, No. 1350; USNM); 1 mi E Warm Spgs., 19 June 1953 (I. La Rivers; USNM); AEC Nevada Test Site, Mercury, numerous dates (ACC, AMNH, LACM, MCZ, USNM); 3 mi W Rhyolite, no date (A. H. Sturtevant; USNM); Amargosa Desert, nr. Beatty, 8 Mar. 1931 (A. H. Sturtevant; USNM). *Clark Co.:* Kyle Cyn., 5200′, Spring Mts., 10 May 1970 (G. C. and J. Wheeler, No. Nev. 860; GCW); 4.5 mi E Las Vegas, 2 Apr. 1931 (A. H. Sturtevant; USNM); 10 W Las Vegas, 3200′, 1 Apr. 1970 (G. C. and J. Wheeler, No. Nev. 666; GCW). *Texas: Hudspeth Co.:* Sierra Blanca, 8 July 1917 (CU; USNM). *New Mexico: Colfax Co.:* 2 mi S Raton Pass, 7700′, no date (A. C. Cole; LACM) Cole, 1954; Cimarron Cyn., 6700′, 29–31 Aug. 1951 (A. C. Cole, No. A–14; LACM). *Santa Fe Co.:* 6 mi NE Santa Fe, 8000′, 2 Aug. 1964 (F., P. and M. Rindge; AMNH); 4 mi NE Santa Fe, 24 Aug. 1964 (G. C. and J. Wheeler, No. 17; GCW); Santa Fe, no date (Wheeler Exped.; AMNH); same locality, Apr. 1879 (R. Thaxter; AMNH). *Taos Co.:* 18 mi S Taos, 6000′, no date (A. C. Cole; LACM) Cole, 1954. *San Miguel Co.:* Pecos, 5 July (T. D. A. Cockerell; MCZ). *McKinley Co.:* 25 mi E Gallup, 7200′, no date (A. C. Cole; LACM) Cole, 1954. *Lea Co.:* 2 mi E Hobbs, 3750′, no date (A. C. Cole; LACM) Cole, 1954. *Doña Ana Co.:* 28 mi N Las Cruces, 17 Aug. 1952 (A. C. Cole, No. 4401; LACM); Las Cruces, 3900′, July

1961 (L. D. Robertson; USNM). *Sierra Co.:* Caballo, 31 Mar. 1962 (M. Cazier; LACM). *Grant Co.:* 15 mi E Silver City, 6900′, no date (A. C. Cole; LACM) Cole, 1954; Cherry Cr. Camp, 6900′, 13 mi N Silver City, 10 July 1964 (F., P. and M. Rindge; AMNH); McMillan Camp, 7000′, 14 mi N Silver City, 14 July 1964 (F., P. and M. Rindge; AMNH); 20 mi N Silver City, no date (A. C. Cole; LACM) Cole, 1954. *Hidalgo Co.:* Granite Pass, 5 Aug. 1967 (D. E. Rich; LACM); 12 mi E Animas, 4300′, 17 Aug. 1967 (R. R. Snelling, No. 67–239; LACM); 15 mi N Rodeo, 18 Aug. 1963 (C. Chesebrough, J. Franklin and N. McFarland; LACM, OSC, USNM). *Arizona: Cochise Co.:* Bowie, 15 July 1917 (W. M. Wheeler; MCZ); Texas Pass, [=Canyon], 19, 20 July 1917 (W. M. Wheeler; CU, MCZ); same locality, 4800′, 12 Aug. 1967 (R. R. Snelling, No. 67–218; LACM); Benson, 21 July 1917 (W. M. Wheeler; GCW; MCZ); Chiricahua Natl. Mon., 9 Apr. 1963 (G. I. Stage; LACM); 2 mi NE Portal, 9 Mar. 1962 (M. Cazier; LACM); 2.5 mi NE Portal, 4 Aug. 1959 (M. Cazier; AMNH); 2 mi E Portal, 4800′, 16 Aug. 1967 (R. R. Snelling, No. 67–232; LACM); Cave Cr. Ranch, Portal, 18 Aug. 1966 (R. Silberglied; CU): Southwest Research Sta., 5400′, 5 mi W Portal, 5 Aug. 1963 (A. R. Moldenke; LACM); same locality, 25 July 1957 (M. Statham; AMNH); 6.1 mi NE Apache, 4550′, 14 Aug. 1967 (R. R. Snelling, No. 67–222; LACM); Huachuca Mts., 18 Nov. 1910 (W. M. Wheeler; AMNH); Garden Cyn., 5400′, Huachuca Mts., 9 July 1950 (W. S. Creighton; LACM); Ramsey Cyn., Huachuca Mts., no date (W. M. Mann; LACM, USNM); Miller Cyn., 5800′, Carr Cyn., 6200′, Huachuca Mts., 12 Aug. 1969 (R. R. Snelling, No. 69–289; LACM); Montezuma Pass, Huachuca Mts., 17 Nov. 1946 (L. F. Byars; USNM); Hereford, 4200′, no date (W. M. Mann; AMNH, MCZ). *Mohave Co.:* 64 mi NW Nixon Spg., 3500′, 5 July 1969 (R. R. Snelling, No. 69–238; LACM). *Coconino Co.:* Locket Lake, 26 Aug. 1933 (P. Klingenberg; MCZ). *Yavapai Co.:* Granite Dells, 4 mi N Prescott, 19–26 July 1970 (L. M. Martin; LACM); Prescott, 25 July 1948 (C. and P. Vaurie; AMNH); same locality, 16 May 1932 (A. C. Cole; USNM). *Maricopa Co.:* 10 mi W Aguila, 1800′, 6 Apr. 1952 (W. S. Creighton; LACM); Phoenix, no date (R. H. Crandall; USNM). *California: Inyo Co.:* 15 mi N Independence, 24 Aug. 1961 (UCB); 3 mi W Lone Pine, 4400′, 3 May 1952 (W. S. Creighton; LACM); 4 mi W Lone Pine, 18 Mar. 1968 (G. C. and J. Wheeler, No. Calif. 371; GCW); Tuttle Cr., 2 mi SW Lone Pine, 16 May 1969 (J. Powell; UCB). *Los Angeles Co.:* 5 mi SE Palmdale, 28 Nov. 1955 (R. H. Crandall; LACM); Llano, 3300′, 11 Apr. 1952 (W. S. Creighton; LACM); 9 mi N Llano, 2800′, 11 Apr. 1952 (W. S. Creighton; LACM); 2 mi S Pearblossom, 3500′, various dates and collectors (LACM); Los Angeles, no date (colln. T. Pergande; USNM); same locality, no date (Coquillett; USNM). *San Bernardino Co.:* 2 mi E, 4.5 mi S Cima, 27 May 1967 (J. Northern and L. Lester; LACM); 12 mi SE Ivanpah, 1 May 1956 (M. Wasbauer; UCB); Ord Mtn., 18 Apr. 1960 (J. R. Powers; UCB); Daggett, 12 Sept. 1961 (C. S. Bodman; LACM); 5 mi N Adelanto, 12 Apr. 1964 (R. R. Snelling; LACM); Victorville, 12 Dec. 1961 (E. Angell; CDA); same locality, 30 Apr. 1918 (J. C. Bradley; CU); 0.7 mi SE Pioneertown, 4500′, 18 Sept. 1965 (G. R. Noonan; LACM); 1 mi NW Cajon, 3125′, 5 Sept. 1965 (R. R. Snelling; LACM); Quail Spgs., 11 Apr. 1962 (R. P. Allen; LACM); Lower Covington Flat, Joshua Tree Natl. Mon., 26 June 1966 (R. J. Hamton; RJH); Squaw Tank, Joshua Tree Natl. Mon., 20 Mar. 1965 (S. L. Jenkins; LACM); Morongo Valley, 7 Apr. 1963 (R. R. Snelling; LACM); same locality, 29 Mar. 1952 (E. I. Schlinger; USNM); Dry Morongo Cyn., 7 Apr. 1963 (R. R. Snelling; LACM). *Riverside Co.:* 0.5 mi E Salton View, 5000′, Joshua Tree Natl. Mon., 8 Oct. 1967 (R. J. Hamton; RJH); Juniper Flat, 4800′, Joshua Tree Natl. Mon., 8 Oct. 1967 (R. J. Hamton; RJH); Indio, 25 Apr. 1967 (Johnson; CDA). *Imperial Co.:* Salton Sea Beach, 20 Apr. 1950 (E. I. Schlinger and R. C. Bechtel; UCD); 6 mi W Seeley, 24 Apr. 1962 (E. L. Paddock; CDA). *San Diego Co.:* Borrego, 21 Apr. 1960 (J. R. Powers; UCB); same locality; 26 Apr. 1955 (P. D. Hurd; UCB); Borrego State Park, 19 Apr. 1969 (R. R. Pinger; CDA); nr Mountain Palm Spgs., Anza-Borrego St. Park, 12 Aug. 1965 (L. and C. O'Brien; LACM); Split Mtn., 500′, Anza-Borrego St. Park, 18 Apr. 1952 (W. S. Creighton; LACM); Vallecito Mts., 600′, Anza-Borrego St. Park, 18 Apr. 1952 (W. S. Creighton; LACM). *MEXICO. Coahuila:* Cuesta La Muralla, Hwy. 57, 4000′, 9 July 1973 (R. R. Snelling; LACM). *Chihuahua:* 24 mi S Hidalgo del Parral, 23 Dec. 1958 (A. S. Menke and L. A. Stange; neotype series, LACM); Santa Clara Cyn., 5600′, 5 mi W Parrita, 27 June 1947 (C. Michener; AMNH), Cañon Prieto, 6500′–6800′, nr Primavera, 2 July 1947 (R. Schrammel; AMNH). *San Luis Potosí:* San Luis Potosí, 20 May 1879 (E. Palmer; AMNH, MCZ). *Durango:* 10 mi N Durango, 6300′, 23 Mar. 1953 (W. S. Creighton, No. 245; LACM); 5 mi W Durango, 6300′, 16 Mar. 1953 (W. S. Creighton, No. 629; LACM). *Guanajuato:* 19 mi E Dolores Hidalgo, 6400′, 6 Sept. 1970 (E. M. Fisher; LACM). *Baja California:* 3 mi SW Mexicali, 30 Mar. 1963 (G. I. Stage; LACM); 5 mi N San Felipé, 0′, 14 June 1952 (W. S. Creighton; LACM); 2 mi N Puertocitos, 4 Apr. 1966 (E. M. Fischer; LACM).

Ecology. This is the most extensively studied of all the species of *Myrmecocystus.* McCook (1881, 1882) published the results of his studies in Colorado; these were supplemented by Wheeler (1908). Briefly, the species forages at night, less commonly on cool, overcast days. Workers emerge singly and seek out food items. The ants derive much of their sustenance from exudates from galls on oaks (*Quercus* spp.) as well as from aphids and pseudococcids (Homoptera). They also take juices from bruised or broken fruits which may be available, such as those of cacti (*Opuntia* spp.) and nectar from a wide variety of flowers and from extrafloral glands.

The ants are by no means wholly dependent upon nectar and fruit juices, for they are assiduous general scavengers. In general, however, this species seems not to be an active predator. I have rarely observed it attacking live insects. On those occasions when I have made such observations, workers were picking up insects attracted to lights at night. Foragers would rush up to an insect and grasp it with the mandibles. If the prey was much smaller than the ant it was immediately carried away. If of a size approximately equal to that of the ant and struggled, it was released and the ant would dart away.

Most protein material brought to the nest consists of fragments of already dead, often desiccated arthropods. Colonies observed in southern Arizona regularly picked up head capsules of *Pogonomyrmex* spp. from detritus piles around the nests of the harvester ants.

Foraging is an individual matter for the most part. The usual pattern seems to consist of an initial mass exodus of workers at the onset of the foraging period. The workers quickly radiate in all directions. Obviously, if there are previously visited sources of food in a limited area, such as a plant harboring large numbers of aphids, a sizable percentage of the foragers ulti-

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 equivalent 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–