AN INTRODUCTION TO THE STUDY OF THE ANTS OF NORTHERN COLORADO

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The present paper is offered as a beginning in the study of Colorado ants. Myrmecologists have collected and studied in the state, but the results of their work are scattered. No systematic work has been done upon the composition of our ant fauna, upon problems of distribution, habits, etc. Professor William M. Wheeler is intending to publish soon a list of the ants of Colorado, including all the material which he has collected or received from different parts of the state. Such a list is much needed and coming from the pen of Professor Wheeler will be highly valuable and indispensable.

The following enumeration of species occurring in northern Colorado is necessarily incomplete, but it presents something upon which to build. It is hoped that the artificial key will facilitate the labor of identification of genera and enable those who are beginning the study to find their way more easily. Keys for the separation of species are not available.[1]

Artificial Key to Genera of Ants Known to Occur in Northern Colorado

(*For the identification of workers*)[2]

1. Pedicel of abdomen one-jointed (fig. 1).
   - A. Abdomen proper constricted between segments 1 and 2 (fig. 2*a*). **Ponera**
   - B. Abdomen proper not constricted between segments 1 and 2.
     1. Antennae 9-jointed; small red ants. **Brachymyrmex**
     2. Antennae 12-jointed.
        - a. Large, slowly moving ants, usually black; frontal carinae sinuous, in form of *S*. **Camponotus**
        - b. Not as above.
          - *a*) Ocelli absent or indistinct.
            - a) Basal prolongation of abdomen covering the pedicel (fig. 2*e*); small black ants. **Tapinoma**
            - b) Basal prolongation of abdomen not covering the pedicel (fig. 1).
              - aa) Anal aperture circular (fig. 3*g*); clypeus trapeziform; legs short. **Lasius**
              - bb) Anal aperture in form of transverse slit (fig. 3*h*); clypeus triangular; legs long. **Iridomyrmex**

[1] In his recently published book, *Ants*, Professor William M. Wheeler gives a key to the subfamilies, genera and subgenera of the North American Formicidae for the identification of workers.

[2] Wheeler has described a new inquiline genus Sympheidole based upon specimens from Boulder and Colorado Springs. The description is based upon males and females, the workers being apparently non-existent. The key in hand being based upon workers, the above genus is not included.

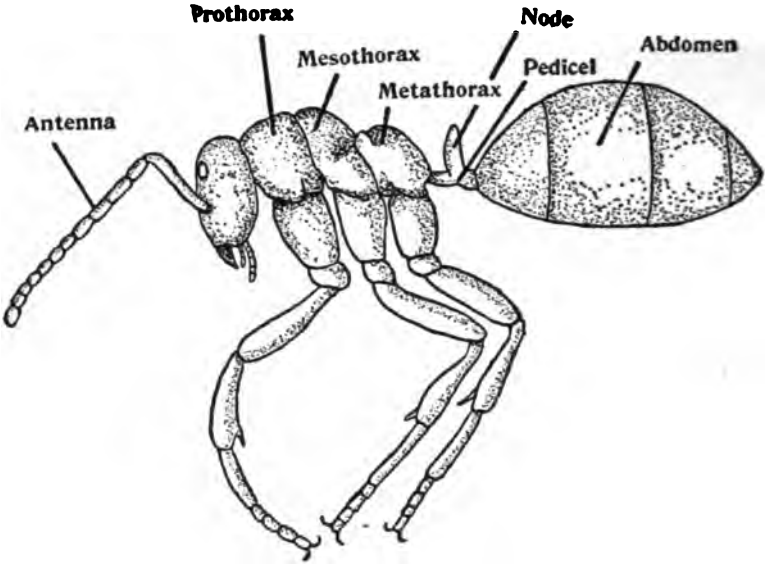

FIG. 1.—SIDE VIEW OF *Formica rufa* L., SUBSP. *rubiginosa* EMERY.

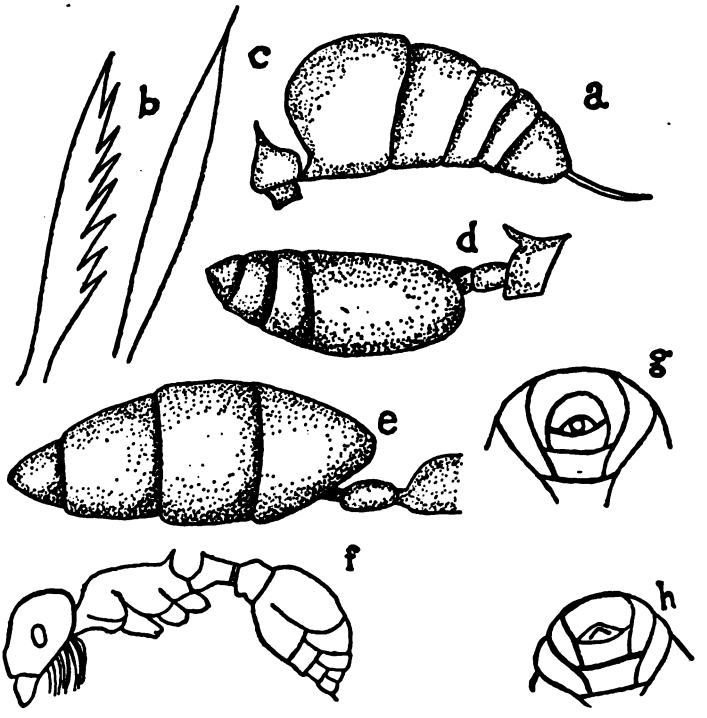

FIG. 2.—DETAILS OF STRUCTURE IN VARIOUS SPECIES.

a. Abdomen of worker of *Ponera* showing constriction between first and second segments; *b.* Toothed spur on posterior tibia of *Myrmica;* *c.* Simple spur on posterior tibia of *Stenamma;* *d.* Showing attachment of pedicel to dorsal surface of abdomen in *Cremastogaster lineolata* Say; *e.* Abdomen and pedicel of *Tapinoma sessile* Say; *f.* Side view of *Pogonomyrmex occidentalis* Cresson; note beard on the head; *g.* Circular anal aperture of *Lasius;* *h.* Slit-like anal aperture of *Iridomyrmex.*

b) Ocelli distinct.
  a) Metathorax with obtuse spine. **Dorymyrmex**
  b) Metathorax without spine.
    aa) Node of pedicel flat; frontal carinae diverging posteriorly (fig. 3*a*). **Formica**
    bb) Node of pedicel rounded; frontal carinae nearly parallel. **Myrmecocystus**

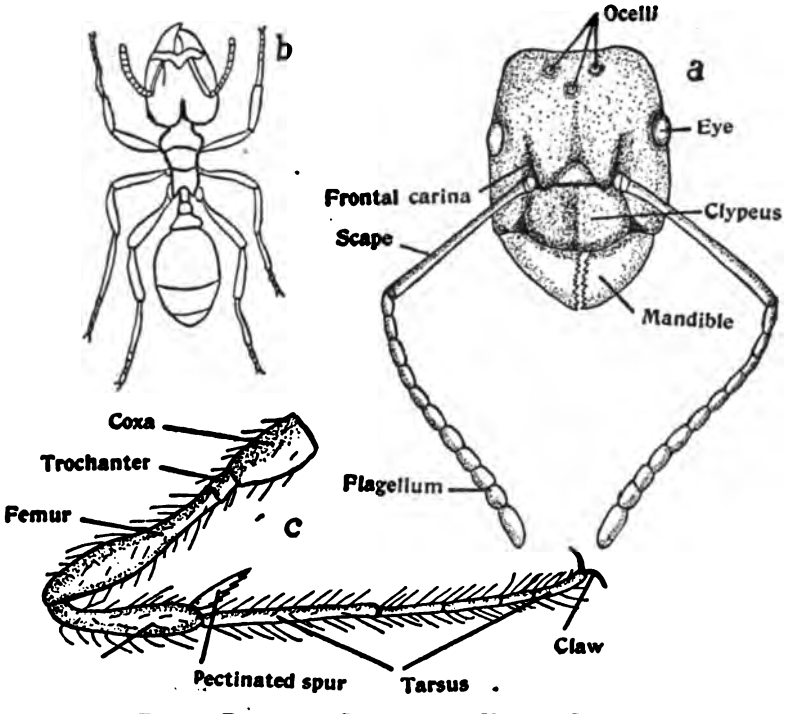

FIG. 3.—DETAILS OF STRUCTURE IN VARIOUS SPECIES.

a. Front view of head of *Formica rufa* L., subsp. *rubiginosa* Emery; *b*. *Pheidole* sp., soldier; note disproportionately large head as compared with the rest of the body; *c*. Posterior leg of *Myrmica scabrenodis* Nyl.

II. Pedicel of abdomen 2-jointed (fig. 2*f*).
  A. Pedicel attached to dorsal surface of abdomen (fig. 2*d*). **Cremastogaster**
  B. Pedicel attached to middle or to ventral surface of abdomen (fig. 1).
    1. Antennae 10-jointed; very small ants. **Solenopsis**
    2. Antennae 11- or 12-jointed.
      a. Beard present on head (fig. 2*f*). **Pogonomyrmex**
      b. Beard not present on head.
        a) Some individuals of colony with head disproportionately large as compared with body (fig. 3*b*). **Pheidole**

b) Not as above.
  a) Tibiae of posterior legs with simple spur (fig. 2*c*); spines of metathorax short; clypeus flat.
    aa) Maxillary palpi 4-jointed; flagellum without distinct club gradually thickened from base to apex. **Aphaenogaster**
    bb) Maxillary palpi 5-jointed; flagellum with a distinctly 3-jointed club. **Leptothorax**[1]
  b) Tibiae of posterior legs with pectinated (toothed) spur (fig. 2*b*); spines of metathorax long; clypeus convex. **Myrmica**

Preliminary List of Species of Ants in Northern Colorado[2]

Subfamily: MYRMICINAE

Aphaenogaster fulva Roger (Boulder).
Cremastogaster lineolata Say (Boulder).
Leptothorax acervorum Mayr., var. *yankee* Emery (Boulder).
Leptothorax curvispinosus Mayr., subsp. *annectens* Wheeler (Boulder).
Leptothorax muscorum Nyl., var. *sordidus* Wheeler (Boulder).
Myrmica brevinodis Emery, var. (Boulder, Meeker).
Myrmica scabrinodis Nyl., var. (Tolland, Boulder).
Myrmica rubra sulcinodoides Emery (Boulder, Ward).
Myrmica rubra L., subsp. *brevinodis* Emery (Boulder, Meeker).
Myrmica rubra L., subsp. *scabrinodis* Nyl., var. (Tolland, Boulder).
Myrmica rubra L., var. *sulcinodoides* Emery (Boulder, Ward).
Myrmica mutica Emery.[3]
Pheidole pilifera Roger, subsp. *coloradensis* Emery (Boulder).
Pheidole ceres Wheeler (Boulder).
Pheidole vinelandica Forel (Boulder).
Pogonomyrmex occidentalis Cresson (Meeker, Boulder, Rifle Gap, New Castle).
Solenopsis molesta Say (Boulder).
Sympheidole elecebra Wheeler (Boulder).

Subfamily: DOLICHODERINAE

Dorymyrmex pyramicus Roger (New Castle).
Dorymyrmex pyramicus Roger, var. *niger* Pergande (Boulder).
Iridomyrmex analis André (Boulder).
Tapinoma sessile Say (Tolland, Boulder).

Subfamily: CAMPONOTINAE

Brachymyrmex heeri Forel, subsp. *depilis* Emery (Boulder).
Camponotus levigatus F. Smith (Meeker).
Camponotus herculeanus L., var. *whymperi* Forel (Tolland).
Camponotus maculatus Fabr., subsp. *vicinus* Mayr., var. *nitidiventris* Emery (Boulder).
Formica crinita Wheeler (Boulder).
Formica fusca L., var. *argentata* Wheeler (Jenny Lake, Tolland).
Formica munda Wheeler (Boulder).

[1] This species may be confounded with the workers of Pheidole, or *vice versa*, their habits are different, however. Leptothorax spp. form much smaller colonies often not more than 25 or 50 individuals; also their motion is much more rapid than that of Pheidole spp. The thorax of Pheidole is strongly constricted between the meso- and metathorax; in Leptothorax it is but slightly or not at all constricted.

[2] In nearly every case the species listed have been determined by Professor William M. Wheeler, the American authority on Formicidae.

[3] This species has not been found in northern Colorado but according to Professor Wheeler should occur here, since it is so abundant in other localities of Colorado, Idaho and even in British Columbia.

Formica rufa L., subsp. *rubiginosa* Emery (Pine Cliff, Boulder).
Formica rufa L., subsp. *obscuripes* Forel (Tolland, Boulder).
Formica rufa L., subsp. *integra* Nyl., var. *coloradensis* Wheeler (Tolland).
Formica rufa L., subsp. *obscuripes* Forel var. *melanotica* Emery (Boulder).
Formica subpolita Mayr., var. (New Castle, Boulder, Tolland).
Formica pergandei Emery (Boulder).
Formica sanguinea Latr., subsp. *subnuda* Emery (Tolland).
Formica sanguinea Latr., subsp. *rubicunda* Emery (Tolland).
Formica fusca L., var. between var. *subsericea* Say and var. *argentata* Wheeler (Pine Cliff, Tolland).
Formica ciliata Mayr. (Boulder).
Formica microgyna Wheeler (Boulder).
Formica pallidefulva Latr., subsp. *schaufussi* Mayr. (Boulder).
Formica pallidefulva Latr., subsp. *nitidiventris* Emery (Boulder).
Formica fusca L., var. *neorufibarbis* Emery (Long's Peak, 12,500 ft.).
Formica fusca, var. *neoclara* Emery (Boulder).
Formica oreas Wheeler (Boulder).
Lasius (*Acanthomyops*) *interjectus* Mayr., small var. ? (Boulder).
Lasius niger L., var. *americanus* Emery (Boulder).
Lasius umbratus Nyl., subsp. *speculiventris* Emery (Boulder).
Lasius niger L., var. *neoniger* Emery (Boulder).
Myrmecocystus melliger Forel, subsp. *mendax* Wheeler (Denver).

Subfamily: PONERINAE

Ponera opaciceps Mayr. (Boulder).

Notes on Distribution and Habits

Cremastogaster lineolata Say. This species is the only one of the genus Cremastogaster which ranges over the whole United States. It extends up to an altitude of 7,000 feet in Colorado. The other species are confined to the southern and southwestern states. The workers are often seen attending masses of coccids or aphids on plants, feeding on the "honey dew" which these insects give off. It has the habit of building on the twigs of plants high above ground "tents" over colonies of these coccids or aphids; hence they are called the "tent-building ants." These tents are enclosures made of agglutinated earth or vegetable matter and often show wonderful workmanship. The workers have a disagreeable odor.

Dorymyrmex pyramicus Roger. This species occurs at altitudes below 6,000 feet. It lives almost always in barren soil.

Dorymyrmex pyramicus Roger, var. **niger** Pergande. This small black ant makes diminutive circular hills in barren soil, ½ inch high and about 2 inches in diameter. It is common at lower altitudes in Colorado.

Formica crinata Wheeler. The nests are from ½–1 foot high and are often constructed of conifer needles.

Formica fusca L., var. between subsericea Say var. and argentata Wheeler var. This is a very rapidly moving ant. It is easily disturbed and excited, even by scraping the feet near the nest.

Formica rufa L., subsp. **obscuripes** Forel. I have seen this subspecies attending aphids on the leaves of aspen.

Formica fusca L., var. **argentata** Wheeler, occurs at considerable elevations, probably above 7,500 feet in northern Colorado.

Formica sanguinea Latr., subsp. **rubicunda.** A number of individuals found at Tolland in a damp cellar had chewed the wood of shelves into a fine sawdust for their nest. They are usually found with slaves. The enslaved individuals belong to other species of Formica.

Formica munda Wheeler. This species is abundant at altitudes below 7,000 feet. The nests are usually in grassy places.

Lasius niger L., var. **americanus** Emery. Ants of this variety occur from low to high altitudes in Colorado. They often build tents low to the ground around the stems of plants and like Cremastogaster lineolata, keep captive there a number of aphids or coccids, chiefly mealy-bugs. In overturning a stone, under which there is a colony of these ants, the workers are seen to seize the mealy-bugs and take them away out of sight. In many of the middle-western states, these ants do considerable damage in corn fields, by their habit of cultivating the root-aphids of the corn.

Leptothorax spp. This is a very widespread group of small ants. They form very small colonies, often not more than 25 to 50 individuals. The nests are small and may be in the ground, between stones or within the tissues of plants. Abandoned galls are often utilized for their nests.

Myrmecocystus melliger mendax Wheeler. Members of this genus are confined almost entirely to the warmer and arid countries. They are abundant in Colorado as far north as Colorado Springs. As far as known, only one colony has been seen in northern Colorado and that by Wheeler in Denver. This is the farthest point north to which any of the Myrmecocysti have been traced. The Myrmecocysti or Honey Ants are interesting from the fact that certain workers, "repletes," store large quantities of honey within their abdomen. The size of the abdomen becomes prodigious and the individual is barely able to walk.

Myrmica rubra brevinodis Emery. In the neighborhood of Boulder, Professor T. D. A. Cockerell has noticed that masses of these ants are attracted to the sunflower plant and are killed by the sap which exudes from broken branches. It illustrates a case of maladjustment in the relations of ants to plants.

Pheidole ceres Wheeler. In colonies of this genus may be found four different forms: large-headed soldiers, much smaller and very numerous workers, winged males and winged females. Pheidole ceres is a harvesting ant which lives upon seeds stored up in the nest. The nests are found in sunny places under stones. This species is rather common at altitudes from 5,000 feet to 9,000 feet.

Sympheidole elecebra Wheeler. These ants are inquiline, that is, they live with other ants. They have been reported by Wheeler as occurring in the nests of Pheidole ceres, which they much resemble. Unlike Pheidole, the workers are non-existent.

Pogonomyrmex occidentalis Cresson is very abundant at elevations between 6,000 feet and 7,000 feet. It is called the "Agricultural" or "Mound-building Prairie Ant." It is distributed over the western plains of the United States, living in large colonies in gravel-covered mounds. The ants remove all the vegetation away from about the nest, so that the mound stands in a cleared, circular space. These mounds, located in the center of cleared, circular areas, are conspicuous objects in many parts of the great plains.

Solenopsis molesta Say. This small, yellow species has a wide geographic range. It often forms compound nests with larger ants. Living in the nests of other species, the

individuals prey on larvae and pupae and eat the food of their hosts. They often live with species of Myrmica, Formica, Lasius and Stenamma. In the eastern states Solenopsis molesta has become a house-pest.

Tapinoma sessile Say. This small, black ant has a wide altitudinal range, being found from 5,000 feet to 10,500 feet. The workers have a peculiar rancid-butter odor.

Partial List of Papers Mentioning Colorado Ants

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