CHAPTER 8

The Ants of Los Alamos County, New Mexico (Hymenoptera:Formicidae)

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Introduction

The Los Alamos National Laboratory has conducted a variety of activities involving radioactive elements for over 40 years (Hakonson and Bostick, 1976). During this time radioactive waste has been deposited in designated waste burial sites in the area. Currently there is much interest by the National Laboratory on the effect of this material on the environment and the effect of biological intrusion into burial sites, including the excavation of soil by ants. In 1986 we began studies on the importance of ants at waste sites. It was obvious that we would need a list of the ants of the area. This report is part of ongoing baseline research supported by the Los Alamos National Environmental Research Park operated by Los Alamos National Laboratory. We continue studies initiated by Donald Lowrie in 1975 on the ants in the area (Lowrie 1977), and form the basis of further studies on the importance of ants on nuclear waste sites.

Material and Methods

Study Area. Los Alamos County is one of the smallest in New Mexico, occupying a total of 280 sq k (Nyhan et al., 1978). Much of the county is located on the Pajarito Plateau, which occupies the eastern flank of the Jemez Mountains in north-central New Mexico. Elevations range from 1615 meters near the Rio Grande to 3140 meters at the Sierra de los Valles. Vegetation types range from sagebrush (*Artemesia tridentata*) and juniper (*Juniperus monosperma*) at lower elevations (Rio Grande sites), Pinon- juniper Ponderosa pine (*Pinus edulis* and *P. ponderosa*) at intermediate elevations (Los Alamos, Mortandad Cyn., bombing range, nuclear waste site G, Chupaderos Cyn.), to fir (*Abies concolor*) and fir-aspen (*Populus tremuloides*) at the higher elevations (Camp May sites). More details on plant communities will be provided

in a separate paper which compares the ant communities.The bombing range and nuclear waste site G are severly impacted, the first from the use of explosive devices, the second by the burial of low level nuclear waste. Soils are derived mostly from the Tshirege member of Bandelier tuff, which is Pleistocene in origin (Nyhan et al., 1978; Tierney and Foxx, 1982). Soil depth ranges from a few cm to 2 m. The climate is semiarid; the average precipitation is 45cm with 75% falling between May and October. Temperatures range from below freezing with an average annual snow depth of 100 cm during the winter, to highs of 30 degrees C in the summer (Tierney and Foxx, 1982).

Sampling. We collected ants using a variety of techniques. Pitfall traps were used in 1975-76 in Mortandad Canyon (Lowrie 1985). They consisted of inverted 1 liter polyethylene bottles with the bottoms removed and with a funnel inserted in the opening. Ten traps were placed ten meters apart at each of 4 sites. Alcohol (75% ethanol) was placed in the bottoms of the traps as a preservative. Traps were left in place for 3 days. Samples were taken five times during the year, twice in the summer and once during each of the other 3 seasons. Pitfall traps were also used in 1986. These traps consisting of a 12 oz plastic cup inside a 16 oz plastic cup. This allowed easy removal of the smaller cup with the specimens, and later replacement of the cup. Ethylene glycol (20 ml) was placed in the bottoms of the cups. We selected 9 different communities at three different elevations and placed 24 traps in each community. The traps were in groups of 4, one meter apart, with six total groups each 10 meters apart.

We installed the cups on 27 June 1986 and collected them on 1 July 1986. The second method of collecting involved 4 man hours of collecting at each of the 9 communities. Four people each collected for 1 hour using only forceps, vials, a trowel and a rock hammer. Collecting was done in late June to early July. We also collected ants on several trips throughout the county as well as the northern part of New Mexico and southern Colorado. We supplemated our list with collections from Bandelier National Monument (=Bandelier), which is adjacent to Los Alamos County in Sandoval County. We used a black light trap to collect winged ants as a third method.

Ants of New Mexico. The ants of New Mexico are poorly known. Cole published a series of papers on ants which will be cited later in this paper. Whitford and his colleagues (See Kay and Whitford, 1978; Schaffer and Whitford, 1981; Schumacher and Whitford, 1976; Whitford, 1976, 1978a, 1978b; Whitford and Bryant, 1979; Whitford and Ettershank, 1975; Whitford et al., 1975, 1976, 1981; Wisdom and Whitford,

1981) have published extensively on the biology of the ants of New Mexico. Gregg's keys (1963) would be useful for identification of ants at least for the northern part of the state. Smith (1979) would be helpful in understanding nomenclatural changes made since the keys were written, as well as provides references to articles on ants. We have attempted to construct keys using current names, and which will be relatively easy to use by a non specialist, but it must be kept in mind that ants are difficult to identify to species. We have also cited the most recent keys so identifications may be checked in more complete keys. Certainly we have not collected all of the species present in Los Alamos County.Therefore we also include additional genera and species collected in other northern counties of the state and mark them with an asterisk to indicate that we did not actually collect them in the county.

Results

A total of 90 species of ants were collected in Los Alamos County and the adjacent Bandelier National Monument. The genera of workers from the area as well as the rest of New Mexico may be separated with the following key:

Key to the genera in New Mexico, based on workers

1. Petiole and postpetiole present (Fig. 1 a and b) 2
-- Petiole present, but postpetiole not well separated from remainder of gaster (Fig. 4b & 9) 4

2. Frontal carinae positioned close to each other and do not cover the insertions of the antennae, which are located near the base of the mandibles (Fig. 2a) 3
-- Frontal carinae not positioned close to each other and have lobes which partially or completely cover the insertions of the antennae (Fig. 3a) (Subfamily Myrmicinae) 11

3. Eyes very large, covering a large portion of side of the head (Fig. 1); 3 ocelli usually present; body long and thin (Fig. 1) Subfamily Pseudomyrmecinae) ..... *Pseudomyrmex*
-- Eyes absent or extremely small (Fig. 5a)(Subfamily Dorylinae) .. .. *Neivamyrmex*

4. A constriction is present between the postpetiole and remainder of the gaster (Fig. 6d); or the mandibles are very long with three teeth at the apex (Fig. 7); integument hard; sting well developed; not commonly collected (Subfamily Ponerinae) 5

-- No constriction occurs between the postpetiole and remainder of the gaster (Fig. 9); the mandibles are never elongated; integument soft; sting absent or rudimentary; very common ants 10

5. Mandibles elongate with three teeth at apex (Fig. 7); antennae with 12 segments (Fig. 7); petiole sharply pointed above (Fig. 4a); gaster with a very weak constriction between the first two terga (Fig. 4) ..... *Odontomachus*
-- Mandibles not elongated; gaster with well developed constriction between the first 2 terga (Fig. 6d) 6

6. Antennae with 11 segments,the last one forming a club whose length is approximately as long as the preceeding 4 segments; 3 ocelli present ..... *Cerapachys*
-- Antennae with 12 segments, the last one not forming a club; ocelli usually absent 7

7. Eyes absent or extremely small; pygidium (dorsum of last segment of gaster) bordered laterally by small spines ..... *Acanthostichus*
-- Eyes normally present and often large; pygidium not bordered laterally by small spines 8

8. Subpetiolar process with a blunted, angeled anteroventral corner and two distinctly angular posteroventral acute teeth, situated side by side; anteriorly the subpetiolar process has a circular or oval "thin spot" or fenestra which is visible in transmitted light . .....*Ponera*
-- Subpetiolar process a simple lobe, never with a fenestra or paired posterolateral teeth 9

9. Anterior border of clypeus with teeth; mandibles large with numerous irregular teeth ..... *Amblyopone*
-- Anterior border of clypeus without teeth; mandible small .... *Hypoponera*

10. Acidopore at apex of gaster round and usually surrounded by a ring of hairs (Fig. 8b) (Subfamily Formicinae) 33
-- Acidopore absent, no ring of hairs at apex of gaster (Fig. 9) (Subfamily Dolichoderinae) 30

11. Antennae with 10 segments, the last 2 forming a club (Fig. 10a); propodeum without spines (Fig. 10b); either dimorphic species or very small monomorphic species ..... *Solenopsis*
-- Antennae with 11 or 12 segments, if only 10 segments are present, antennal club formed from last 3 segments 12

12. Antenna consisting of 10 or 11 segments 13
-- Antenna consisting of 12 segments 19

13. Propodeum without spines; antenna with three segmented club; thorax mostly smooth and shining .....genus near *Diplomorium*
-- Propodeum with spines or teeth (Fig. 11a); thorax not smooth and shining; antenna with 11 segments 14

14. Postpetiole connected to upper surface of gaster (Fig.11b); gaster, when seen from above, heart shaped with a pointed apex; pronotum without spines or bumps ..... *Crematogaster*
-- Postpetiole not connected to upper surface of gaster (Fig. 12); gaster not heart shaped 15

15. Pronotum with spines or bumps (Figs. 12a & 13a); clypeus does not form a welt in front of the antennal insertions (Figs. 14 & 15) 16
-- Pronotum without spines or bumps (Fig. 16). 18

16. Frontal carinae distinct and extend to the posterior border of the head (Figs. 14a & 15a); dark red or greyish black ants; monomophic 17
-- Frontal carinae do not extend more than 1/2 the distance from the posterior border of the clypeus to the posterior border of head; red ants which are very polymorphic (2-6 mm) ..... *Acromyrmex*

17. Dorsum of thorax with distinct pointed spines (Fig. 12); greater than 3 mm in total length ..... *Trachymyrmex*
-- Dorsum of thorax with bumps (Fig. 13); brownish red ants less than 3 mm in total length ..... *Cyphomyrmex*

18. Clypeus elevated and forming welt in front of the antennal insertions (Fig. 17a); frontal carinae extend to the occipital border of the head and form scrobes to receive the antennae (Fig. 17b) ..... *Tetramorium*
-- Clypeus not forming a welt; frontal carinae do not extend to the posterior border of the head .....*Leptothorax*

19. Propodeum with two pairs of spines; petiole without a distinct node; legs short with thickened femora and tibiae ..... *Myrmecina*
-- Without all of these characteristics; commonly collected 20

20. Clypeus elevated and forming welt in front of the antennal insertions (Fig. 17a) ..... *Tetramorium*
-- Clypeus not elevated in the form of a welt 21

21. Middle and hind tibial spurs pectinate (Fig. 19a) 22

-- Middle and hind tibial spurs not pectinate 24

22. Constriction between the mesonotum and propodeum absent, propodeum often with spines, psammophore (long curved hairs on underside of head) usually present (Fig. 18c); common ants at lower elevations. ..... *Pogonomyrmex*
-- Constriction present and distinct between the mesonotum and the propodeum which usually has spines (absent in *Manica*); psammophore absent; most common in pine forests and mountainous areas 23

23. Propodeum with spines or teeth ..... *Myrmica*
-- Propodeum without spines or teeth, although blunt protuberances may be present ..... *Manica*

24. Propodeum without spines (Fig. 20a); antennal club composed of three segments (Fig. 20); small, shiny, black ants ...*Monomorium*
-- Propodeum with spines, or if not, the ants are not small, shiny and black 25

25. Antennal club composed of 3 segments (Figs. 21 & 23). 26
-- Antenna without a club or with a club containing more than 3 segments (Fig. 24) 29

26. Workers dimorphic or polymorphic; major with head two times as large as gaster (Fig. 22); petiole with a long peduncle; scape of the antenna of workers often extends past the occipital border of the head (Fig. 23a); very common ants at lower elevations .... *Pheidole*
-- Monomorphic species; the scape does not extend past the occipital border of the head (Fig. 21). 27

27. Peduncle of petiole as long or longer than height of node of petiole; thorax short, moderately to strongly arched anteroposteriorly; promesonotal and mesopropodeal sutures faintly indicated or absent; extremely rare, in arid and semiarid regions 28
-- Peduncle of petiole generally much shorter than height of node of petiole; thorax usually with a flat dorsum; common especially in pine forests ..... *Leptothorax*

28. Eyes with less than 50 facets; antennal club longer than remainder of flagellum; anteroinferior pronotal angle present (Fig. 21a); hind femur not noticably thickened ..... *Rogeria*

-- Eyes with more than 50 facets; antennal club shorter than the remainder of the flagellum; anteroinferior portion of pronotum not angular; hind femur noticeably thickened ..... *Leptothorax* (=*Macromisha*)

29. Clypeus with pair of longitudinal carinae; thorax thickened with little constriction between the mesonotum and the propodeum; cryptic or leaf litter ants ..... *Stenamma*
-- Clypeus without carinae or with more than one pair; thorax very slender (Fig. 24); common ants in numerous habitats ..... *Aphaenogaster*
30. Propodeum with a dorsal protuberance in the form of a cone (9a); maxillary palps very long (Fig. 9b) ..... *Conomyrma*
-- Propodeum lacking a conical protuberance. 31
31. Node of petiole almost absent; monomorphic black ants which are widely distributed in the county. ..... *Tapinoma*
-- Node of petiole obvious although it may be small (Fig. 9); common ants 32
32. Workers polymorphic; ocelli present at least in larger workers; gaster with grey pubescence; thorax in profile without impression before the posterior edge of the propodeum (Fig. 25); nests usually in oak trees in mountainous areas ..... *Liometopum*
-- Workers monomorphic; ocelli absent; most common in desert regions nesting in the soil ..... *Forelius*
33. Antenna with 9 segments; small,light colored, subterranean ants that are not commonly collected. ..... *Brachymyrmex*
-- Antenna with more than 9 segments; 34
34. Mandibles very long and sickle shaped; red ants found in mixed nests with *Formica* spp ..... *Polyergus*
-- Mandibles not long and sickle shaped. 35
35. The insertions of the antennae are located far from the posterior border of the clypeus; the thorax and propodeum form a single convexity in profile (except for *C. hyatti* in which the profile is flattened) (Fig. 26) ..... *Camponotus*
-- The insertions of the antennae located about one scape width or less from the basal border of the clypeus; the thorax and propodeum not forming a single convexity in profile (Fig. 27) 36
36. The maxillary palps are very long, segment 4 is as long as segments 5 and 6 combined (Fig. 8c); psammophore present ..... *Myrmecocystus*

-- Maxillary palps shorter, segment 4 not unusually long; psammophore absent 37

37. Frontal carinae prominent, lateral margins slightly deflected upward; ocelli distinct; larger ants (3-8mm); some spp. weakly polymorphic (Fig. 27) ..... *Formica*
-- Frontal carinae poorly marked, lateral margins flat; ocelli indistinct or absent; smaller (2-3.5mm) monomorphic ants 38

38. Antennal scapes surpassing the occipital margin by at least one-third their length (Fig. 28); erect hairs coarse, long and usually black in color and are especially noticable on the dorsum of the pronotum (Fig. 28a) 39
-- Antennal scapes not surpassing the occipital margin, or at least not by an amount greater than the length of the first funicular joint; erect hairs not coarse, are short and golden 40

39. Thorax as seen from above with mesonotum strongly compressed, pronotum and propodeum appear swollen in front and behind the constriction; scapes and tibiae without erect hairs; most of or all of eye above middle of head ..... *Prenolepis*
-- Thorax seen from above only slightly constricted at the mesothorax; scapes and tibiae with erect hairs; most or all of eye at or below the middle of the head (Fig. 28) ..... *Paratrechina*

40. Maxillary palps short and composed of three segments, and are difficult to see ..... *Acanthomyops*
-- Maxillary palps longer and composed of 6 segments, very obvious ..... *Lasius*

SUBFAMILY PONERINAE

Cole (1953a) discussed the subfamily in New Mexico.

Genus *Hypoponera* (Key: Creighton, 1950)

Hypoponera opaciceps (Mayr)
Habitat: Riparian and sagebrush (Rio Grande), loose on ground.

SUBFAMILY DORYLINAE

Cole(1953a) includes this subfamily in his paper.

Genus *Neivamyrmex* (Key: Watkins, 1985)

This is a genus of native army ants which raid the nests of other ant species.

Key to *Neivamyrmex* workers

1. Head densely granulated (i.e., texture similar to sandpaper) .... *nigrescens*
-- Head not densely granulated, but may have numerous punctures 2

2. Node of petiole about two times longer than wide .. *opacithorax*
-- Node of petiole about as long as wide ..... *carolinensis*

Neivamyrmex carolinensis (Emery)
Locality: Bandelier (Pippin and Pippin,1984).

N. nigrescens (Cresson)
Habitat: Pinon-juniper (bombing range), pitfall trap.

N. *opacithorax* (Emery)
Habitat: Sagebrush (Rio Grande), pitfall trap.

SUBFAMILY MYRMICINAE

Genus *Aphaenogaster* (Key: Creighton, 1950)

Aphaenogaster huachucana crimera Cole
Locality: Bandelier National Monument (Type Locality).

Genus *Crematogaster* (Key: Buren, 1968)

This is an extremely difficult group for identification to species. Buren (1968) presented a key to the North American species, but due to the variability within species, use of the key does not always result in correct identifications. A number of "species" especially *C. cerasi* are probably species complexes. *Crematogaster punctulata* Emery and *C. navajoa* Buren are included in the key as they occur in New Mexico.

Key to *Crematogaster* workers

1. Erect hairs numerous on the dorsum of thorax, usually 10 or more on pronotum, 2 or more (usually 6 or more) on the mesothorax; one or more on the propodeum or propodeal spines 2
-- Erect hairs not numerous on dorsum of thorax and rarely present on mesothorax or propodeum, usually restricted to one to four on pronotum, often completely absent on pronotum 3

2. Thoracic punctation fine, surface shining to subopaque, especially obvious on sides of pronotum ..... *navajoa*
-- Thoracic punctation coarse, surface subopaque, sides of pronotum coursely punctate ..... *punctulata*

3. Possessing most or all of the following characteristics: Hemilobes of postpetiole completely rounded; process on ventral surface of peduncle of petiole very poorly developed or absent; propodeal spines thickened at the base; most common species in county . . . . . cerasi

-- Possessing most or all of the following characteristics: hemilobes of postpetiole somewhat angulate to very angulate behind in profile; process on ventral surface of peduncle well developed and lobe like; propodeal spines not thickened at base, smoothly tapering . . . . . *colei*

Crematogaster cerasi (Fitch)

Habitats: Juniper and sagebrush (Rio Grande); Ponderosa Pine (Los Alamos); Riparian (Camp May).

Biology: Nests commonly found under rocks, brood and reproductives in nests in July and August. Most common *Crematogaster* spp. in the county.

Discussion: Specimens of this species may be keyed with difficulty to *C. colei* using Buren (1968). The pronotum often has a single erect hair, a pair of hairs or 3 or more pairs of erect hairs. The characteristics in our key should allow separation of the two species.

C. colei Buren

Habitat: Sagebrush (Rio Grande); disturbed area (nuclear waste site G).

Biology: Not common in county, nests usually under rocks.

Discussion: Specimens of this species would often key to *C. depilis* using Buren (1968), as there are often no hairs present on the pronotum. It differs in that the hemilobes of postpetiole are always at least somewhat angulate (rounded in *C. depilis*), the posterior part of the side of the pronotum is somewhat shiny and lightly punctated (heavily punctated in *C. depilis*), it is concolorous dark brown to yellowish brown (*C. depilis* is usually reddish brown with a black gaster) and the peduncular process is well developed (poorly developed in *C. depilis*). It could also be confused with *C. larreae*, but as far as is known, *C. larreae* nests only in creosotebush shrubs (*Larrea tridentata).*

Genus *Leptothorax* (Key: Creighton, 1950)

This is a common group, but is not often collected except by the specialist. They are small ants found nesting in rotten wood or under rocks. Cole (1953b, 1954a, 1958) includes the species from New Mexico.

Key to *Leptothorax* workers

1. Antennae with 12 segments 2
-- Antennae with 11 segments 6

2. Eye about twice as long as wide and kidney shaped ..... *obliquicanthus*
-- Eye about as long as wide and rounded 3

3. The dorsum of the postpetiole coarsely reticulo- rugose ..... *texanus texanus*
-- Dorsum of postpetiole punctate or granulose, but not reticulo-rugose, rugae, if present, longitudinal and confined to sides of node 4

4. Posterior half of head partly smooth and shining with a broad central strip which is free of sculpture; petiolar node in profile angular, with a relatively sharp apex ..... *nitens*
-- Head largely or entirely sculptured, the surface feebly shining or completely opaque, if a central strip is without sculpture, then petiolar node is rounded and blunt in profile 5

5. Dorsum of thorax densely and evenly punctate, rugae, if present, very feeble; sides of thorax with heavy punctures which largely obscure the rugae ..... *andrei*
-- Dorsum of thorax with punctures interrupted by prominent rugae on the propodeum, mesonotum and often pronotum; rugae on sides of thorax not obscured by punctures ..... *tricarinatus*

6. Dorsum of postpetiole shining, sculpture consisting of widely spaced, small punctures with the surface between them smooth or delicately shagreened ..... *provancheri*
-- Dorsum of postpetiole opaque or nearly so, surface densely punctate or punctate-granulose 7

7. Clypeus with median, elevated ridge or keel (or several); mesopropodeal suture seldom present on the thoracic dorsum and never impressed ..... *rugatulus*
-- Clypeus without median elevated ridge or keel, its center depressed to form a shallow, longitudinal trough; mesopropodeal suture usually present on thoracic dorsum and usually depressed slightly below level of rest of thorax 8

8. Erect body hairs numerous, long and usually pointed; interrugal punctures on thorax heavy and dense, surface feebly shining or opaque ..... *crassipilis*

-- Erect body hairs sparse, short and usually clavate; interrugal punctures on thorax shallow and rather sparse, the surface where they occur moderately shining ..... *muscorum*

Leptothorax andrei Emery
Habitat: Juniper (Rio Grande), Pitfall traps.

L. crassipilis Wheeler
Habitat: Ponderosa pine-riparian (Mortandad Cyn., 8 k NE Los Alamos in Chupaderos Cyn), in pitfall traps.
Biology: Nest in Chupaderos Cyn. under rock.

L. muscorum (Nylander) (= *L. canadensis* Provancher)
Habitat: Ponderosa pine-riparian (Mortandad Cyn.); ponderosa pine (Bandelier); aspen (Camp May).
Biology: This is the most common *Leptothorax* spp in the county. It nests in rotten logs (usually ponderosa pine) throughout the area. Logs may range from 15 cm to 1 m in diameter. Brood and reproductives were found in the nests in July.

L. nitens Emery
Habitat: Ponderosa pine-riparian (Mortandad Cyn.); highly disturbed area (waste site G), in pitfall traps.

L. obliquicanthus Cole
Habitat: Highly disturbed site (waste site G), in pitfall traps.

L. provancheri Emery
Habitat: Riparian (Camp May), pitfall trap.

L. rugatulus Emery
Locality: Bandelier, under rocks (Cole 1953b).

L. texanus texanus Wheeler
Habitat: Ponderosa pine riparian (Mortandad Canyon), pitfall traps. This is the first record of this species from New Mexico.

L. tricarinatus Emery
Habitat: Ponderosa pine riparian (Mortandad Canyon), pitfall traps.

Genus *Monomorium* (Key: DuBois, 1986)

This is a common group of tiny, shiny, black ants. Cole (1953c) deals with the species in New Mexico.

Key to *Monomorium* workers

1. Mesopleuron punctate; fewer than 8 hairs projecting above dorsum of thorax; unmated females without wings ..... *cyaneum*
-- Mesopleuron not punctate; usually more than 10 hairs projecting above thorax; unmated females with wings ..... *minimum*

Monomorium cyaneum Wheeler

Habitat: Juniper (Rio Grande); disturbed area (Nuclear waste site G), in pitfall trap.

M. minimum (Buckley)

Habitat: Ponderosa pine-riparian (Mortandad Canyon); pinon-juniper (bombing range); Bandelier, pitfall traps.

Genus *Myrmecina*

Cole (1953c) treats the distribution of this genus in New Mexico.

Myrmecina americana Emery

Habitat: Ponderosa pine-riparian (Mortandad Canyon), pitfall traps.

Genus *Myrmica* (Key: Creighton, 1950)

These are very common ants in Los Alamos county. The nests are usually located under rocks in forested areas. Cole (1953d, 1953e, 1957) discusses the genus in New Mexico. These ants are very difficult to identify. We are not sure of the names of a large portion of the *Myrmica* we collected in the area. The group is currently being revised by Andre Francoeur. The key we provide may be used in identifying the described species in the area. Specimens that do not work out in the key may belong to undescribed species.

Key to *Myrmica* workers (Modified from Gregg, 1963)

1. Antennal scape gradually and evenly bent at base, upper surface never forming a right angle at the bend 2
-- Antennal scape sharply bent at base, upper surface forming right angle, a lamina of varying shapes present on the upper surface of the scape at the base 4

2. Lateral margins of frontal lobes deflected toward the antennal insertions (antennal scapes of the male not longer than the three following segments taken together, and straight at the base) 3
-- Lateral margins of frontal lobes moderately to strongly elevated (antennal scape of the male slightly bent at the base, and as long as the following four or five segments taken together) .... *brevispinosa*

3. Sculpture fine, color reddish brown over most of the body and appendages ..... *incompleta*
-- Sculpture of head and thorax coarse; color dark brownish black to black, legs and antennae lighter ..... *sulcinodoides*

4. Base of first gastral segment furnished with diverging striations ..... *striolagaster*
-- Base of first gastral segment without striations 5

5. Bend of antennal scape with large, thick lobose lamina which extends backward along basal third of scape ..... *monticola*
-- Bend of scape with small, transverse lamina, or with thin lamina which surrounds bend like a collar, and does not extend backward along scape 6

6. Ventral surface of postpetiole in profile flat or nearly so, and not forming an anterior projection (antennal scape of male as long as or longer than following four segments taken together, and straight at the base) ..... *americana*
-- Ventral surface of postpetiole convex or forming prominent anterior projection which extends forward under anterior peduncle (antennal scape of male bent at base, or if straight it is distinctly shorter than above) 7

7. Lamina of antennal scape forming a high, semicircular welt which surrounds scape at the bend, and undercut along its distal edge so as to produce a distinct hook (antennal scape of male bent at base and usually shorter, never longer, than the three following segments taken together) ..... *hamulata*
-- Lamina of antennal scape not forming a high, semicircular welt, and not forming a deep hook (antennal scape of male straight at base, or if bent its length is equal to following five segments taken together). 8

8. Antennal lamina small and diagonally transverse on upper surface of scape, but continued as a prominent transparent flange along the inner surface of that part of scape that lies below the bend (antennal scape of the male straight at the base and as long as the three following segments together) ..... *emeryana*
-- Antennal lamina not forming prominent flange as above, or if a small flange is present, the lamina is not transverse on the upper surface of the scape 9

9 10. Antennal lamina encircling bend of the scape in the form of a spoon-like flange (antennal scape of male abruptly bent at base

with upper surface angulate at the bend; propodeal spines of male well developed, prododeum with distinct rugae) .... *lobicornis* subsp. *lobifrons*

-- Antennal lamina small, transverse, and forming an angular tooth on inner side of bend (antennal scape of male gradually bent at base and not forming a distinct angle; propodeal spines of male reduced to rounded angles, the propodeal rugae feeble or lacking) ..... *lobicornis* subsp. *fracticornis*

Myrmica brevispinosa Wheeler

Habitat: Riparian (Camp May); pinon-juniper (bombing range).

Biology: Not common in area, nests under rocks, brood and reproductives in nests in early August, foundress females also collected in August.

Discussion: There are two subspecies formally recognized: *brevispinosa brevispinosa* Wheeler and *b. discontinua* Weber. *M. b. discontinua* is said to have longer propodeal spines and is darker brown. We have found considerable variation in these characters, even from individuals from the same nest. One nest (Colorado, Conejos County, 81 k W Antonito) possesses individuals with only tiny angles as propodeal spines and other individuals with spines as long as those found in "typical" *discontinua*. The two spines on an individual are often different in length. Therefore we will call the specimens we collected simply *brevispinosa*, but will not formally synonymize *discontinua* as the genus is currently under revision. There are possibly other differences: *brevispinosa* has a more rounded node of the petiole, *discontinua* has a pointed node in the workers; the female *brevispinosa* is much lighter than a mature female of *discontinua*; the posterior end of the node of the postpetiole of the male is somewhat less truncated in *brevispinosa* than in *discontinua*. Our specimens are most similar to "*discontinua*".

M. emeryana Forel

Habitat: Riparian-ponderosa pine (Mortandad Cyn., Bandelier).

Biology: Nests under rocks throughout much of montane New Mexico.

M. hamulata Weber

Habitat: Ponderosa pine-riparian (Los Alamos, Mortandad Cyn.); spruce (Camp May); Bandelier.

Biology: This species is not common in the county, nests are usually in open areas in the soil, but are occasionally under rotten logs and stumps.

M. incompleta Provancher

Habitat: Riparian, aspen (Camp May).

Biology: Most of the specimens were collected as strays or in pitfall traps.

Genus *Pheidole* (Key: Gregg, 1958)

This is a large genus of abundant ants. It is a difficult group replete with taxonomic problems. Cole (1952, 1953f, 1955a, 1956) includes the New Mexican species. Our treatment includes a previously undescribed species, *P. wheelerorum*.

Key to *Pheidole* majors (Modified from Gregg, 1963)

1. Antennal scape of major surpassing the occipital borders ..... *desertorum*
-- Antennal scape of major not reaching occipital border. 2

2. Scape of major abruptly bent at base so it turns toward the midline of the head in passing to antennal insertion, basal section of scape flattened and as broad as the distal portion 3
-- Scape of major not abruptly bent towards midline of head, if basal section is flattened it is not as broad as the distal portion ... 4

3. Entire dorsal surface of head of major covered with reticulo-rugose sculpture, interrugal spaces granulose, and the surface opaque ..... *cockerelli*
-- Reticulo-rugose sculpture on head of major largely confined to anterior half, occipital lobes punctate or feebly granulose, but the surface shines rather strongly ..... *hyatti*

4. Tops of occipital lobes of major and usually their faces as well, covered with sculpture, the surface opaque or feebly shining ..5
-- Tops of occipital lobes of major and usually their front faces also, free of sculpture except for piligerous punctures, the surface in most cases smoothly shining 7

5. Humeral angles of pronotum of major weakly developed and not forming lateral bosses ..... *sitarches sorites*
-- Humeral angles of pronotum of major strongly developed and forming distinct epaulet-like lateral bosses 6

6. Head of major in profile almost rectangular, occipital lobe bluntly rounded and almost as deep as the depth of the head at eye

level; minor with part of clypeus, frontal area and at least part of head smooth and shining ..... *pilifera coloradensis*

-- Head of major in profile narrowed at the occipital lobes, which are somewhat pointed (Fig. 29); entire head of minor, including the clypeus, completely punctate (a small area behind frontal area may be lightly punctate and shining) ..... *wheelerorum*

7. Sculpture on head of major extending to the vertex, only the occiput smooth and shining ..... *ceres*

-- Sculpture on head of major largely confined to the anterior half, the posterior half smooth and shining 8

8. Vertex and occiput of minor with small, close-set punctures, which give the surface a noticeably duller appearance on those parts than elsewhere on the head ..... *cerebrosior*

-- Vertex and occiput of minor strongly shining or only slightly less shining than the rest of the head, the punctures widely scattered over the entire head ..... *bicarinata*

Pheidole cerebrosior Wheeler

Habitat: Sagebrush, riparian (Rio Grande).

Biology: Two nests were collected under rocks in July.

Ph. ceres Wheeler

Habitat: Ponderosa pine, p. pine-riparian (Los Alamos); highly disturbed area (nuclear waste site G) and at a burned area (Ponderosa Camp) at Bandelier National Monument. Also found in pinon-juniper in other areas of northern New Mexico.

Biology: Collected in pitfall traps, nests normally under rocks. Brood and reproductives collected in July. Apparently able to adapt well to large scale disturbance such as forest fires and waste site construction.

Ph. desertorum Wheeler

Habitat: Sagebrush, juniper (Rio Grande).

Biology: Two nests were found under rocks in addition to pitfall samples.

Ph. hyatti hyatti Emery

Habitat: Riparian (Rio Grande), pitfall trap. This is the first record of the species from New Mexico.

Ph. sitarches soritis Wheeler

Habitat: Sagebrush (Rio Grande); disturbed area (nuclear waste site G).

Biology: This is a common ant in the county, especially in disturbed areas.

Discussion: Cole (1953f) proposed that *P. sitarches campestris* Wheeler be synonymized with *P. sitarches soritis* Wheeler, but later (Cole, 1956) reversed his position. *Pheidole sitarches sitarches* Wheeler and *P. sitarches campestris* also hybridize at the area of overlap of their distributions near Austin,TX (Creighton, 1950). The minors in our samples show considerable variation in the sculpturing of the head, and in the pronotal rugae, and some of them would key to *P. sitarches sitarches*. We suggest that at least *P. sitarches sitarches* and *P. sitarches sorites* are conspecific. A revision of the species complex would probably reveal two species: *P. sitarches* Wheeler and *P. littoralis* Cole. We consider that Naves (1985) was justified in treating *P. littoralis* as a separate species.

Ph. wheelerorum W. MacKay

Major (HOLOTYPE) (collection # 8059 of WPM). Head 1.50 mm wide, 1.52 mm long (occipital lobes to anterolateral corners of clypeus); mandible large with two large teeth at apex, apical tooth somewhat wider and longer than subapical tooth; clypeus with an impressed notch in the middle of the anterior border; antenna with 12 segments, the last 3 forming a club; scape not abruptly bent at the base, but is slightly flattened over the basal 2/3 of its length, scape extending just past the posterior border of the eye; frontal carinae strongly diverging posteriorly, with about 16 coarse rugae between them; malar area with prominent coarse rugae, interrugal spaces smooth and shining, rugae between frontal carina and malar area reticulo-rugose with interrugal spaces strongly punctate; front faces of occipital lobes finely rugose and punctated; tops of occipital lobes finely striate; eye with about 85 ommatidia; head in profile not rectangular, occipital lobes narrowed as compared to the rest of head (Fig. 29).

Pronotum with strongly developed humeral angles which form lateral bosses; propodeum depressed below level of promesonotum; mesopropodeal suture well developed and very deep on the side of the alitrunk; propodeal spines well developed, thickened and directed upward (Fig. 29); entire alitrunk, including propodeal teeth, strongly punctate, with faint rugae on side of pronotum, mesopleural region, area near metapleural glands and between the propodeal spines.

Petiole and postpetiole strongly punctate; petiolar node depressed in middle; lateral connules of postpetiole well developed (Fig. 30).

Gaster shining with punctures at the base. Erect hairs numerous on body surface, truncate and weakly clavate on the occipital lobes and promesonotum.

Head, most of thorax and legs reddish-brown, thorax partly infuscated; petiole, postpetiole and gaster dark reddish-brown.

Minor (PARATYPE) (Collection # 8059, individual used for description mounted on same pin as holotype).

Head 0.58 mm wide, 0.62 mm long; mandibles striated with seven teeth, two at apex larger, apical tooth largest of the two; clypeus punctate with a median carina, median notch poorly developed; antenna with three segmented club, scape extends to occipital border; head densely and evenly punctate; eye with about 60 ommatidia.

Thorax densely and evenly punctate, somewhat shining on the side of the pronotum; propodeal spines well developed and directed upwards.

Petiole and postpetiole strongly punctate; gaster smooth and shining, except for a few punctures at the base.

Erect hairs numerous over body surface, truncate and somewhat clavate, especially on the dorsal surface of alitrunk. Color dark brown, mandibles, legs and area anterior to eye somewhat lighter.

Female and male: unknown

Type locality.- New Mexico, Los Alamos County, 4 k N of Los Alamos (Chupaderos Canyon), 19 Aug. 1986, collected by Emma MacKay. All of the type material was collected from a single nest.

Distribution.- Northern New Mexico: Rio Arriba Co. (4 k N Chama, 7 k S Cebolla); Los Alamos Co. (4 k N Los Alamos, nuclear waste site G in city of Los Alamos, natural area adjacent to waste site).

Habitat.- Pinon-juniper (Rio Arriba Co., Los Alamos: natural area adjacent to waste site G); ponderosa pine-riparian (Chupaderos Cyn.); disturbed site (waste site G).

Biology.- Three nests were under rocks; we captured other individuals in pitfall traps in the area around waste site G, but were unable to locate the nests. The ants must nest in soil without rock cover in waste site G as there are no rocks avail-

able. Brood was present in the nests on 29 June and 19 Aug. 1986.

Disposition of types.- The holotype and paratype minor will be deposited in the U.S. National Museum of Natural History, paratypes will be deposited in the Los Angeles County Museum of Natural History, the New Mexico Museum of Natural History, American Museum of Natural History, the Museum of Comparative Zoology and El Museo de Historia Natural, Universidad Nacional Autonoma de la Ciudad de Mexico, and the insect collections of the Colegio de Graduados, Escuela Superior de Agricultura "Hermanos Escobar", New Mexico State University and Texas A & M University, the Florida State Collection of Arthropods, and in our personal collection.

Variation in the species.- The propodeal spines vary in thickness, and length; some majors are darker than the holotype; lateral connules are not always as well developed as they are in the holotype, but they are always quite obvious.

Etymology of specific epithet. -This species is named in honor of Drs. George and Jeanette Wheeler in recognition of their excellent work on ant larvae and for providing the most " user friendly" keys available for the identification of ants.

Discussion.- Majors would key to *pilifera coloradensis* in Gregg (1963).They differ from *p. coloradensis* in that the rugae on the occipital lobes are weakly developed and the lobes are punctate and feebly shining (longitudinal rugae well developed in *p. coloradensis*); the head in profile is narrowed at the occipital lobes (the head in profile is almost rectangular in *p. coloradensis*, the occipital lobes are bluntly rounded and almost as deep as the depth of the head at the level of the eyes); propodeal spines are well developed (poorly developed in *p. coloradensis*); postpetiole connules are usually longer than in *p. coloradensis*, although they are somewhat variable in size; and they are somewhat darker than *p. coloradensis*.

Minors of *P. wheelerorum* can be distinguished from those of *p. coloradensis* in that the head, including the clypeus, is completely punctated, only a small area behind the frontal area is lightly punctated and somewhat shining (part of clypeus, frontal area and at least part of head is smooth and shining in *p. coloradensis*).

Genus *Pogonomyrmex* (Keys: Cole, 1968; MacKay et al., 1985)

This is a common and obvious group of seed harvesting ants. Cole (1934, 1954b) discusses the genus in New Mexico.

Key to *Pogonomyrmex* workers (Modified from MacKay et al.,1985)

1. Propodeal spines connected by a ridge; psammophore (long curved hairs on ventral surface of head) poorly developed; clypeus (seen from above) forms projections anterior to the antennal fossae ..... *imberbiculus*
-- Propodeal spines (not always present) not connected by a ridge; psammophore well developed; clypeus without projections anterior to the antennal fossae 2

2. Propodeal spines absent, or if present in some workers in a nest, they are bumps or tiny asymmetrical spines 3
-- Propodeal spines well developed 4

3. Longitudinal rugae of head almost parallel and do not form concentric curves above the eyes; anterior margin of clypeus with a wide and deep impression that often extends to the frontal lobes; workers without tiny spines on propodeum ..... *apache*
-- Longitudinal rugae of head widely diverging towards the posterior lobes of the head, usually forming concentric curves above the eyes; clypeus without such impression; usually some workers have tiny spines on their propodeum ..... *maricopa*

4. Basal tooth of mandible (closest to head) abruptly bent upward and backward; common ant which builds large mounds ....*occidentalis*
-- Basal tooth oriented parallel to other teeth of mandible; ants do not build gravel mounds, although they often surround nest entrance with gravel 5

5. Color deep red or reddish orange, gaster same color as thorax .. ..*barbatus*
-- Color dark or black, often the gaster is lighter in color than thorax ..... .*rugosus*

Pogonomyrmex apache Wheeler

Habitat: Sagebrush, (Rio Grande), collected strays and individuals in pitfall traps.

Pogo. barbatus (Smith)

Habitat: Sagebrush,riparian, brush (Rio Grande). Also Bandelier.

Biology: This is a common ant at lower elevations in Los Alamos County.Nests are in soil often surrounded by gravel, but are never mounds. Brood and reproductives are found in the nests in July.

Pogo. (Ephebomyrmex) imberbiculus Wheeler

Habitat: Juniper (Rio Grande).

Biology: This species is not common in the county. Nests in soil.

Discussion: Many authors feel *Ephebomyrmex* should be separated from *Pogonomyrmex* (Wheeler and Wheeler, 1986). We agree, but will place it under *Pogonomyrmex* until a thorough analysis can be done on the 3 subgenera of *Pogonomyrmex*.

Pogo. maricopa Wheeler

Habitat: Grass (Rio Grande).

Biology: Apparently not common in the county , nests in soil.

Pogo. occidentalis (Cresson)

Habitat: Sagebrush (Rio Grande); Pinon-Juniper (bombing range, Los Alamos); Ponderosa pine-riparian and ponderosa pine all over the county; highly disturbed area (waste site G).

Biology: This is one of the most common and obvious ants in the county.It is especially conspicuous as it builds large gravel mounds up to 1 m in diameter and 50 cm in height. It colonizes an area rapidly as it is present on waste site G on plots 5 years old. Brood and reproductives are found in the nests throughout the summer.

Pogo. rugosus Emery

Habitat: Riparian (Rio Grande); Bandelier.

Biology: Nests in soil, often places gravel around the nest entrances. This species is not common in the county.

Genus *Solenopsis* (Key: Creighton, 1950)

This is a relatively common group in northern New Mexico. Snelling and George (1979) consider the common New Mexican ant, previously known as *S. xyloni*, to actually be *S. maniosa*. We did not collect *S. maniosa* in the county, although it probably occurs on dryer sites. *Solenopsis molesta* is the most common species in the area. We recognize a second small species as *S. krockowi*, although it could be *S. salina*, as there is considerable variation in the ventral tooth of the anterior peduncle of the petiole. Cole (1953c) discusses the distribution of the genus in New Mexico.

Key to *Solenopsis* workers

1. Workers polymorphic; eye of minor with about 50 ommatidia ... . *maniosa*
-- Workers monomorphic; eye of minor with less than 15 ommatidia 2

2. Punctures on head small, often visible only under high magnification, and not much larger than the hairs which arise from them 3
-- Punctures on head small, but distinct, and are clearly greater in diameter than the hairs which arise from them 4

3. Color clear golden yellow or light brownish yellow .... *molesta*
-- Color deep castaneous brown ..... *truncorum*

4. Anterior peduncle of petiole with prominant, sharp ventral tooth ..... *salina*
-- Anterior peduncle of the petiole with a blunt ventral tooth .... *krockowi*

Solenopsis krockowi Wheeler
Habitat: Riparian, juniper, sagebrush (Rio Grande).
Biology: Nest under rocks, also captured in pitfall traps.

S. molesta Say
Habitat: Riparian (Rio Grande, Los Alamos); pinon-juniper (Los Alamos,bombing range); p. pine-riparian (Mortandad Cyn.); sagebrush (Rio Grande); disturbed area (waste site G).
Biology: This is a common, widely distributed species. Nests are in the soil (often under rocks) and often adjacent to the nests of other species. Reproductives and brood are present throughout the summer.

Genus *Stenamma* (Key: Smith, 1957)

This is a rarely collected genus in the southwest. It is currently being revised by Mark DuBois.

Stenamma occidentale M. R. Smith.
Habitat: Ponderosa pine-riparian (Mortandad Cyn.), pitfall traps.

Subfamily Dolichoderinae

Genus *Conomyrma* (Key: Snelling, 1973)

Conomyrma insana (Buckley)
Habitat: All vegetation types at lower elevations, especially disturbed sites such as nuclear waste site G.

Biology: Widely distributed throughout the state, nests in soil, brood and reproductives in nest throughout summer. Nuptial flight occurred at 1600 on 27 July 1986, 66 k E Albuquerque.

Discussion: This is actually a species complex currently under study by James Trager. We must refer to the taxon as "insana" until the group is revised.

Genus *Forelius*

Forelius analis (Andre)

Habitat: Juniper, sagebrush, riparian (Rio Grande), pitfall traps. Also reported from Bandelier (Pippin and Pippin, 1984). Widely distributed in many habitats in New Mexico.

Discussion: Snelling and George (1979) have transferred this ant from *Iridomyrmex* to *Forelius* based on the structure of the proventriculus.

Genus *Liometopum* (Key: Creighton, 1950)

This genus is relatively common; nests are usually located under rocks or in living trunks or dead logs.The ants are very aggressive, and although they do not sting, they can be very unpleasant.

Key to *Liometopum* workers

1. Long erect hairs present on dorsum of gaster mixed with shorter erect hairs, some of the hairs nearly as long as those on the pronotum ..... *apiculatum*

-- Erect hairs on dorsum of gaster very short (or absent) and of approximately equal length, usually shorter than erect hairs on pronotum..... *luctuosum*

Liometopum apiculatum Mayr

Habitats: Sagebrush (Rio Grande); ponderosa pine-riparian (Los Alamos); widely distributed in New Mexico.

Biology: Nests under rocks and in trunks of living and dead trees. Very aggressive ants. Male and female collected on ground in July, Foundress females collected in August under rocks.

Liometopum luctuosum Wheeler

Habitats: Ponderosa pine-riparian (Los Alamos), pitfall traps.

Biology: Nests occur in living or dead tree trunks. Very agressive. Lone male collected in mid July.

Discussion: This species has been considered a subspecies of *L. occidentale*. *Liometopum luctuosum* occurs at higher elevations (usually above 2000 meters) whereas *L. occidentale* usually oc-

curs below 2000 meters.The distributions of the two are parapatric or sympatric in a number of areas, especially the mountains of southern California,with no hybridization. Because the morphological differences and lack of hybridization, we agree with Snelling and George (1979) and Wheeler and Wheeler (1986) that *L. luctuosum* should be regarded as a separate species.

Genus *Tapinoma*

Tapinoma sessile (Say)

Habitat: Juniper,sagebrush (Rio Grande); pinon-juniper (high explosives test range); p. pine-riparian (Los Alamos, Mortandad Cyn., Bandelier, 4 k N and 8 k N of Los Alamos); riparian (Los Alamos, Camp May); aspen (Camp May).

Biology: This species is found in a wide variety of habitats nesting in open soil, under rocks and logs or in dead wood. It is a common house infesting ant in the area.

Subfamily Formicinae

Genus *Acanthomyops* (Key: Wing, 1968)

This genus is similar to *Lasius*. Nests are usually located under rocks. Cole (1954c) discusses the genus in New Mexico. Many of the workers in Los Alamos Co. may be separated using the following key.

Key to *Acanthomyops* workers (Modified from Wing, 1968)

1. Length of standing hairs of dorsum of gaster 0.23 mm or more in length, those on gula 0.20 mm or more; in side view, crest of petiolar scale moderately sharp, usually emarginate, standing hairs on dorsum of gaster confined to the posterior edges of the tergites (except for the first tergite) ..... *interjectus*
-- Standing hairs on dorsum of gaster usually less than 0.22mm, those on the gula usually less than 0.20mm; scale of petiole variable; standing hairs on dorsum of gaster usually uniformly distributed 2

2. Crest of petiolar scale blunt (in profile),convex; standing hairs on gula almost always distributed over entire surface (as seen from side) ..... *latipes* and *pogonogynous*
-- Crest of petiolar scale at least moderately sharp, usually emarginate: standing hairs on gula usually covering the posterior 3/4 or 1/2 of the surface ..... *coloradensis*

A. coloradensis (Wheeler)
Locality: Bandelier National Monument (Pippin and Pippin, 1984)

A. interjectus (Mayr)
Habitat: residential area (Los Alamos); ponderosa pine (8 k N Los Alamos).

A. latipes (Walsh)
Habitat: Ponderosa pine-riparian (Mortandad Cyn.); sagebrush (Rio Grande); Bandelier, ants captured loose or in pitfall traps.
Discussion: The workers of *A. pogonogynous* cannot be separated from those of *A. latipes* and would key to *A. latipes*. *Acanthomyops murphyi* may also occur in the area and would also key to *A. latipes*. *Acanthomyops latipes* is one of the most common species in the area and therefore most or all samples which would key here would be *A. latipes*. See Wing (1968) for further details.

A. pogonogynous Buren
Habitat: Residential area in Los Alamos, female loose on ground. This is the first record of this species in New Mexico.

Genus *Brachymyrmex*

Brachymyrmex depilis Emery
Habitat: Juniper and sagebrush (Rio Grande); Ponderosa pine (Bandelier).
Biology: Rarely collected, females and nests usually found under rocks. Cole (1954d) discusses the distribution in New Mexico.

Genus *Camponotus*

This is a genus of common "carpenter" ants. They often nest in logs and stumps or under rocks. Cole (1954d) includes the distribution of the species in New Mexico.

Key to *Camponotus* major workers

1. Entire body, including legs, black 2
-- Thorax usually reddish or yellowish, lighter than head and gaster, or at least the legs are reddish-brown 3

2. Antennal scape covered with short scattered white erect hairs, thorax strongly shining with bluish reflections ..... *laevigatus*
-- Antennal scape without short scattered erect hairs (a few hairs are present at the tip); thorax not strongly shining ..... *modoc*

3. Clypeus with a distinct notch in the anterior border, rarely collected ants 4
-- Clypeus without a distinct notch in the anterior border; commonly collected ants. 5

4. Thorax strongly arched in profile, without a distinct impression between the mesonotum and propodeum ..... *sayi*
-- Thorax with a deep impression between the mesonotum and propodeum ..... *hyatti*

5. Most or all of thorax black and as dark as gaster; legs reddish-brown, contrasting sharply with dark thorax ..... *herculeanus*
-- Thorax brown and usually much lighter in color than the head and gaster. 6

6. Antennal scape extending past the occipital borders by an amount equal to or greater than the length of the first funicular joint. . 7
-- Antennal scape of major not surpassing the occipital corners, or surpassing them by an amount less than the length of the first funicular joint ..... *sansabeanus*

7. Antennal scape distinctly flattened at the base with the flattened portion forming a small lateral lobule; rarely collected ..... *semitestaceus*
-- Antennal scape slightly flattened at the base without the presence of a small lateral lobule; common species ..... *vicinus*

Camponotus herculeanus (Linnaeus)

Habitat: Aspen, spruce, riparian (Camp May), in pitfall traps. Widely distributed in northern New Mexico.

Biology: This very common species normally nests in rotten logs and stumps, but nests are occasionally found under rocks, especially incipient nests. Reproductives and brood were present in the nests from June to August. Foundress females were found from mid July to August.

C. hyatti Emery

Habitat: Sagebrush (Rio Grande). One worker collected loose on ground, a second worker collected in vegetation.

Discussion: This species has been previously reported from Nevada, California and Baja California. This record represents a considerable range extension of the species. These specimens are identical to others of the species collected in Riverside County California.

C. laevigatus (F. Smith)
Habitat: Ponderosa pine-riparian (Los Alamos);Bandelier; residential (Los Alamos).
Biology: Nest in rotten logs and stumps.

C. modoc Wheeler
Locality: Bandelier National Monument, collected 9 July 83 by E.B. Mann.

C. sansabeanus (Buckley)
Habitat: Sagebrush, juniper (Rio Grande); pinon-juniper, ponderosa pine (Los Alamos); and Bandelier.
Biology: This is a very common species in northern New Mexico. The nests are usually found under rocks, but may be in rotten stumps.

C. semitestaceus Emery
Locality: Bandelier National Monument (Pippin and Pippin, 1984)

C. vicinus Mayr
Habitat: Sagebrush (Rio Grande); ponderosa pine-riparian, pinon-juniper, ponderosa pine (Los Alamos); pinon-juniper (natural area near waste site G).
Biology: Very common species in northern New Mexico which nests under rocks. Brood and reproductives in nest in June-August, dealate females captured from end of June to mid August.

Genus *Formica* (Keys: Francoeur,1973; Snelling and Buren, 1985; Wheeler and Wheeler, 1977, 1986).

This is a very large, difficult and common genus in the county. The ants nest in a wide variety of sites, from logs and stumps to under rocks. The species in the "*rufa*" species group usually build thatched dome-like nests. Species in the *sanguinea* group enslave other species. Cole (1954e, 1955b) discusses New Mexican species. Wheeler and Wheeler (1977,1986) present good keys to the species and provide illustrations for the characters used in the following key. We have followed Wheeler and Wheeler (1986) and have included the *microgyna* group as part of the *rufa* group.

Key to the *Formica* species groups workers
(Modified from Wheeler and Wheeler, 1977)

1. Ventral border of clypeus notched in middle; integument dull to feebly shining; pubescence dense, at least on gaster; bicolored, head and thorax reddish brown or reddish yellow, gaster brown

or black; propodeum short and usually angulate in profile; facultative slave- makers. ..... *sanguinea* group

-- Ventral border of clypeus not notched or, if so, pubescence is very sparse and body shining; other characters various 2

2. Slender; surface shining; propodeum rounded in profile (i.e., base and declivity not differentiated) 3

-- Generally robust; surface usually dull; propodeum usually angulate in profile (i.e., base and declivity clearly differentiated) .. .4

3. Scape slender, long (1 1/4-1 1/3 length of head), scarcely curved at base; median segments of funiculus more than 1 1/2 times as long as broad; posterior face of petiolar scale convex; frontal carina long and sigmoid, larger ants (4-7mm long) ..... *pallidefulva* group

-- Scape shorter (less than 1 1/4 head length); frontal carinae subparallel, not diverging posteriorly; smaller ants (3- 6mm long) . ..... *neogagates* group

4. Larger workers with occipital border distinctly concave; pronotum (in profile) with basal and declivous faces meeting at an angle ..... *exsecta* group

-- Larger workers with occipital border at most slightly concave, usually flat or slightly convex; pronotum (in profile) evenly convex, not angulate 5

5. Frontal carinae divergent; bicolored: head and thorax reddish or yellowish red and notably lighter than gaster or, if infuscated, infuscation not completely masking reddish ground color in larger workers; gaster brown or black; surface mostly dull; polymorphic ..... *rufa* group

-- Frontal carinae parallel for most of their length; concolorous black or brown or bicolored; if bicolored, thorax lighter than gaster and upper portion of head ..... *fusca* group

Key to the *fusca* group workers

1. Metasternum in profile with a pair of distinctly pilose lobes (middle and hind leg of one side must be removed to see this character), arising one on either side of median sternal cavity; mesometasternal profile composed of a concavity followed by a pilose triangle 2

-- Metasternum without such lobes; mesometasternal profile composed of concavity followed by a straight or convex line 10

2. Concolorous 3
-- Bicolored. 8

3. Dark brown or black 4
-- Pale brown or yellowish brown 7

4. Gula without erect hairs ..... *occulta*
-- Gula with erect hairs 5

5. Erect hairs present on genae and episterna 6
-- Erect hairs absent from genae and episterna ..... *altipetens*

6. Head as seen in full face, with erect hairs present only from the occiput to the level of the ventral border of eye; genae with one or two erect hairs ..... *montana*
-- Erect hairs present below the level of the ventral border of the eye; genae with more than two erect hairs ..... *canadensis*

7. Gula without erect hairs ..... *neoclara*
-- Gula with erect hairs ..... *montana*

8. Gula without erect hairs ..... *neoclara*
-- Gula with erect hairs 9

9. Occipital angles and episterna with erect hairs ..... *montana*
-- Occipital angles, genae and episterna without erect hairs ..... *altipetens*

10. Concolorous 11
-- Bicolored (i.e., head and thorax reddish and gaster distinctly darker (minors and some majors may be so dark that the lighter color is reduced to patches on genae and thorax) 16

11. Dark brown or black; gula often with erect hairs 12
-- Pale brown or yellowish brown; gula never with erect hairs ..... *argentea*

12. Gena between eye and mandibles with coarse elongate punctures, widely spaced on dorsal half of gena 13
-- Gena between eye and mandible without coarse elongate punctures or, if present, they are concentrated on upper half, where they are closely spaced and interspersed with fine circular punctures 14

13. Erect hairs numerous on the ventral surface of head, dorsal surface of thorax and dorsal margin of petiole; all workers are brownish-black or black ..... *hewitti*

-- Erect hairs absent on above mentioned structures; usually larger workers are at least somewhat bicolored (at least the ventral section of head is reddish-black) ..... *neorufibarbis*

14. Hairs on first gastral tergite (exclusive of posterior row) abundant (average 20, rarely fewer than 10); metasternum less pilose, hairs not surrounding metasternal cavity, but usually restricted to region behind it 15
-- Hairs on first gastral tergite (exclusive of posterior row) sparse (average 4, rarely more than 10); metasternum more pilose, hairs surrounding metasternal cavity ..... *fusca*

15. Pubescence dense to very dense on genae and first four gastral tergites, producing a silvery luster. ..... *argentea*
-- Pubescence dilute to normal on fourth gastral tergite and on genae (at least on dorsal half), with a silky luster ..... *podzolica*

16. Gena between eye and mandible with coarse, widely spaced elongate punctures; head and gaster dark brown, thorax yellowish or reddish brown; thorax sometimes infuscated, with lighter color reduced to mere patches; lower half of head sometimes paler; smallest workers may be entirely black ..... *neorufibarbis*
-- Gena between eye and mandible without coarse elongate punctures or, if present, they are concentrated on upper half, where they are closely spaced and interspersed with fine circular punctures ..... *gnava*

Key to the *neogagates* group workers
(Includes all North American species)

1. Anterior border of clypeus notched or concave in the middle, or entire border is straight 2
-- Entire anterior border of clypeus convex and rounded 5

2. Gaster clear reddish-yellow, no darker than head and thorax; clypeus concave in the middle, but with little evidence of a notch; petiole very thick when viewed in profile (Man., MN, IA west to Alberta, MT, WY, CO ..... *bradleyi*
-- Gaster darker than thorax and head; other characteristics are usually different 3

3. Basal face of propodeum with many long, erect hairs, body hairs in general long and numerous; gula with about 10 long, but erect hairs (WY, CO, KA, OK, TX, NM, CA, state of Chihuahua, Mexico) ..... *perpilosa*

-- Basal face of propodeum with few or no erect hairs, gula usually with 2 erect hairs 4

4. Anterior border of clypeus straight, with a prominent central, longitudinal carina; head and thorax yellowish orange; a few erect hairs are usually present on propodeum (ID, UT, WA, OR, NV, CA) ..... *manni*
-- Anterior border of clypeus notched or concave in the middle, central longitudinal carina on clypeus poorly defined; head and thorax piceous brown; erect hairs usually absent on propodeum (OR) ..... oregonensis

5. Scapes bearing a number of short, very delicate erect whitish hairs (NS, Que. west to BC, south to MA, MI, SD, CO, NM, AZ, CA) ..... *lasioides*
-- Scapes without erect hairs except for a small clump at the extreme tip 6

6. Thorax with numerous erect hairs; surface of body moderately shining (NS, Que. west and north to AL, south to NC, IL, IA, NB, NM, AZ, CA) ..... *neogagates*
-- Thorax with two or fewer erect hairs; surface of body strongly shining (MN, ND, CO, NM, UT, NV) ..... *limata*

Key to the *rufa* group workers

(Includes the *microgyna* species group) (Modified from Wheeler and Wheeler, 1986).

1. Scapes with erect or suberect hairs on all surfaces 2
-- Scapes with very few or no erect hairs 3

2. All hairs tapering to sharp points; thoracic hairs slender and unequal in length ..... *oreas*
-- Some hairs spatulate; thoracic hairs all short and subequal in length (female no larger than largest worker) ..... *microgyna*

3. Petiolar scale (seen from behind) with a flat or broadly concave crest; sides of upper half of scale parallel, tapering only in lower half (female sometimes no larger than largest worker, strongly shining, color dull brown with some yellow markings) ..... *dakotensis*
-- Petiolar scale (seen from behind) with crest convex or angularly produced upward in middle; sides of scale tapering inward from crest to base 4

4. Clypeal fossa deep and pit-like; edge of clypeus distal to pit ascending steeply to median lobe; median lobe box-like (i.e. sides descending abruptly to fossae and making angles with its median basal portion) 5
-- Clypeal fossa shallow and scarcely pit-like; edge of clypeus distal to the pit broadly united to base of lobe and not forming a distinct curve with it; median lobe not box-like (i.e., sides descending to fossae through even curves which begin at carina) 6

5. Middle and hind tibiae with numerous erect hairs on all surfaces ..... *obscuriventris*
-- Middle and hind tibiae without erect hairs except for double row on flexor surfaces ..... *laeviceps*

6. Erect hairs on middle and hind tibiae usually abundant on all surfaces, but at least there are more than 2 erect hairs in addition to those on flexor surfaces 7
-- Erect hairs on middle and hind tibiae, when present, confined to double row on flexor surface, rarely 1 or 2 erect hairs elsewhere 9

7. Head of largest worker as broad as or broader than long, erect hairs on thorax unequal in length; hairs on head only a little less abundant and not much longer than those on thorax ..... *obscuripes*
-- Head of largest worker longer than broad; erect hairs on thorax short and of about equal length; hairs on head notably longer and sparser than those on thorax 8

8. Smaller workers extensively infuscated, medias more or less infuscated; legs in all sizes of workers, brownish black ... *planilpilis*
-- Head and thorax of all workers (except an occasional minor) clear red; legs scarcely or not at all darker than thorax .. *coloradensis*

9. Gaster densely clothed with short erect hairs which (in profile) are so close together that they give appearance of a loose plush-like vestiture ..... .10
-- Erect hairs on gaster much more widely spaced and not forming an even vestiture 11

10. Erect gastral hairs very short, averaging 0.06 mm long (female yellow, hairs very long, yellow, with tips curled) ..... *.ciliata*
-- Erect gastral hairs averaging 0.12 mm long (female dirty brown, mostly dull, without erect hairs on dorsum, densely pubescent) ..... *mucescens*

11. Clypeus, gula, and gena strongly shining ..... *subnitens*
-- Clypeus, gula, and gena dull 12

12. Gula, crest of petiole, and thoracic dorsum usually without erect hairs, rarely 1 or 2 inconspicuous hairs ..... *haemorrhoidalis*
-- Pronotum, propodeum and crest of petiole with numerous erect hairs in at least a considerable part of nest series 13

13. Erect hairs slender and pointed at tip 14
-- Erect hairs blunt or spatulate (female no larger than largest worker) 15

14. Erect hairs on occipital angles in most of nest series . *integroides*
-- Occipital angles without erect hairs ..... *propinqua*

15. Occipital margin evenly convex in all sizes of workers; erect hairs on thorax about 0.06 mm long and spatulate ..... *querquetulana*
-- Occipital margin flat or slightly concave for at least 1/2 width of head in largest workers and often in smaller workers as well; thoracic hairs various 16

16. Erect hairs always present on crest of petiole; pubescence on gastral dorsum dense and wholly concealing the surface; sides of gaster feebly shining. 17
-- Erect hairs never present on crest of petiole; pubescence of gastral dorsum rather dilute and not wholly concealing surface at rear edge of somites; sides of gaster strongly shining .... *whymperi*

17. Crest of petiole broadly rounded in side view; body hairs broadly spatulate at tips ..... *densiventris*
-- Crest of petiole sharp in side view; body hairs narrowly spatulate at tip ..... *calviceps*

Key to the *sanguinea* group workers
(modified from Snelling and Buren, 1985)

1. Gula and pronotum with no erect hairs or pronotum with fewer than six very short (less than 0.006 mm long), stiff, blunt bristles; crest of petiole without erect hairs 2
-- Gula with one or more erect hairs on each side and (or) pronotum with six or more flexuous bristles, at least some of which are more than 0.10 mm long; crest of petiole with erect hairs 3

2. Crest of petiole sharp, petiole broadly fan-shaped in posterior view; longest hairs on disc of second tergum of gaster about 0.06

mm long; clypeal disc distinctly but finely striate along middle and often laterad along apical margin ..... *subnuda*

-- Crest of petiole blunt, petiole narrowly fan-shaped in posterior view; longest hairs on disc of second tergum about 0.10 mm long; clypeal disc without very fine striae along middle ..... *emeryi*

3. Erect hairs of thoracic and gastral dorsa short (0.06-0.14 mm long), stiff and bristle-like, usually more or less flattened and blunt-tipped, or abruptly tapering 4

-- Erect hairs longer (0.10-0.25 mm long), evenly tapering to tip .. 5

4. Scape shorter than head length; propodeum subangulate in profile and crest of petiole is sharp ..... *rubicunda*

-- Scape longer than head length; propodeum broadly rounded between basal and declivous faces; crest of petiole blunt in profile ..... *obtusopilosa*

5. Pubescence of antennal scape fine and entirely appressed. ... 6

-- Pubescence of antennal scape coarse and at least partly decumbent to sub-erect ..... *puberula*

6. Eyes large and protruding beyond sides of head in frontal view in all sizes; female microgynous. ..... *wheeleri*

-- Eyes not protruding beyond sides of head, at least not in large workers; females normal, much larger than largest workers .... *pergandei*

List of *Formica* spp. of all species groups:

Formica altipetens Wheeler

Localities: Bandelier (Pippin and Pippin, 1984), bombing range (pitfall trap).

F. argentea Wheeler

Habitat: Ponderosa pine-riparian (Mortandad Cyn, 4 k N Los Alamos); disturbed site (nuclear waste site G); Bandelier (Pippin and Pippin, 1984).

Biology: Nests under rocks, dealate female collected in Los Alamos on 9 July 1986, workers collected in pitfall traps.

F. ciliata Mayr

Habitat: Pinon-juniper (Los Alamos, natural area adjacent to waste site G).

Biology: Nests thatched with pinon pine needles and juniper needles, also often nests under rocks. Mound is small and is not much higher than soil surface.

F. densiventris Viereck

Habitat: Ponderosa pine-riparian (Mortandad Cyn., 4 K W Los Alamos, 8 K N Los Alamos); pinon-juniper (natural area adjacent to waste site G).

Biology: Nests are usually under rocks, but may nest in logs and stumps. Brood and reproductives in nest in June and July. Loose dealate female collected on 3 July 1986. This is one of the most common *Formica* spp. in the area. It enslaves other *Formica* spp.

Discussion: The nomenclature and status of this ant have been very complicated. The description by Viereck (1903) is brief and completely inadequate, and based on two poorly preserved specimens (Brown, 1947). This has created considerable confusion. A number of species and subspecies have been synonymized with *F. densiventris* (Creighton, 1950; Cole, 1955b). Wheeler (1903) described a taxon, *F. rasilis* based on workers, females and males. Subsequently hybridization was observed between *F. rasilis* and *F. densiventris* (Creighton, 1950; Cole, 1955b; Gregg, 1963). Because of this, Gregg chose to consider *F. densiventris* as a subspecies of *F. rasilis*. We do not recognize a separate subspecies and due to precedence of date of publication (Viereck: Jan 1903; Wheeler: Nov 1903) we consider the proper name of the species to be *Formica densiventris* Viereck.

F. fusca Linnaeus

Habitat: Ponderosa Pine-riparian (Mortandad Cyn.); Pinon juniper (bombing range); aspen (Camp May).

Biology: Nests found under rocks or individuals captured in pitfall traps.

F. hewitti Wheeler

Habitat: Ponderosa pine-riparian (Mortandad Cyn.); grassy area next to ponderosa pine (Bandelier); aspen, riparian (Camp May).

Biology: Found in pebble and soil mounds (up to 20 cm high, 50 cm in diameter), often with some thatching, occasionally nest is simply under a rock or log. Common species in northern New Mexico.

F. lasioides Emery

Habitat: Ponderosa pine-riparian (Mortandad Cyn., Los Alamos); Bandelier.

Biology: This is a common species which nests in the soil. Two dealate females were collected on the soil surface on 6 Aug. 1986.

F. limata Wheeler
Habitat: Ponderosa pine-riparian (Mortandad Cyn., Los Alamos); pinon-juniper (bombing range). Commonly collected in pitfall traps.

F. microgyna Wheeler
Habitat: Aspen (Camp May) in pitfall traps.

F. neoclara Emery
Habitat: Residential area at Los Alamos. Dealate females were collected in July. First record of species in New Mexico.

F. neogagates Emery
Habitat: Pinon-juniper (bombing range, natural area adjacent to waste site G, Los Alamos), highly disturbed areas (waste site G).
Biology: Nests in soil, *Formica densiventris* and *F. pergandei* enslave it.

F. neorufibarbis Emery
Habitat: Riparian (Rio Grande and Camp May); sagebrush (Rio Grande); spruce and aspen (Camp May); Bandelier.
Biology: This is a common, widely distributed species. Nests may be found under rocks or logs and in rotten logs and stumps.

F. obscuripes obscuripes Forel
Habitat: Ponderosa pine-riparian (Mortandad Cyn., Los Alamos); pinon-juniper (bombing range); residential area (Los Alamos).
Biology: This species is not common in the area, most individuals were collected in pitfall traps. Dealate females were collected in late June and early July.

F. obscuriventris clivia Creighton
Habitat: Ponderosa pine-riparian (Bandelier).
Biology: This ant constructs domes of pine needles, typical of the *F. rufa* species group. They are very aggressive and attack when the nest is disturbed.

F. obtusopilosa Emery
Habitat: Pinon-juniper (bombing range); aspen (Camp May).

Discussion: We include *F. obtusopilosa* in the *sanguinea* species group though it shows characteristics which ally it to the *neogagates* group. ~~Guinea species group though i~~

F.occulta Francoeur

Habitat: Ponderosa pine-riparian (Los Alamos, Chupaderos Cyn.); aspen (Camp May); residential (Los Alamos).

Biology: Most individuals were captured in pitfall traps. Nests are usually located under rocks. Dealate females were collected in late June and early July.

F. pergandei Emery

Habitat: Aspen (Camp May); disturbed area (waste site G); Bandelier. This is the first record of the species in New Mexico.

Biology: Nests in the soil, enslaves other *Formica* spp. Reproductives were in the nest in August.

F. planipilis Creighton

Habitat: Ponderosa pine-riparian (Los Alamos)

Biology: Nest in soil, usually with some thatching of pine needles, but may also be in rotten logs and stumps. Brood and reproductives in nest in late June.

F. podzolica Francoeur

Habitat: Pinon-juniper (Natural area adjacent to waste site G); disturbed area (waste site G); p. pine-riparian (Los Alamos); aspen, spruce, riparian (Camp May).

Biology: Most were collected in pitfall traps or were loose on vegetation, nests were collected under rocks.

F. subnuda Emery

Habitat: Ponderosa pine (Bandelier).

Biology: Nests in ponderosa pine logs, brood in nest in early July.

Genus *Lasius* (Key: Wilson, 1955)

This is a common genus in the county. Most species nest under rocks. Separation of closely related species is difficult.

Key to *Lasius* workers (Modified from Wilson, 1955)

1. Maximum worker eye length 0.20 times the head width or more, at least 10 ommatidia at the maximum diameter of the eye (usually more than 12) 2
-- Maximum worker eye length 0.17 times the head width or less; less than 12 ommatidia at the maximum diameter of the eye . . .7

2. In a given nest series all larger workers and most smaller workers with one or more offset teeth at the basal angle of the mandible ..... *pallitarsis*
-- Workers of all sizes with the posterior basal tooth aligned with the adjacent teeth of the masticatory border 3

3. Maximum eye length usually less than 0.25 times the head width and never more, usually with 11 ommatidia (10-12) in the maximum eye diameter; color always yellowish-brown; scapes always lacking standing hairs ..... *sitiens*
-- Maximum eye length exceeding 0.25 times the head width, even if only slightly, usually 12-14 ommatidia in the maximum diameter of eye; color occasionally yellowish-brown, but then the scapes have standing hairs 4

4. In one or both mandibles of the nest series, either the penultimate basal tooth is markedly reduced in size relative to the two flanking teeth, or the gap between the penultimate and terminal basal teeth tends to be larger in area than the terminal basal tooth and variable in shape 5
-- In all of the workers of a nest series, the penultimate and terminal basal teeth are subequal in size, the gap between them has about the same area as the terminal tooth and is constant in shape ...6

5. The scapes and tibiae bearing standing hairs; body color light brown to medium brown, very rarely dark brown ..... *neoniger*
-- Scapes and tibiae lacking standing hairs and usually without hairs; color usually dark brown ..... *crypticus*

6. The scapes and tibiae bearing few or no standing hairs ..... *alienus*
-- The scapes and tibiae bearing numerous standing hairs ..... *niger*

7. Dorsal crest of petiole as seen in frontal view strongly convex and non-emarginate ..... *humilis*
-- Dorsal crest of petiole at most feebly convex and often emarginate 8

8. Eyes with less than 35 ommatidia 9
-- Eyes with more than 35 ommatidia 11

9. Outer surfaces of each tibia with numerous standing hairs prominent above the ground pubescence ..... *fallax*
-- Outer surfaces of each tibia with at most one or two standing hairs 10

10. Terminal segment of the maxillary palp longer than the penultimate segment, at least in a majority of a nest series . . *nearcticus*
-- Terminal segment of the maxillary palp at most as long as the penultimate segment ..... *flavus*

11. Longest hairs of the posterior half of the first gastral tergite, exclusive of the extreme posterior strip, not exceeding in length 0.50 times the maximum width of the hind tibia at its midlength; eye with more than 65 ommatidia; brownish yellow ..... *umbratus*
-- Longest hairs of the posterior half of first gastral tergite, exclusive of the extreme posterior strip, at least 0.60 times as long as the maximum width of the hind tibia at its midlength; eye with less than 65 ommatidia; yellow ..... *subumbratus*

Lasius alienus (Foerster)
Habitat: Pinon-pine (bombing range); p. pine-riparian (Mortandad Cyn.). This is the first record from New Mexico.

L. crypticus Wilson
Habitat: Ponderosa pine-riparian (4 k W Los Alamos: Chupaderos Cyn.); Bandelier.
Biology: Uncommon in county, nests under rocks.

L. flavus (Fabricius)
Habitat: Ponderosa pine-riparian (Chupaderos Cyn.); Bandelier.
Biology: Nests under rocks, reproductives in nest in mid Aug.

L. humilis Wheeler
Habitat: Juniper, sagebrush (Rio Grande).
Biology: Lone female collected in pitfall trap. Reproductives in nests in early July.

L. neoniger Emery
Habitat: Ponderosa pine-riparian (Mortandad Cyn.).
Biology: Uncommon in county, nests under rocks. Reproductives in nest in early July.

L. niger (Linnaeus)
Habitat: Ponderosa pine-riparian (Chupaderos Cyn.); residential (Los Alamos); Bandelier.
Biology: Uncommon in county, reproductives in nest in late Aug.

L. pallitarsis (Provancher)
Habitat: Ponderosa pine-riparian (Mortandad Cyn.); ponderosa pine (8k N Los Alamos); Bandelier.

Biology: This is the most common species of *Lasius* in New Mexico. Nests are located under rocks, reproductives are present in nests from late July to late Aug.

L. sitiens Wilson

Habitat: Juniper (Rio Grande); pinon-juniper (Natural area adjacent to waste site G, Los Alamos); ponderosa pine (4 k W and 4 k N Los Alamos, Bandelier).

Biology: This is a common species which nests under rocks. Reproductives were captured in nests from late June to early Aug.

L. subumbratus Viereck

Habitat: Ponderosa pine-riparian (Mortandad Cyn., Chupaderos Cyn.); Bandelier.

Biology: Uncommon, nests under rocks.

Genus *Myrmecocystus* (Key: Snelling, 1976)

These are the "honey pot" ants in which repletes fill their crops with liquids and hang inside the nests, serving as storage structures. This genus is not common in the county, as they are usually found in more arid regions. Cole (1954c) discusses the genus in New Mexico. These ants nest in the soil and often have a well developed mound (5-20 cms dia.) with a surprisingly large entrance hole which allows rapid escape when the nest is attacked by army ants.

Key to *Myrmecocystus* workers (Modified from Snelling, 1976)

1. Light yellow or brownish-yellow; mandible with eight or ten teeth 2

-- Bicolored, head brownish-red, thorax and gaster blackish; mandible with six or seven teeth 3

2. Head, pronotum and gaster shining, with little or no appressed pubescence; mid and hind tibiae with not more than three or four erect hairs beyond basal third of outer face, usually none ..... *navajo*

-- Head, pronotum and gaster with abundant appressed pubescence; mid and hind tibiae usually with numerous erect hairs along the apical half of outer face ..... *mexicanus*

3. Longest hairs on pronotal dorsum and disc of second tergum no more than 0.5 times the minimum diameter of eye, usually less ..... *placodops*

-- Longest hairs on pronotal dorsum and disc of second tergum at least 0.6 times the minimum diameter of eye, usually about 0.75 times the minimum diameter ..... *mendax*

Myrmecocystus mendax Wheeler
Habitat: Juniper (Rio Grande); Bandelier.

M. mexicanus Wesmael
Habitat: Pinon-juniper (bombing range).

M. navajo Wheeler
Habitat: Sagebrush (Rio Grande).

M. placodops Forel
Habitat: Sagebrush (Rio Grande).

Genus *Paratrechina* (Key: Trager, 1984)

This genus is not common in the area. Nests are usually found in the soil or under rocks. A single species was collected in the county.

Paratrechina terricola (Buckley)
Habitat: Sagebrush (Rio Grande).
Biology: A single nest was found under a rock.

Genus *Polyergus*
(Key: Creighton, 1950; taxonomy: Wheeler, 1968)

These ants enslave species of the genus *Formica*. Cole (1954c) discusses the distribution of the genus in New Mexico.

Key to the *Polyergus* workers

1. Antennal scapes reaching or surpassing the occipital border; gastral pubescence dilute, the surface shining ..... *lucidus*
-- Antennal. scapes not reaching the occipital border; gastral pubescence dense, giving the surface a grayish sheen ..... *breviceps*

Polyergus breviceps Emery
Habitat: Ponderosa pine (Los Alamos, 4 k N Los Alamos)
Biology: This species enslaves species of the genus *Formica*. It is not commonly collected in the area.

Abstract

We report a total of 90 species of ants from Los Alamos County and the adjacent Bandelier National Monument, located in north- central New Mexico, USA. The genera include: *Hypoponera, Neivamyrmex, Aphaenogaster, Crematogaster, Leptothorax, Monomorium, Myrmecina,*

Myrmica, Pheidole, Pogonomyrmex, Solenopsis, Stenamma, Conomyrma, Forelius, Liometopum, Tapinoma, Acanthomyops, Brachymyrmex, Camponotus, Formica, Lasius, Myrmecocystus, Paratrechina, and *Polyergus. Pheidole wheelerorum* MacKay is described, *Formica rasilis* Wheeler is synonymized with *F. densiventris* Viereck, *Liometopum luctuosum* Wheeler is formally raised to a species. The following species are recorded from New Mexico for the first time: *Leptothorax texanus* Wheeler, *Pheidole hyatti hyatti* Emery, *Acanthomyops pogonogynous* Buren, *Camponotus hyatti* Emery, *F. pergandei* Emery, and *Lasius alienus* (Foerster). We include keys to the species, and notes on the habitats of the species.

Acknowledgments

We would like to thank a number of individuals who helped in the project. Tom Hakonson, Miguel Salazar, Jim Kent, Ken Bostick, Caroline Reynolds, John Warren, Silvia Gonzalez and Ed Essington of Los Alamos National Laboratory offered suggestions, logistic support, materials and allowed us to work at the various sites. Tina Kincaid and Tim Ellis of Rust College, Holly Springs, MS provided assistance in the field. Jill Eash illustrated most of the ants. Awinash P. Bhatkar reviewed the manuscript. David Smith and Andre Francoeur identified the ants listed in the paper of Pippin and Pippin (1984); Robert Gregg identified the ants from Mortandad Cyn. and the bombing range. Voucher specimens are deposited in the New Mexico Museum of Natural History (Albuquerque). Alice MacKay typed the manuscript.

The research was supported by the Association of Western Universities, a faculty research grant of New Mexico State University, The Los Alamos National Environmental Research Park, operated by the Los Alamos National Laboratory, and the United States Air Force Academy.

This paper is dedicated to Dr. George Wheeler on the occasion of his 90th birthday.

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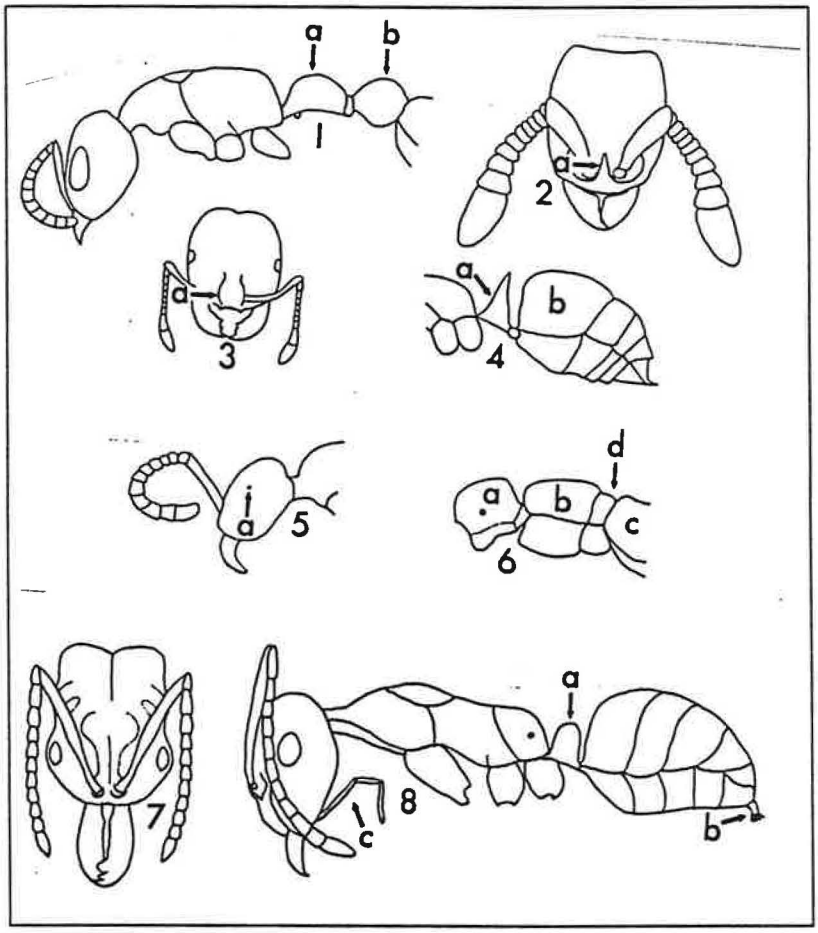
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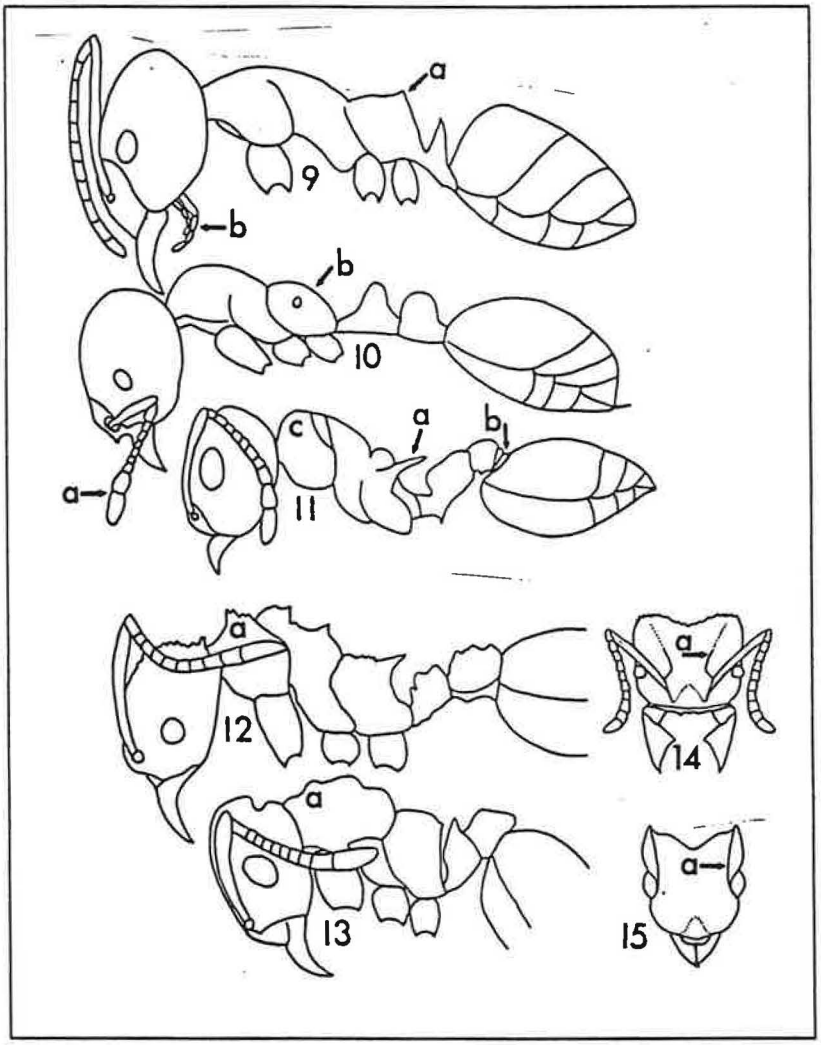
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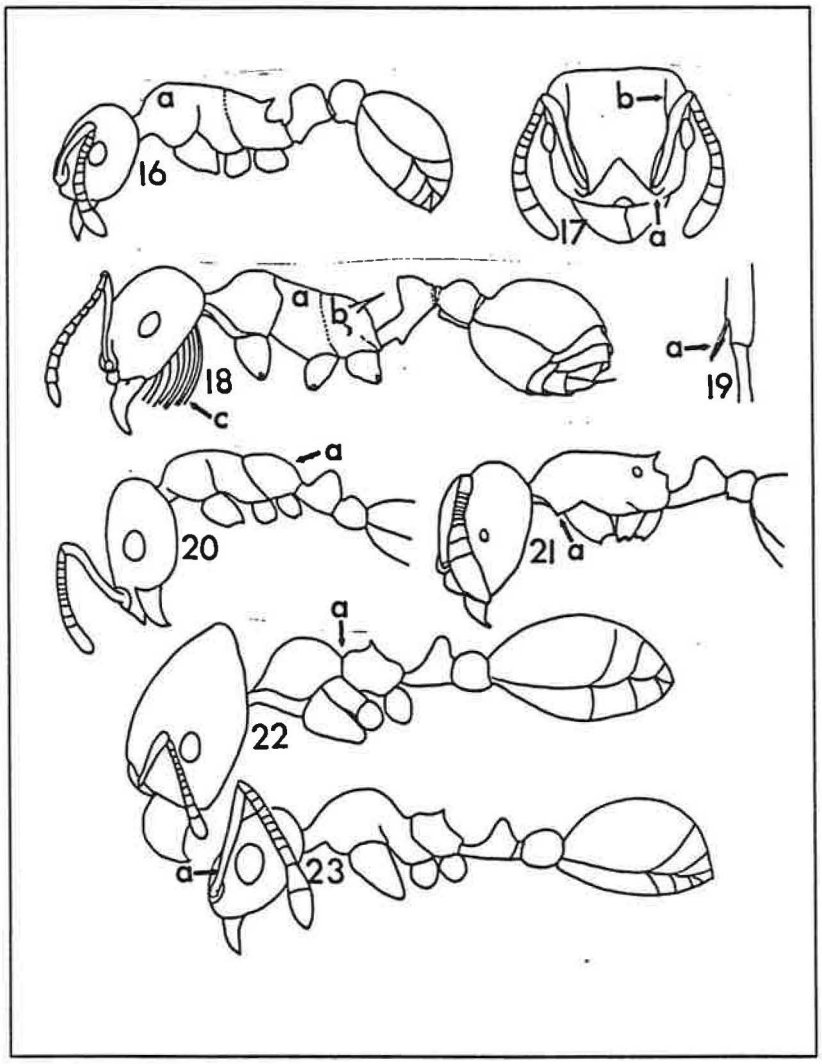
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Figs. 1-8:1) Lateral view of *Pseudomyrmex apache* worker. a. petiole, b. postpetiole.2) Full face view of head of *Cerapachys agustae* worker. a. frontal carina.3) Full face view of head of *Solenopsis maniosa* worker. a. frontal carina.4) Lateral view of petiole and gaster of *Odontomachus clarus* worker. a. petiole, b. postpetiole.5) Lateral view of head of *Neivamyrmex harrisi* worker. a. eye.6) lateral view of petiole and postpetiole of *Cerapachys agustae* worker. a. petiole, b. postpetiole, c. gaster, d. constriction between postpetiole and gaster.7) Full face view of *Odontomachus clarus* worker.8) Lateral view of *Myrmecocystus depilis* worker. a. petiole, b. acidopore, c. maxillary palp, segments 4,5,and 6.



Figs. 9-15:9) Lateral view of *Conomyrma insana* worker. a. cone on propodeum, b. maxillary palp.10) Lateral view of *Solenopsis maniosa* worker. a. antennal club composed of two segments, b. propodeum without spines.11) Lateral view of *Crematogaster larreae* worker. a. spines on propodeum, b. postpetiole attached to upper surface of gaster, c. pronotum without spines or bumps.12) Lateral view of *Trachymyrmex smithi* worker. a. pronotum with spines.13) Lateral view of *Cyphomyrmex wheeleri* worker a. pronotum with bumps.14) Full face view of head of *Trachymyrmex smithi*. a. frontal carina.15) Full face view of head of *Cyphomyrmex wheeleri* worker. a. frontal carina.

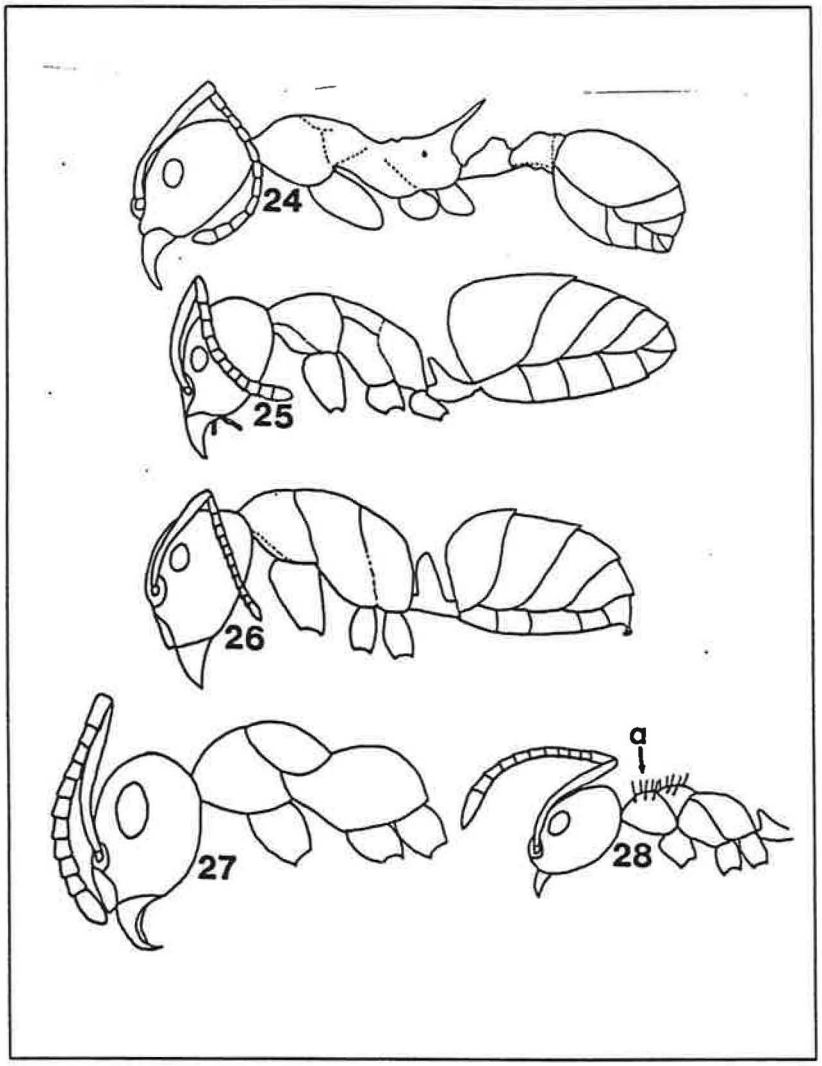


Figs. 16-23:16) Lateral view of *Tetramorium spinosus* worker. a. Pronotum without spines or bumps.17) Full face view of head of *T. spinosus* worker a. clypeus forming welt in front of antennal insertion, b. frontal carina.18) Lateral view of *Pogonomyrmex rugosus* worker. a. mesonotum, b. propodeum, c. psammophore.19) Middle tibia of *P. rugosus*. a. pectinated spur.20) Lateral view of *Monomorium cyaneum* worker. a. propodeum without spines.21) Lateral view of *Rogeria huachucana*. a. inferior pronotal angle.22)Lateral view of *Pheidole tucsoni* major. a. constriction at mesopropodeal suture.23) Lateral view of *P. tucsoni* minor. a. scape of antenna.

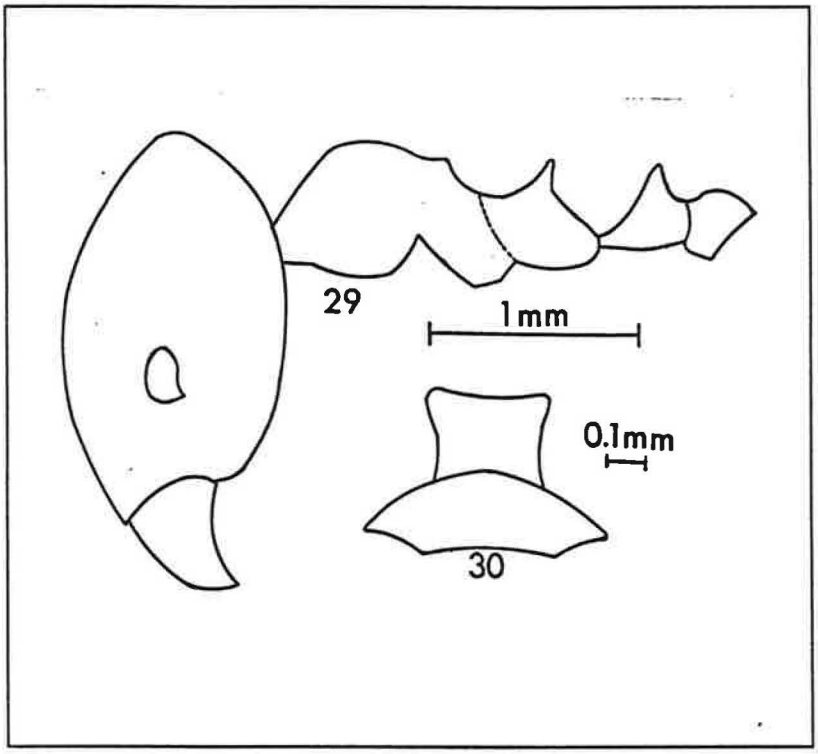
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Figs. 24-28:24) Lateral view of *Aphaenogaster cockerelli* worker.25) Lateral view of *Liometopum apiculatum* worker.26) Lateral view of *Camponotus vicinus* worker.27) lateral view of *Formica perpilosa* worker.28) Lateral view of *Paratrechina terricola* worker. a:coarse dark hairs on pronotum.



Figs. 29 and 30:29) Lateral view of head and thorax of *Pheidole wheelerorum* holotype major.30) Dorsal view of petiole and postpetiole of *P. wheelerorum* holotype major.