THE ANTS OF OKLAHOMA

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THE ANTS OF OKLAHOMA

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PREFACE

The study of the distribution of ants in the United States has been a long and continuous process with many contributors, but the State of Oklahoma has not received the attentions of these observers to any great extent. The only known list of ants of Oklahoma is one prepared by M. R. Smith (1935).

Early in 1954 a survey of the state of Oklahoma was made to determine the species present and their distribution. The results of this survey, which blanketed the entire State, are given in this paper.

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INTRODUCTION

Oklahoma lies in an area that separates the semi-arid regions of the southwest and the humid regions of the east. In traveling from east to west one finds that the country becomes flatter, more arid, higher in elevation, and has fewer trees. The variation from north to south is not nearly so great. Along with this variation in the climate and terrain, there is a marked change in the ant fauna. The need for studying this ant fauna was expressed by M. R. Smith as early as 1935, for although most of the surrounding states have been studied in regard to their ant fauna, Oklahoma has not. It has been the aim of the author to present in this paper a list of the ants of Oklahoma--their habits, characteristics, distribution and keys to identify them; thus not only filling the gap in ant taxonomy but also providing a means for identifying the Oklahoma species.

Since the classical work of Creighton (1950), the variety has lost its rank in ant taxonomy; a fact that gladdens the hearts of those who have searched through the maze of varietal names that often occur in connection with a species. With the passing of the variety, along with population and ecological studies, concepts of species and subspecies have begun to take on their proper meaning. They have passed from the pinned museum specimen stage to the stage of being viewed as a living entity occupying an area defined by the peculiar requirements of the particular animal in question. These factors were kept in mind during the preparation of this paper. The type of classification used was entirely that laid down by Creighton (1950).

The data for the species collected in Oklahoma, as well as the locations where they were collected, have come mainly from four sources: the museum at

Oklahoma Agricultural and Mechanical College, the museum at University of Oklahoma, a paper by M. R. Smith (1935) on the ants sent to him from Oklahoma, and the author's personal collection. It is realized that other sources of information have probably been overlooked. The author has collected from all parts of the State. M. R. Smith made some of the determinations and the rest were compared with specimens contained at the museum at Oklahoma A. and M. Most of the specimens at the museum at Oklahoma A. and M. were also identified by Smith.

Seventy-two forms are listed in this paper as occurring in this State and six others are listed as probably occurring here but have not been found yet. This includes 25 genera that have been found and 2 others that probably are here. Five subfamilies are represented: Dolichoderinae, Formicinae, Dorylinae, Myrmicinae, and Ponerinae. Myrmicinae is the largest in Oklahoma as well as elsewhere, with 34 species and 10 genera occurring here. Formicinae is next largest with 23 species and subspecies and 8 genera. Dolichoderinae has 6 species and 5 genera. Dorylinae has 8 species and one genus. Ponerinae has only one species and one genus but others are listed as probables. Two other subfamilies are known in the United States but have not been taken from this State; they are, Pseudomyrminae and Cerapachyinae. Creighton (1950) lists 585 forms in 64 genera from this country. Thus a little over 12% of the forms and nearly 40% of the genera are known from Oklahoma.

HISTORY OF ANT TAXONOMY FOR OKLAHOMA

The history of ant taxonomy in Oklahoma begins where animal taxonomy begins (1758); that is, we have one Linnaean species--it is the introduced Monomorium pharaonis. Linnaeus did not describe it from specimens from this country but according to Creighton (1950) he used African specimens for his description. Linnaeus placed this species, as he did all ants that he des-

cribed, in the genus Formica. The next description came in 1773 by DeGeer, of Camponotus pennsylvanicus. In 1802 the Frenchman, Latreille, described four of the Oklahoma species: Paratrechina longicornis, Eciton coecum, Formica pallidefulva, and Camponotus castaneus; all were placed in the genus Formica. The first American to describe an Oklahoma species was Thomas Say who described Crematogaster lineolata, Tapinoma sessile, Solenopsis molesta, and Prenolepis imparis in 1836. Stigmatomma pallipes, which was described by Haldeman in 1844, is probably in Oklahoma but has not been found here. From 1850 until 1900, 49 of the 72 forms present here were described, and this, of course, was the most productive era. During this period many famous names appeared. Mayr, a Brunn University professor, described 11 of our species including such forms as Aphaenogaster tennesseensis (1862), Crematogaster ashmeadi (1886), Pheidole dentata (1886), etc. Frederick Smith, the Englishman, and Julius Roger also contributed much during this era, especially the latter. From the 1880's to the first few years in the twentieth century, two men contributed much to the knowledge of our fauna; these were: Forel and Emery. Forel was in charge of an asylum at Burgholzi, Switzerland, and Emery was a professor of zoology at the University of Bologna. Forel described 6 of our species and Emery 11. In the early 1900's the most prominent figure in American myrmecology appeared at the University of Texas in the person of William Morton Wheeler. He was responsible for the description of 14 of our species which is more than anyone else has described. Since 1915, when Wheeler described Aphaenogaster texana carolinensis only two species have been described. In 1923, M. R. Smith described Camponotus mississippiensis and in 1934, G. C. and E. W. Wheeler described the only species ever described from specimens collected from Oklahoma; this was Aphaenogaster treatae pluteicornis. The forms listed in this paper were described by 18

men, a list of the men and the number of species which each described is as follows: Linneaus-1, DeGeer-1, Say-4, Haldeman-3, Emery-11, Mayr-11, Wheeler-14, Forel-6, Roger-7, Latreille-4, Cresson-3, Buckley-5, F. Smith-2, M. R. Smith-1, McCook-1, E. Andre-1, G. E. and E. W. Wheeler-1, Walsh-1.

Recently two men have been outstanding in their contributions to the taxonomy of the ants of Oklahoma; they are M. R. Smith and W. S. Creighton. Smith published a list of the ants of Oklahoma in 1935 and a superior paper on the genera and subgenera of the ants of the United States in 1947. Creighton released his book on the ants of North America in 1950. This book is one of the finest pieces of taxonomic literature ever published on ants and is certain to be a classic.

FAMILY FORMICIDAE

The family Formicidae is a group of social Hymenoptera, considered by many to be the top of the ladder in insect evolution. Every species that occurs in Oklahoma has at least 3 castes; that is, male and female reproductives and a worker caste that is generally sterile. The male is always winged throughout its life--which is, in most cases, short. The female reproductive is winged only during her developmental period and loses her wings after fertilization. Some females never have wings (Eciton). The worker caste or castes as the case may be, are apterous, sterile females. In many forms, the females both fertile and sterile have an oviposter modified into a sting. The antennae of ants are geniculate and well supplied with sensory structures. The abdomen has a pedicel consisting of one or two segments. The body of the worker is simple compared to most higher insects; thus rendering the morphology of the family fairly simple. Ants are one of the most abundant terrestrial animals in Oklahoma. The author has found only one spot in the State where ants cannot be found within a few feet, and that place is the Salt Plains in the northwestern part. Some ants are rather specialized but as a rule ants exhibit a good deal of latitude in most of their requirements. The type of food, shelter, etc., is highly variable from species to species and in many cases is highly variable within a particular species.

This paper gives an account of the ants of Oklahoma from the five existing subfamilies. The major sources of literature are tapped many times; especially the works of Wheeler, Creighton, and M. R. Smith. Much of the synonomy, and national distribution is taken wholly or in part from Creighton

(1950). The basic keys are patterned after Smith and Creighton. A short citation is given with each species along with a brief description to aid the reader. The descriptions are to be used as aids and not to be considered complete except in a few designated places. The classification is based on the workers unless otherwise stated. The Oklahoma distribution is given entirely by counties. After each citation in the distribution a number appears; this number refers to the following list of sources of material.

(1) - The author's personal collection.
(2) - The museum at Oklahoma A. and M. College.
(3) - Lists of "The Ants of Oklahoma" by M. R. Smith (1935).
(4) - The collection at the University of Oklahoma.
(5) - "Ants of North America" by Creighton, 1950.
(6) - A generic and subgeneric synopsis of the United States Ants by M. R. Smith (1947).
(7) - "Legionary Ants, subgenus Neivamyrmex" by M. R. Smith.

KEY TO THE SUBFAMILIES

1. Pedicel consisting of two segments- 2
   Pedical consisting of one segment - - - - - - - - - - - - - - - - - - - 3
2. Eyes usually well developed. Frontal carinae generally concealing the antennal insertion - Myrmicinae
   Eyes absent or ocellus-like. Frontal carinae not covering antennal insertion - Dorylinae
3. Pronounced constriction between the first and second gaster segments - Ponerinae
   No constriction between first and second gaster segment - - - - - - - - - 4
4. Cloacal orifice circular with a circular fringe of hairs surrounding it - Formicinae
   Cloacal orifice slit-shaped and without circular hairs - - Dolichoderinae

SUBFAMILY PONERINAE Lepeletier

The subfamily Ponerinae is considered to be the most primitive group of ants now living on this planet. The colonies, in most cases, are small and obscure. The number of workers in the Oklahoma forms is generally less than one hundred per hill. According to Wheeler (1913) these ants are not abundant anywhere except Australia, where the huge bulldog ants may reach a length of 25 mm. The bulldog ants are conceded by Wheeler to be the living representatives of some of the most primitive ancestors of ants. He states that these ants will sometimes follow a person quite a distance from the nest and that they are capable of leaping a foot. The Ponerinae in general have very primitive body structures and actions. The larvae are not fed by regurgitation like most ants; instead, the food is thrown to them and they do the chewing. According to Wheeler (1913), some of the queens are not protected but are treated much the same as workers. In general, the queens of this group more closely resemble the workers than do the queens of other subfamilies. All the species seem to be carnivorous. The body structures are highly variable; a fact which is interpreted by Wheeler to be due to the longer period of evolution. Most of the nests that occur in the soil are not arranged systematically, but are only loose constructions. Nests also occur in logs and similar places.

Only one species of this subfamily is known to have been found in Oklahoma--Ponera trigona opacior Forel. It is believed that other species of Ponera must exist here along with species from other genera. The reason for a lack of collections of the members of the subfamily is probably due to the small size of the colonies, in conjunction with the fact that even within the

main range of most of the species of this group the findings are not abundant; for these reasons two other genera, along with two other species of Ponera, are included in this paper.

Characteristics: Pronounced constriction between the first and second gasteral segments. Sting well developed. Workers monomorphic. Pupae in cocoons. Integument strongly scleritized. Eye poorly developed. Pedicel consisting of one segment--the petiole. Cloacal orifice slit-shaped. Small in size.

KEY TO THE GENERA OF SUBFAMILY PONERINAE
(Partially taken from Creighton, 1950)

1. Row of coarse bidenticulate teeth on mandibles - - - - - - - - Stigmatomma
   Without row of such teeth - 2
2. Dorsum of thorax with well developed sutures - - - - - - - - - - - Ponera
   Dorsum of thorax without well developed sutures - - - - - - - Proceratium

GENUS PONERA Latrielle

The members of the genus Ponera form small colonies of a few dozen workers. Colonies are most often found in logs or similar places. The workers are carnivorous. The only species known from Oklahoma seems to avoid light. According to Creighton (1950) at least two of the species that occur in the United States (trigona opacior and opaciceps) are known deep in South America in the countries of Uruguay (opaciceps) and Chile (trigona opacior).

Characteristics: Thorax with well developed promeso- and mesoepinotal sutures. Eye very poorly developed. Antenna with the segments gradually becoming larger toward the tip. Scape incrassated. Sting well developed. Middle and hind tibia with a single spur. Legs short. Length of worker 2 to 3.75 mm.

KEY TO THE SPECIES OF PONERA
(Adapted from Creighton (1950)

1. Petiole narrower at top than at bottom - - - - - - trigona subsp. opacior
   Petiole about as wide at top as at bottom - - - - - - - - - - - - - - - - 2

2. Dense, coarse punctures on head - - - - - - coarctata subsp. pennsylvanica
   Punctures of head dense but much finer - - - - - - - - - - - - - opaciceps

PONERA COARCTATA PENNSYLVANICA Buckley

Ponera pennsylvanica Buckley, 1866, Proc. Ent. Soc. Phila., 6:171, male.
Ponera coarctata pennsylvanica Emery, 1895, Zool. Jahrb. Syst., 8:267, male, female and worker.

Distribution in the United States: Ninety-seventh longitude eastward (5).
Distribution in Oklahoma: Not known to occur in Oklahoma.

Ponera coarctata pennsylvanica is not known to occur in Oklahoma, but has been included here because of the great possibility that it might occur. M. R. Smith (1935) is of the opinion that this species probably occurs in the northern section of the State. According to Wheeler (1913) the members of this species are slow in their return for their young after the nests have been disturbed.

The following description was abstracted from M. R. Smith (1936):

> "Worker--length: 3 to 3.75 mm. Head including mandible very much longer than broad, sides moderately convex, posterior border faintly but definitely excised in the middle. Eyes very small, not convex, composed of approximately 6 ommatidia, placed toward the front of the head about one-fourth the distance from the base of the mandibles. Ocelli absent. Clypeus convex medianally. No distinct frontal area. Frontal furrow extending approximately half the distance from the frontal carinae to the posterior border of the head. Mandibles with two or three prominent teeth anteriorly, and many small denticulae posteriorly. Scape robust, not attaining the posterior border of the head. Funiculus clavate, the terminal segment almost, or about as long as the three preceding segments together. Thorax laterally compressed, moderately convex dorsally, wider anteriorly than posteriorly; promeso- and mesoepinotal suture distinct. Epinotal declivity faintly concave with weakly marginate sides, meeting the base in a well rounded obtuse angle. Petiole thick antero-posteriorly, scarcely narrowed dorsally, convex anteriorly, concave posteriorly, beneath with a prominent rectangular tooth, the front of which bears a spiracular opening, the posterior of which terminates in a rather sharp tooth. Tibia of legs each with a well developed pectinated spur."

PONERA OPACICEPS Mayr

Ponera opaciceps Mayr, 1887, Verh. Zool.-Bot. Ges. Wien., 37:536, female and worker.

Distribution in the United States: Southwestern and southern states; west as far as Arizona (5).
Distribution in Oklahoma: Not known to occur in Oklahoma.

Ponera opaciceps like the previous species has, as far as can be determined, not been found in Oklahoma; but for reasons stated above, it has been included in the present work. Smith (1935) was of the opinion that this species might occur in the southern part of the State. Creighton (1950) also lists Oklahoma as being in the main range of this species. According to Wheeler (1913) this species is widely distributed in the American tropics. Creighton (1950) reports that this species has been taken from Uruguay.

The following description was abstracted from Smith (1936):

> "Worker--length: 3.2 to 3.4 mm. Head including mandibles, longer than broad, posterior border faintly emarginate, the sides convex, and the posterior angles rounded. Eyes small, with approximately 10-12 facets, situated at a distance less than twice their greatest diameter from the base of the mandibles. Mandibles with more irregular teeth than with P. pennsylvanica, the front teeth not only larger but more regular. Clypeus convex medianly. No frontal area. A faint frontal carinae to the posterior border of the head. Scape not attaining the posterior border of the head, the funiculus clavate, the last segment apparently shorter than the three preceding segments. Thorax with distinct promeso- and meso-epinotal sutures, not so laterally, compressed, especially above the pronotum as with P. pennsylvanica; epinotal declivity faintly concave, with bluntly marginate sides, meeting the base in a well rounded, obtuse angle. Petiole viewed in lateral profile thick antero-posteriorly, scarcely narrower dorsally, convex anteriorly, concave posteriorly; viewed posteriorly the superior border merges into the sides in well rounded angles; tooth below although rectangular, apparently lacking the spiracular opening in front, and the point posteriorly as with P. pennsylvanica."

PONERA TRIGONA OPACIOR Forel
(Fig. 2)

Ponera trigona opacior Forel, 1893, Trans. Ent. Soc. Lond., p. 363, female and worker.

Distribution in the United States: In the southern and southwestern states. Scarce west of Texas (5).
Distribution in Oklahoma: Kay, Washington, Delaware, Payne, McIntosh, Latimer, Pushmataha, Choctaw and McCurtain (1); Beckham and Comanche (2) (3).

Ponera trigona opacior is the only species reported from Oklahoma. The author has found this form only in the eastern half of the State but Smith (1935) reports it from the southwestern counties which probably means that it occurs throughout the State. This species is almost numerous in some areas. It is most easily found in the middle of a hot dry summer. In 1954, Oklahoma underwent a severe drought. The temperature reached 110 degrees F. and above on several occasions. During this period the author was able to find P. trigona opacior species under piles of cow dung. It is not known exactly why this occurred but it was thought that the foraging workers were merely in search of food and in dry weather many insects feed or seek shelter under these moist piles. No colonies were established under the cow dung, only the foraging workers. In some areas workers could be found under almost every pile, a fact which might show that this timid species is more common than is realized.

Characteristics: Petiole subtriangular; that is, wider at top than at bottom. Segments of funiculus becoming larger toward the tip. Eye small and extremely anterior. Scape incrassated, bowed, and failing to reach the occipital border. Promesonotal and mesoepinotal sutures well developed. Thorax becoming more narrow posteriorly. Epinotum flattened posteriorly. Petiole concave behind. Sting well developed. Pubescence dense on most of body. Length of workers a little over 2 mm. Color reddish brown.

GENUS PROCERATIUM Roger

PROCERATIUM CROCEUM (Roger)

Ponera crocea Roger, 1860, Berl. Ent. Zeitschr., 4:288, female.
Sysphingta crocea Mayr, 1866, Sitzungsb. Akad. Wiss. Wien., 53:501, female.
Proceratium croceum Mayr, 1886, Verh., Zool.-Bot. Ges. Wien, 36:437, female and worker.

Distribution in the United States: East Texas, east along the gulf to Florida and north sporadically to latitude thirty eight (5).
Distribution in Oklahoma: Not known to occur in Oklahoma.

The range of Proceratium croceum indicates that it probably occurs in Oklahoma, although it has not been collected thus far. According to Smith (1935) it occurs in both Kansas and Texas, which is strong evidence that it probably occurs here too. According to Wheeler (1913) the genus Proceratium is one of the most primitive of the Ponerinae. He also states that an ant is found in Prussian amber that appears to be a primitive relative. Smith (1923) reports that the largest colony he found contained only 30 ants. He also stated that the colonies were usually located in rotting logs. Creighton (1950) reveals that P. croceum species can be separated from other members of this subfamily by the fact that it does not have distinct sutures on the dorsum of the thorax.

GENUS STIGMATOMMA Roger

STIGMATOMMA PALLIPES (Haldeman)

Typhlopone pallipes Haldeman, 1844, Proc. Acad. Nat. Sci. Phila., 2:54, worker.
Stigmatomma pallipes Emery, 1895, Zool. Jahrb. Syst., 8:261, male, female and worker.
Stigmatomma pallipes subsp. arizonense, Wheeler, 1915, Bull. Amer. Mus. Nat. Hist., 34:389, worker.
Stigmatomma pallipes var. wheeleri Santschi, 1913, Ann. Soc. Ent. Belg. 57:429, male, female and worker.
Stigmatomma serratum Roger, 1895, Berl. Ent. Zeitschr., 3:251, worker.
Arotropus binodosus Provancher, 1881, Canadian Nat., 12:207, worker.

Distribution in the United States: "Southern Ontario and Quebec south to the gulf coast with a sporadic distribution in Texas and the southern Arizona mountains (5).
Distribution in Oklahoma: Not known to occur in Oklahoma.

Stigmatomma pallipes has not been collected from Oklahoma but its known range indicates that it probably occurs within this State. According to Wheeler (1913) it is one of the most primitive of the Ponerinae. He also states that he has seen callows escaping from their cocoons without the aid of other workers. Creighton (1950) reports that the queens are known to forage during the period of nest founding; another factor that places it as one

of the most primitive of ants. Only one species occurs in the United States but it has several subspecies. It can be separated from the other Ponerinae by the row of coarse bidenticulate teeth on the mandibles (Creighton, 1950).

SUBFAMILY DORYLINAE

The subfamily Dorylinae includes the famous driver ants of Africa and army ants of South America. These tropical species have been widely publicized and in many cases overemphasized in popular publications; few people realize that we have members of this group present in Oklahoma. The members in Oklahoma are not aggressive, nor as conspicuous as the large nomadic bands of foraging legionnaires present in both of the great tropical continents. In most cases, species present here are quite to the contrary, often being timid. While foraging, the ants form long lines, often reaching several yards in length. The food consists mainly of arthropod flesh. Some species are almost altogether subterranean. None of the species seems to be very abundant. All members of this subfamily in Oklahoma belong to the genus Eciton; hence, a description of the subfamily for this state is also a description of the genus Eciton.

Characteristics: Eye vestigial or ocellus-like. Pedicel consisting of 2 segments--a petiole and a postpetiole. Antenna 12-segmented. Pupae bare. Sting well developed. Cloacal orifice slit-shaped. Scape insertion near mouth. Antennal scape often short and swollen. Segments of pedicel usually more angular than other subfamilies. Workers polymorphic. Female wingless and workerlike, called a dichthadiigyne. Male and female with only one segment making up the pedicel.

It is impossible to give a key to the workers of the genus Eciton because workers of some forms present in Oklahoma have not been found. As a result, two keys will be given--one to the major workers and the other to

the males. It appears to the author that males are by far the most common caste collected in Oklahoma. This is expected because of the dichthadiigyne which is a wingless type female produced by Eciton.

KEY TO THE MAJOR WORKERS OF ECITON

1. Tarsal claw with median tooth - coecum
   Tarsal claw without median tooth - 2
2. Petiole with a spine underneath that projects down and backward - pilosum
   Without spine underneath petiole - 3
3. Head, thorax, and pedicel opaque. Deeply punctate - - - - - - - nigrescens
   Head shiny - 4
4. Dorsum of thorax opaque. Propleura shiny - - - - - - - - - - - opacithorax
   Dorsum of thorax smooth and shiny - - - - - - - - - - - - - - - commutatum

KEY TO THE MALES OF ECITON
(modified from M. R. Smith, 1942)

1. Epinotum with median longitudinal groove where base and declivity meet - pilosum
   Epinotum not as above - 2
2. Mandible sickle-shaped - 3
   Mandible not sickle-shaped - 4
3. Head when viewed anteriorly with projecting posterior corners visible between eyes and lateral ocelli - - - - - - - - - - - melsheimeri
   Head without posterior corners - minus
4. Eyes and ocelli unusually large. Ocelli on high protuberances above general surface of head - - - - - - - - - - - - - - - - - - harrisii
   Eyes and ocelli small - 5
5. Head and thorax sculptured but with glabrous appearance. Dorsal surface of head rounding off anteriorly without forming a perceptible ridge above antennal socket - - - - - - - - - - - - opacithorax
   Dorsum of thorax opaque, head forming distinct ridges above antennal sockets - nigrescens

SUBGENUS LABIDUS Jurine

ECITON COECUM (Latreille)

Formica coeca Latreille, 1802, Fourmis, p. 270, worker.
Labidus latreillei Jurine, 1807, Nouv. Math. Class. Hym. p. 283, male.
Labidus jurinei Shuckard, 1840, Ann. Nat. Hist., 5:198, male.
Labidus savi Haldeman, 1852, Stansbury's Exp. Great Salt Lake, Lippincott Grambo and Co., p. 366, male.
Labidus atriceps F. Smith, 1859, Cat. Hym. Brit. Mus., 7:5, male.
Nycteresia coeca Roger, 1861, Berl. Ent. Zeitschr., 5:22, worker.
Myrmica rubra Buckley, 1866, Proc. Ent. Soc. Phila., p. 335, worker.

Pseudodichthadia incerta E. Andre, 1885, Spec. Hym. Europe, 2:8, worker.
Mutilla fulvescens Blanchard, 1894, in Cuvier Regne Animal Ins. 2:118.
Eciton coecum Mayr, 1886, Wien Ent. Zeit., 5:119, worker.
Eciton vastator F. Smith, 1860, Jour. Ent. Soc., 1:71, worker.
Eciton erratica F. Smith, 1860, Jour. Ent. Soc., 1:71, worker.
Eciton jurinei Mayr, 1886, Wien, Ent. Zeit., 5:33, male.
Eciton omnivorum Emery, 1891, Bull. Soc. Ent. Ital., 33:163, worker.
Eciton selvi Forel, 1904, Ann. Soc. Ent. Belg., 48:169, worker.

Distribution in the United States: Oklahoma and Texas (5).
Distribution in Oklahoma: It is listed for Oklahoma but no location is given (3).

The author has not found Eciton coecum in Oklahoma; in fact, the only record of its occurring here is Smith (1947). He, however, does not mention from what part of the State his material comes. It is assumed that it must be from the southern part since the main range of this insect lies south of Oklahoma. Creighton (1950) lists the range from Texas to Argentina. Wheeler (1908) states that the workers are subterranean or hypogaeic; that the males are common around electric lights in some parts of the year in Texas. He further states that the workers forage in galleries beneath the surface of the ground or under stones, and that they feed on insects and carrion of dogs and cats, etc.

Smith (1947) lists these brief characteristics of the species: Length of workers 2.5 to 7 mm. Tarsus with median tooth on claw. Tooth on each frontal carina. Eye on worker absent. Sting well developed. Antenna 12-segmented.

SUBGENUS NEIVAMYRMEX Borgneier

ECITON COMMUTATUM Emery

Eciton (Acamatus) commutatum Emery, 1900, Mem. Accad. Sci. Bologna 8:522, worker.
Eciton commutatum M. R. Smith, 1942, Amer. Mid. Naturalist, 27:568, worker.

Distribution in the United States: "Kansas south to Texas and southwest to Arizona" (5).
Distribution in Oklahoma: Comanche (2) (3).

Eciton commutatum is evidently very uncommon in Oklahoma. Smith (1942) states that the workers are the only caste of this species thus far found. Little is known about the biology of this species.

Smith (1942) gives the following characteristics for the major worker of this form:

> "Eye extremely small, indistinct, apparently placed beneath general surface of head, and only observable after careful examination. Superior border of mandible with remarkably large, blunt, angular, basal tooth; margin deeply excised between this tooth and masticatory border, masticatory border usually with a number of small, irregular teeth, which often may be worn off. Antennal scape remarkably robust, short, less than three times as long as its greatest width; funiculus exceedingly short and broad, all segments, except first two and last, very noticeably broader than long. Antennal socket open in front, that is, without a flange (this best seen from above). Posterior border of head from above, deeply emarginate, forming distinct, blunt, angular posterior corners; posterior corners not outwardly curved. Thorax compressed. Pronotum without transverse carina. Promesonotum approximately two and a half times length of epinotum when measured from the point where the carina should be back to mesoepinotal suture; mesoepinotal suture broad, distinct, but not deep. Anterior half of promesonotum, in profile, convex; posterior half distinctly flattened; posterior part of promesonotum clearly elevated above base of epinotum. Base of epinotum meeting declivity in blunt, obtuse angle, which in some aspects does not appear much greater than a right angle. Petiole robust, subquadrate, approximately seven-eighths as broad as long. Postpetiole scarcely shorter than petiole but very clearly broader, approximately one and one-fourth times as broad as long, broader posteriorly than anteriorly.
>
> "Body and appendages unusually smooth and highly polished, with the following exceptions: Mandibles subopaque, coarsely and longitudinally striated, and bearing scattered piligerous punctures near the masticatory border; anterior declivity of pronotum, propleura, and sides of petiole and postpetiole faintly shagreened, subopaque; meso- and metapleura more coarsely granulate-punctate; mesoepinotal suture granulate-punctate, with also longitudinal striae; tarsi and funiculi opaque owing to the abundant pile. Head with small, scattered, but distinct punctures.
>
> "Hairs yellowish, moderately abundant, of variable length, apparently sparse or absent on sides of thorax and head. Appressed pubescence more visible on gaster than elsewhere. Deep yellowish brown to reddish brown, with lighter petiole, Postpetiole, gaster, and legs; mandibles and frontal carinae much darker, especially around borders."

ECITON HARRISII (Haldeman)

Labidus harrisii Haldeman, 1852, Stansbury's Exp. Great Salt Lake, Lippincott, Grambo and Co., p. 367, male.
Eciton (Acamatus) harrisii Emery, 1900, Mem. Acad. Sci. Bologna 8:515, male.
Eciton (Neivamyrmex) harrisii M. R. Smith, 1942, Amer. Mid. Naturalist, 27:572, male.

Distribution in the United States: Oklahoma, Texas, New Mexico, and Arizona (7).
Distribution in Oklahoma: Payne (2) (7).

This lone report of harrisii occurs in the north central part of Oklahoma, which probably means that the species occurs in other parts of the State. The collection at Oklahoma A. and M. contains 2 males which were identified by M. R. Smith in 1937. According to Smith (1942) only the males have been found. It is his opinion that it might be the male of wheeleri. Nothing is known of the biology. It is apparently rare in Oklahoma.

Characteristics: Body extremely hairy, Eye and ocellus large. Ocelli on high protuberances above the surface of the head. Antennal scape short. Petiole small. Reddish-brown with dorsum of thorax and head darker. Length about 10 mm. Tarsal claw with very weak teeth. Epinotum subpunctate or weakly concave. Thorax slender.

ECITON MELSHEIMERI (Haldeman)

Labidus melsheimeri Haldeman, 1852, Stanbury's Exp. Great Salt Lake. Lippincott, Grambo and Co., p. 368, male.
Eciton (Labidus) melsheimeri Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:442, male.
Eciton (Neivamyrmex) melsheimeri M. R. Smith, 1942, Amer. Mid. Naturalist, 27:576, male.

Distribution in the United States: Texas and Oklahoma (7).
Distribution in Oklahoma: Latimer (7) (2) (3).

Eciton melsheimeri is another species that has been identified by the males. The other castes have never been found or at least they have never been associated with the males. Nothing is known about the biology of this

form. E. melsheimeri is very rare, having been taken but once, in the south-eastern part of the State.

Smith (1942) gives the following description of this species:

"Head approximately one and six-tenths times as broad as long. Eye prominent, convex, protuberant. Ocelli large; ocellar protuberance concave at summit, inner border of eye and lateral ocellus almost touching each other. Frontal carinae sharply margined, subparallel, with distinct groove between them up to point where each converges outwardly toward eye, thus forming a prominent ridge above each antennal socket. Antennal scape robust, short, approximately as long as combined length of first 3 funicular segments; second funicular segment unusually short, third through fifth distinctly broader than any succeeding segments. A pair of short, stubby, toothlike projections posterior to clypeus, these not evident on all individuals. Mandible rather long, slender, curved tapering from base toward apex, where it ends in a very acute point. Posterior corner of head strongly projecting between lateral ocellus and inner border of eye, but not so well developed as in fuscipennis. From above, posterior corners of head projecting behind and also dorsolaterad of eye, thus giving head an extended appearance. In profile, vertex and posterior corner of head well extended dorsally above superior border of eye. Eye nearly touching base of mandible, occupying all of side of head except for large, protuberant, ridge-shaped corner posterodorsad of eye. Region of head posterior to ocelli, in profile, flattened or feebly concave; occiput without a perceptible flange. Thorax, in profile, distinctly longer than high, not projecting perceptibly above head. Anterior median and parapsidal lines often indistinct or missing, the former most easily seen. Epinotum, in profile, subtruncate. Tarsal claws faintly toothed. Petiole, in profile, flattened or feebly convex beneath. Gaster elongate, slender, compressed, with distinct constrictions between segments. Intermediate tooth on apex of seventh gastrib sternum small and indistinct, the lateral teeth acute. In profile, apex of paramere truncate, ventral border of apex convex, and dorsal border of apex excised.

"Body rather shining in spite of the unusually long and fairly dense hairs covering it. Punctures on side of thorax sparse, but visible in some lights.

"Hairs yellowish, long, suberect; less appressed on head, thorax, petiole, and ventral surface of gaster; unusually long near apex of gaster."

ECITON MINUS (Cresson)

Labidus minor Cresson, 1872, Trans. Amer. Ent. Soc. 4:195, male.
Eciton (Labidus) minor Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:441, male.
Eciton (Neivamyrmex) minus M. R. Smith, 1942, Amer. Mid. Naturalist, 27:574, male.

Distribution in the United States: Arizona, California, Kansas, Oklahoma, New Mexico, and Texas (7).
Distribution in Oklahoma: Payne (2) (7).

The lone collection of Eciton minus is from the northcentral part of the State and was identified by M. R. Smith in 1938. This species, like melsheimeri, is known only from males. It probably occurs in other parts of Oklahoma but is apparently rare, or else the nests are so well hidden that it makes them very difficult to find. Nothing is known of the biology.

Characteristics: Mandibles sickle-shaped. Eye and ocellus large. Eye dark in color but ocellus whitish and placed on protuberance above surface of head. Hair not long as in harrisii, but dense, short, and closely appressed. Length 8.7 mm. Antennal scape not quite as long as first four segments of funiculus. Most of body surface shiny through the short hairs. Leg very tiny.

ECITON NIGRESCENS (Cresson)

Labidus nigrescens Cresson, 1872, Trans. Amer. Ent. Soc., 4:194, male.
Eciton (Acamatus) nigrescens Wheeler, 1908, Bull. Amer. Mus. Nat. Hist., 24:417, male.
Eciton sumichrasti Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:440.
Eciton (Acamatus) schmitti Emery, 1894, Bull. Soc. Ent. Ital., 26:183, worker.
Eciton (Neivamyrmex) nigrescens M. R. Smith, 1942, Amer. Mid. Naturalist, 27:550, male, female, and worker.

Distribution in the United States: Entire southern part. Extending to the 38 degree lat. in the east; the 40 degree lat. in the midwest and to the 35 degree lat. in the far west (5).
Distribution in Oklahoma: Woodward and Payne (1), Latimer (4) (7), Oklahoma (7), Cleveland (4) (3), Comanche (3).

This also includes the form schmitti. Eciton nigrescens is one of the best known and most widely distributed species occurring in North America, and is probably the most common species of this genus in Oklahoma. The author has taken this species several times in Payne county. The workers forage in lines in the daytime. One colony, which was taken at Woodward,

was foraging at night. Food consists of arthropods which they are able to find and catch.

Characteristics: Head, thorax, and pedicel opaque; deeply punctate. Eye consisting of one ocellus-like facet. Scape thickening toward the apex. First funicular segment about half as wide as the apex of the scape. Antenna 12-segmented. Segments of funiculus becoming larger toward the end. Erect hairs over most of body. Depression at mesoepinotal region of thorax. Thorax when viewed from above narrowing toward the epinotum. Tibial spurs of forelegs larger than those on remaining legs. Petiole with flat sides and more narrow than the rounded postpetiole. Length of major worker about 4.7 mm.

ECITON OPACITHORAX Emery

Eciton californicum subsp. opacithorax Emery, 1894, Bull. Soc. Ent. Ital., 26:184, worker.
Eciton (Acamatus) opacithorax Emery, 1900, Mem. Accad. Sci. Bologna, 8:524.
Eciton (Acamatus) carolinense Wheeler, 1921, Proc. Amer. Acad. Arts. Sci. Bos. 56:314, female.
Eciton (Neivamyrmex) opacithorax M. R. Smith, 1942, Amer. Mid. Naturalist, 27:555, male, female and worker.

Distribution in the United States: Texas and New Mexico, east to North Carolina, and Tennessee (5).
Distribution in Oklahoma: Payne (1) (2) (3) (7), Roger Mills and Caddo (1).

Collections made of Eciton opacithorax by the author have not been satisfactory. In most cases, only one to a few individuals were found. In Payne county the species was taken on several occasions but never in any great numbers. According to Wheeler (1913), it feeds on other ants. The nests of other ants are raided quite often. In Payne county, the author took a major worker from a nest of Pheidole.

Characteristics: Dorsum of thorax opaque but propleura shiny. Eye consisting of one ocellus-like facet. Distinct carina on pronotum. Antenna 12-segmented. Scape surpassing the eye. Mesoepinotal suture impressed. Petiole more slender than the rounded postpetiole. Promesonotal region

forming a continuous, somewhat rounding, arch. Erect and suberect hairs numerous over most of the body. Major worker about 4.5 mm. in length. Known from workers, males and females.

ECITON PILOSUM F. Smith
(Fig. 1)

Ecitón pilosa F. Smith, 1858, Cat. Hym. Brit. Mus., 6:151, worker.
Eciton pilosum Mayr, 1865, Novara Reise Formicid., p. 77.
Labidus mexicanum F. Smith, 1859, Cat. Hym. Brit. Mus., 7:7, male.
Eciton clavicornis Norton, 1868, Trans. Amer. Ent. Soc., 2:46, worker.
Eciton subsulcatum Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:440, male.
Eciton (Acamatus) pilosum Emery, 1894, Bull. Soc. Ent. Ital., 26:183, worker.
Eciton (Acamatus) mexicanum Emery, 1900, Mem. Acad. Sci. Bologna (5), 8:515, male.
Eciton (Neivamyrmex) pilosum M. R. Smith, 1942, Amer. Mid. Naturalist, 27:544, worker and male.

Distribution in the United States: Arkansas, Mississippi, Oklahoma, Texas (7).
Distribution in Oklahoma: Latimer (2) (3); Mayes and LeFlore (2) (7); Bryan (7); Adair (2).

The distribution of pilosum seems to be in the eastern and southern portion of Oklahoma. Colonies are apparently quite large. The workers are carnivorous. In Adair county, an unidentified farmer collected over a half pint from his well. Upon going through this large number of pilosum a female reproductive was found; it is not believed that the female of this species has heretofore been observed. A description is given below.

Description of the major worker: Length about 5 mm. Spine attached to petiole that projects down and backward. Spine attached to the petiole with a thin lamella. Head, thorax, and gaster shiny except the sides of the meso- and epinotal region and the mesoepinotal impression. Promesonotum rounded and continuous, wider than epinotum. Thorax impressed at mesoepinotal region. Eye ocellus-like. Scape incrassated. Funiculus segments gradually becoming larger toward the tip. Color deep red.

Description of female: Length 15 mm. Length of head including mandibles 3 mm. with head at widest point 2 mm. Head rounded above the antennal insertion. Y-shaped suture starting between the antennal insertion and extending

posteriorly. Eye ocellus-like and placed well upon the side of the head. Clypeus broad with median notch. Mandibles narrow, shiny, and ending with a toothlike apex. Head widening toward mandibles. Scape incrassated and lacking about the length of the first 3 funicular segments reaching the eye. Segments of funiculus subequal except the last which is longer. Promesothoracic region continuously rounded on dorsum. Mesoepinotal suture widely impressed. Epinotum wider than remainder of thorax. Epinotum with longitudinal impression at posterior end. Femur and tibia flattened and somewhat reduced in size. Posterior angles of the epinotum high and rounded. Spiracle of the epinotum large and conspicuous. Epinotum appears flattened when viewed from above. Pedicel with median sulcus which divides it into two pear-shaped lobes with the large ends divided by the sulcus and the small ends directed outward and backward. Gaster voluminous. Gaster 9 mm. long and 3.5 mm. wide at its widest point, without erect hairs but having closely appressed pubescence. Spiracles of gaster apparent on each segment. Gaster clearly shiny and light brownish-red in color, remainder of body dark brownish-red. Head, thorax, and pedicel with numerous hairs. Scattered punctures over head, thorax, and pedicel but not completely rendering the surface opaque. Most areas somewhat shiny. This description was made from one female.

SUBFAMILY MYRMICINAE Lepeletier

The subfamily Myrmicinae contains forms with diverse habits and morphological characteristics. It is represented in this state by ten genera and thirty-two species. This is the dominant subfamily in Oklahoma. It also contains many species which are economically important. Solenopsis xyloni, McCook; Pogonomyrmex barbatus, F. Smith; Monomorium minimum, Buckley; and M. pharaonis (Linnaeus) are a few examples of the most important economic species. Myrmicinae is the largest, most diverse, and most economically important subfamily in the world (Smith, 1947). Food varies from seed to honeydew. Nesting sites variable.

Characteristics: Integument strongly sclerotized. Pedicel composed of two segments--a petiole and a postpetiole. Workers monomorphic, dimorphic, or polymorphic. Many have well developed stings. Pupae bare. Epinotum with or without spines. Eye well developed. Antenna with a varying number of segments, usually a club on the tip of the funiculus. Frontal carina covering antennal insertions. Cloacal orifice slit-shaped.

KEY TO THE GENERA OF THE SUBFAMILY MYRMICINAE

1. Antenna with 10 segments. Last 2 segments of funiculus forming distinct club. Epinotum unarmed - - - - - - - - - - - - - - - - Solenopsis
   Antenna with more than 10 segments - 2
2. Antenna with 11 segments - 3
   Antenna with 12 segments - 5
3. Pedicel attached to the dorsal surface of the gaster. Tip of gaster pointed at apex - - - - - - - - - - - - - - - - - - Crematogaster
   Pedicel not attached to the dorsal surface of the gaster - - - - - - - - 4
4. Head with numerous tubercles. Pronotum with a pair of tubercle-covered spines, and mesonotum with two pairs of tubercle-covered spines - Trachymyrmex
   Body without tubercles. Only one set of spines on the epinotum. Nest under bark in trees - - - - - - - - - - - - - - - - - - Leptothorax
5. Spurs of middle and hind tibia pectinate - - - - - - - - - - - - - - - - 6
   Spurs of middle and hind tibia not pectinate - - - - - - - - - - - - - - 7

6. Psammophore present. Mesoepinotal constriction not pronounced - Pogonomyrmex
Psammophore absent. Mesoepinotal constriction pronounced - - - - Myrmica
7. Epinotum with 2 pairs of spines - - - - - - - - - - - - - - - - - - Myrmecina
Epinotum without spines or with only one pair - - - - - - - - - - - - - - - 8
8. Epinotum unarmed. Workers monomorphic. Small ants often found in houses - Monomorium
Epinotum armed or if not armed, workers dimorphic - - - - - - - - - - - - 9
9. Workers dimorphic. Major workers with large heads. Major workers with pronounced constriction, dividing posterior part of head into 2 pronounced occipital lobes - Pheidole
Disagreeing with one or more characteristics given above - - - - - - - - 10
10. Funiculus without distinct 3-segmented club at tip. Workers have long slender appearance - Aphaenogaster
Funiculus with a distinct 3-segmented club at tip - - - - - - - Leptothorax

GENUS APHAENOGASTER Mayr
(Fig. 3)

All species of Aphaenogaster in America north of Mexico are in the subgenus Attomyrma Emery. This genus has 5 representatives in Oklahoma. The only ant ever described from Oklahoma was A. treatae pluteicornis G. C. and E. W. Wheeler. Nesting may be in the soil as with A. treatae pluteicornis or in dead wood as A. tennesseensis Mayr. Colonies are not abundant in most areas. Most often found in eastern part of the State.

Characteristics: All species in Oklahoma are of a deep red color and are about 4-6 mm. in length. Head longer than broad. Entire animal slender. Tip of funiculus enlarged but not forming a club. Antenna 12-segmented. Epinotum armed with a pair of spines of varying length. Eye well developed. Antennal scape extending beyond the occipital border. Mesoepinotal suture well developed. Thorax sloping downward behind pronotum.

KEY TO THE SPECIES OF APHAENOGASTER Mayr

1. Antennal scape with a conspicuous lobe at base - - - - - - - - - - - - - 2
Antennal scape without such lobe - 3
2. Head narrowing posterior to the eyes. Posterior part of head with longitudinal rugae - treatae
Head not narrowing posterior to the eyes. Posterior of head without rugae - treatae subsp. pluteicornis
3. Epinotal spines longer than the basal face of the epinotum. Color very deep red. Postpetiole wider than long - - - - - - - - - tennesseensis
Not as above - 4
4. Anterior portion of mesonotum higher than adjacent pronotum - - - - fulva
Anterior part of mesonotum not higher than pronotum - - - - - - - - - - - 5

5. Female reproductives 7 mm. long, workers 5.5 mm. - - - - - - - - - - texana
   Female reproductives 5.5 mm. long, workers 4.5 mm. long - - - - - -
   - texana subsp. carolinensis

APHAENOGASTER FULVA Roger

Aphaenogaster fulva Roger, 1863, Berl. Ent. Zeitschr., 7:190, worker.
Stenamma fulvum Emery, 1895, Zool. Jahrb. Syst., 8:303, male, female and worker.
Aphaenogaster fulva var. rubida Enzmann, 1947, Jour. N. Y. Ent. Soc., 55:8, worker.

Distribution in the United States: Alabama northward in the eastern part of of the country and west to Ohio and Oklahoma (5) (4).
Distribution in Oklahoma: McClain and Cleveland (4).

The only report of Aphaenogaster fulva having been found in Oklahoma is from the University of Oklahoma which has some specimens of this species in its collection. It would appear that A. fulva is by no means common in the State. It has been assumed by some myrmecologists that A. fulva may be the host of tennesseensis. The relationship seems to be a case of temporary parasitism in which tennesseensis is the parasite. According to Creighton (1950) this has been supported by the discovery of a few mixed colonies of the two species. This has not been observed by the author.

APHAENOGASTER TENNESSEENSIS (Mayr)

Atta tennesseensis Mayr, 1862, Verh. Zool.-Bot. Ges. Wien, 12:95, worker.
Atta laevis Mayr, 1862, Verh. Zool.-Bot. Ges. Wien, 12:743, worker.
Myrmica subrubra Buckley, 1867, Proc. Ent. Soc. Phila., 6:336, female and worker.
Aphaenogaster tennesseensis Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:443, worker.
Stenamma tennesseensis Emery, 1895, Zool. Jahrb. Syst., 8:301, worker.
Stenamma tennesseensis var. ecalcarata Emery, 1895, Zool. Jahrb. Syst., 8:301, worker.

Distribution in the United States: Eastern gulf states to New England and west to Wisconsin and eastern Oklahoma (5).
Distribution in Oklahoma: Latimer and Caddo (2) (3); Payne and Washington (1).

Aphaenogaster tennesseensis most often nests in dead timber. It is said to be a temporary parasite of fulva. It seems to be restricted to the eastern

part of Oklahoma. A. tennesseensis has been taken once in Caddo county which is the most western point at which it has been collected. Many attempts to find this species in the western part of the State have failed.

Characteristics: Epinotal spines longer than basal face of the epinotum. Postpetiole broader than long. Spines of epinotum tapering backward. Antenna 12-segmented. Last four segments of the scape enlarged but not forming club. Eye well developed. Color deep red. Pronotum broader than remainder of thorax. Mesothorax sloping toward the rear. Head longer than broad. Workers monomorphic. General body shape long and slender.

APHAENOGASTER TEXANA Emery

Aphaenogaster fulva var. texana Emery, 1895, Zool. Jahrb. Syst., 8:306, worker.
Aphaenogaster texana Wheeler, 1915, Bull. Amer. Mus. Nat. Hist., 34:412, worker.
Aphaenogaster (Deromyrma) silvestrii Menozzi, 1929, Bull. Lab. Zool. Portici, 22:282, female and worker.

Distribution in the United States: Southern states from Arizona eastward (5).
Distribution in Oklahoma: Latimer (4); Payne and Washington (1).

All state collections of Aphaenogaster texana have been taken from the eastern part of Oklahoma, but this is of questionable significance since Creighton (1950) lists it from Arizona and Texas. All collections made by the author were from wooded areas. The workers appear to be mainly carnivorous. This species does not appear to be very abundant in Oklahoma.

Characteristics: Head about one-third longer than wide. Epinotum armed with a pair of spines. Epinotal spines of medium length much shorter than tennesseensis. Color red (specimens taken by the author in Oklahoma have legs that are of a lighter color than the rest of the body.) Largest worker about 5.5 mm. Female reproductive about 7 mm. in length. Scape surpassing the occipital border by at least the length of the first three segments of the funiculus. Antenna 12-segmented. Mesoepinotal suture well developed. Workers monomorphic. Last few segments of antenna enlarged but not forming

a club. Eye well developed. Erect hairs scattered sparsely over the body surface. General body appearance long and slender.

APHAENOGASTER TEXANA CAROLINENSIS Wheeler

Aphaenogaster texana subsp. carolinensis Wheeler, 1915, Bull. Amer. Mus. Nat. Hist., 34:414.

Distribution in the United States: "Piedmont region from southwestern Virginia to northern Alabama (5), Oklahoma (3).
Distribution in Oklahoma: Latimer (2) (3) (4).

Aphaenogaster texana carolinensis has not been taken by the author. Smith (1935) lists this form as occurring in Oklahoma and the collection at the University of Oklahoma contains specimens of this form. Both of these reports are from Latimer county.

Characteristics: Wheeler (1915) lists the following differences between this form and the typical texana. Length of both worker and female reproductive is somewhat shorter in carolinensis. The worker is about 4.5 mm. and the female reproductive about 5.5 mm. Sculpture of the head more pronounced in carolinensis. Ground color of the body less red in carolinensis and the epinotal spines less erect and directed backward more.

APHAENOGASTER TREATAE Forel

Aphaenogaster treatae Forel, 1886, Ann. Soc. Ent. Belg., 30:40, male, female and worker.
Stenamma treatae Emery, 1895, Zool. Jahrb. Syst., 8:302, worker.
Aphaenogaster treatae subsp. wheeleri Mann, 1915, Psyche, 22:51, female and worker.
Aphaenogaster treatae var. alabamensis G. C. and E. W. Wheeler, 1934, Psyche, 41:11, female and worker.

Distribution in the United States: Southern gulf states to New England and west to Ohio and sporadic to Illinois (5) and Oklahoma (3).
Distribution in Oklahoma: Latimer (2) (3) (4); Woods (2) (3); Comanche (3).

It appears that Aphaenogaster treatae is rather scarce in Oklahoma. The habits are similar to the preceding species.

Characteristics: Lobe at base of antenna. Rugae extending into the occiput. Scape of antenna surpassing the occipital border by about one-third its length. Eye well developed. Head not narrowing just behind the eyes. Epinotal spines shorter than the distance that separates them. Postpetiole much wider than petiole. Pronotum wider than rest of thorax. Body has scattered erect hairs. Body long and slender in appearance.

APHAENOGASTER TREATAE PLUTEICORNIS G. C. and E. W. Wheeler (Fig. 3)

Aphaenogaster treatae subsp. pluteicornis G. C. and E. W. Wheeler, 1934, Psyche, 41:7, male, female and worker.
Aphaenogaster treatae subsp. pluteicornis var. oklahomensis G. C. and E. W. Wheeler, 1934, Psyche, 41:10, worker.

Distribution in the United States: Eastern Oklahoma and Texas, and southern Alabama (5) (1).
Distribution in Oklahoma: LeFlore (2) (3); Payne and Pushmataha (1).

Aphaenogaster treatae pluteicornis is the only ant ever described from Oklahoma. The type location is Poteau which is located in LeFlore county; a county which lies on the eastern border of Oklahoma. The author has found this form at two locations. One of the locations was in Payne county. Here, three colonies were found on open grassland with nests in the soil. All of these colonies were within 100 yards of each other. The colonies were small and the ants seemed timid. The elevation at this point was about 1,000 feet. The second location was in a heavily wooded area east of Antlers in Pushmataha county. This colony was also located in the soil. It contained more workers than did the colonies from Payne county. The elevation was about 500 feet.

Characteristics: Thick lobe at base of antenna. Head narrowing just behind the eyes; rugae not present on the occiput. Occiput granulose. Epinotal spines shorter than the distance separating them. Head very narrow, one-third longer than broad. Occiput very narrow. Promesonotal and meso-

epinotal sutures well developed. Scape surpassing occipital border by one-third its length. Scattered erect hairs on body.

GENUS CREMATOGASTER Lund
(Fig. 4)

Crematogaster is one of the more abundant genera in Oklahoma both in number of ants and in the number of species. Oklahoma has 5 species with representatives in both subgenera. Members of this genus are often seen attending aphids; this is especially noticeable in the summer on sunflowers. Nesting sites vary from the open plains areas to the woods, laeviuscula is even known to nest in houses. It may be noted that some members of this genus move their colonies to the protection of piles of cow manure when the temperature gets very high in the summer.

Characteristics: Pedicel attached to the dorsal surface of the gaster. Gaster acutely pointed at apex. Antenna 11-segmented. Funiculus with 2 or 3 segmented club at tip. Epinotum with a pair of spines of varying length. Eye well developed. Workers monomorphic, but some forms show much variation in size. Head as viewed from side is highly convex.

KEY TO THE SPECIES OF CREMATOGASTER Lund

1. Postpetiole without median sulcus. Postpetiole continuously rounded - minutissima subsp. missouriensis
   Postpetiole with median sulcus which divides it into two parts - - - - 2
2. Head and thorax reddish-yellow, gaster brownish-black with yellow patch at base of first segment. Epinotal spines long and extending outward. Size variable but not polymorphic - - - - laeviuscula
   Not as above - 3
3. Small (usually less than 3 mm.) Epinotal spines very short and thick - ashmeadi
   Larger than 3 mm. with longer epinotal spines - - - - - - - - - - - - - 4
4. Dorsum of thorax with more than 15 erect hairs- - - lineolata punctulata
   Dorsum of thorax with less than 15 erect hairs - - - - - - - - - lineolata

CREMATOGASTER MINUTISSIMA MISSOURIENSIS Emery

Crematogaster victima subsp. missouriensis Emery, 1895, Zool. Jahrb. Syst., 8:228, worker.
Crematogaster minutissima subsp. missouriensis Creighton, 1939, Psyche, 46:139, worker.

Distribution in the United States: "Texas to Missouri (5)."
Distribution in Oklahoma: Payne and Canadian (1); Comanche and Latimer (2) (3) (4); Grady and McClain (2) (3).

Crematogaster minutissima missouriensis is the only member of the subgenus Orthocrema thus far recorded from Oklahoma. This small ant nests in the soil, generally with one opening. According to Smith (1947) they probably feed on honeydew. They are not very abundant in this State. Their small size and tiny colonies make them difficult to find.

Characteristics: Small in size (less than 3 mm.). Antenna 11-segmented with a two-segment club at tip. Postpetiole without median sulcus. Color clear yellow except the tip of the gaster which is brown. Frontal part of head very strongly convex. Erect hairs numerous on most of body surface. Epinotal spines shorter than the space that separates them and turned slightly outward. Gaster acute at tip. Pedicel attached at dorsal surface of gaster. Eye well developed. Somewhat slow of movement.

SUBGENUS ACROCOELIA Mayr

CREMATOGASTER ASHMEADI Mayr

Crematogaster ashmeadi Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:463, male, and worker.
Crematogaster atkinsoni var. helvepla Wheeler, 1919, Psyche 26:110, male and female.
Crematogaster ashmeadi var. matura Wheeler, 1932, Jour. N. Y. Ent. Soc., 40:8, worker.

Distribution in the United States: Eastern gulf and Atlantic coast states (5); Oklahoma (1) (2) (3).

Most of the collections of Crematogaster ashmeadi seems to be in the southern part of Oklahoma, a fact which may prove to be significant. C. ashmeadi is sometimes a serious house pest. It attends aphids religiously and feeds on other arthropods.

Characteristics: Epinotal spines short and thick at the base. Short, not over about 3 mm. Antenna 11-segmented with a 3-segmented club at the

tip of funiculus. Color deep brown. Scape when in repose surpassing the occipital border. Erect hairs scarce. Postpetiole with well developed median sulcus separating it into two lobes. Eye well developed. Pedical attached to dorsal surface of base of gaster, giving gaster appearance of being inverted. Gaster acutely pointed at apex. Head roundish. Generally somewhat slow in movement.

CREMATOGASTER LAEVIUSCULA Mayr
(Fig. 4)

Crematogaster laeviuscula Mayr, 1870, Verh. Zool.-Bot. Ges. Wien, 20:993, worker.
Crematogaster clara Mayr, 1870, Verh. Zool.-Bot. Ges. Wien, 20:993, worker.
Crematogaster lineolata subsp. laeviuscula Emery, 1895, Zool. Jahrb. Syst., 8:2-84, worker.
Crematogaster laeviuscula var. clara Wheeler, 1919, Psyche, 24:111.

Distribution in the United States: Oklahoma down to Texas and southern New Mexico (5).
Distribution in Oklahoma: Latimer (1) (2) (3) (4); Jackson and Alfalfa (4); Choctaw, McCurtain and Payne (1) (2) (3); Woods, Pontotoc, Pittsburg, Coal, Garvin, Bryan, Logan and Dewey (2) (3), Canadian, Caddo, Grady, Pottawatomie, McIntosh, Adair, Sequoyah, LeFlore, Pushmataha (1).

This is one of Oklahoma's most best adapted species and it occurs throughout the state. It is most often found in wooded areas. It often gets into houses and causes much annoyance. This species can generally be found with a little searching in almost any part of the State.

The author is in hearty agreement with Wheeler that clara is a synonym of C. laeviuscula. A large series shows time and time again the fact that both forms occur in the same colony. C. laeviuscula also attends aphids.

Characteristics: Head and thorax reddish-yellow with a black gaster. Epinotal spines long and directed outward. Size variable. Colonies usually large. Workers monomorphic. Antenna 11-segmented with 3-segmented club at tip of funiculus. Petiole with median sulcus. Erect hairs over most of body. Mesoepinotal suture well developed. No promesonotal suture. Eye well developed. Pedicel attached to dorsal surface of base of gaster. Tibia and tarsus often darker in color than femur and coxa.

CREMATOGASTER LINEOLATA (Say)

Myrmica lineolata Say, 1836, Bost. Jour. Nat. Hist., 1:290, male, female, and worker.
Myrmica cerasi Fitch, 1854, Trans. N. Y. State Agri. Soc., 14:835, worker.
Crematogaster lineolata Roger, 1863, Verz. Formicid., p. 37.
Crematogaster lineolata var. cerasi Emery, 1895, Zool. Jahrb. Syst., 8:282.
Crematogaster lineolata var. lutescens Emery, 1895, Zool. Jahrb. Syst., 8:282.
Crematogaster lineolata subsp. cerasi var. punctinodis Enzmann, 1946, Jour. N. Y. Ent. Soc., 54:91, male and worker.
Crematogaster lineolata subsp. cerasi var. wheldeni Enzmann, 1946, Ibid.

Distribution in the United States: New England, north Atlantic states, north central states to Colorado (5), Oklahoma (3).
Distribution in Oklahoma: Comanche (1) (2) (4); Latimer (2) (3) (4), Payne (1) (2) (3); Major and McClain (2); Roger Mills (2); Cimarron, Texas, Beaver, Harper, Ellis, Woodward, Craig, Harmon, Caddo, Canadian, Hughes, and McIntosh (1).

This classification also includes the variety cerasi which Smith recorded from Oklahoma. This form is placed as a synonym by Creighton (1950). C. lineolata is also widespread in Oklahoma, occurring in every part. This is one of the most diverse ants occurring in this area. It is believed that when a series of this species collected over its entire range is obtained, a clearer picture will be evident. It attends most forms of honeydew-excreting insects. In the summer, this species can be found often under piles of cow manure, probably searching for moisture; this was especially noticeable in the summer of 1954. The colonies can be found almost anywhere.

Characteristics: Epinotal spines long with tips directed outward. Color somewhat variable but of some shade of brown. Scape when in repose slightly surpassing the occipital border. Erect hairs numerous on most of body. Sculpturing on thorax delicate. Antenna 11-segmented with 3-segmented club at tip. Postpetiole with median sulcus well developed. Pedicel attached to the dorsal surface of the base of gaster. Eye well developed. Frontal area of head convex. Movement slow.

CREMATOGASTER LINEOLATA PUNCTULATA Emery

Crematogaster punctulata Emery, 1895, Zool. Jahrb. Syst., 8:287, worker.
Crematogaster lineolata var. punctulata Wheeler, 1908, Bull. Amer. Nat. Hist., 24:479.
Crematogaster opaca var. texana Santschi, 1929, Wien Ent. Zeitung. 46:91, worker.

Distribution in the United States: Eastern Colorado, New Mexico, western Texas (5), Oklahoma (3).
Distribution in Oklahoma: Grady, Comanche, Beckham, Cotton, Harmon, Logan Kiowa, Jackson, Woods, and McClain (2) (3) (4); McCurtain, Pushmataha, LeFlore, Latimer (1).

Smith (1935) lists a form by the name Crematogaster opaca depilis var. punctulata; this combination has not been found elsewhere, but it is assumed that this is Creighton's C. lineolata punctulata. Examination of specimens in the collection at Oklahoma A. and M. College, which were identified by Smith, shows that this is probably the correct form. Collections by the author over the State show a great deal of variation, and it is hard to place the specimens in a subspecies. It is thought that perhaps this is an intergrading area for the lineolata complex. The only material available for comparison was some specimens of C. opaca depilis var. punctulata (regarded C. lineolata punctulata) and the typical lineolata in the museum at Oklahoma A. and M. College. Both forms were collected in the 30's. Also available were some specimens identified by Smith in September, 1955, to be the typical lineolata. No specimens of C. lineolata subopaca Emery, were available. Due to the fact that Smith has examined several collections from this State, it was thought advisable to follow his lead and divide this species into the typical lineolata and lineolata punctulata. It is believed however, that this is not the complete answer, because the author has found forms that seem to resemble more closely lineolata subopaca.

Characteristics: Dorsum of thorax with more than 15 erect hairs. Color dark brownish. Antenna 11-segmented, with a distinct 3-segmented club at tip

of funiculus. Epinotal spines well developed and subparallel. Eye well developed. Pro- and mesonotum with heavy sculpturing rendering the surface dull. Mesoepinotum deeply impressed.

GENUS LEPTOTHORAX Mayr
(Fig. 5)

Leptothorax is represented by 3 species in Oklahoma. There is a variation in its morphological characteristics which makes them hard to summarize. These ants are not usually found in large numbers. The nesting habits vary from the ground to trees.

Characteristics: Antenna 11 or 12-segmented (a fact that is uncommon in a genus.) Funiculus with a 3-segmented club. Eye well developed. Antennal scape may or may not surpass the occipital border. Epinotum armed with a pair of spines. Members of two of the subgenera are represented. May be taken from any part of the State.

KEY TO THE SPECIES OF LEPTOTHORAX

1. Antenna with 11 segments - - - - - - - - - - - - - - - - - - - schaumi
   Antenna with 12 segments - 2
2. Mesoepinotal suture strongly impressed. Promesonotum strongly convex. Antennal scape slightly surpassing occipital border - pergandei
   Mesoepinotal suture not strongly impressed - - - - - - - - - - - texanus

SUBGENUS DICHOTHORAX Emery

LEPTOTHORAX PERGANDEI Emery

Leptothorax pergandei Emery, 1895, Zool. Jahrb. Syst., 8:323, male, female, and worker.
Leptothorax manni Wesson, 1935, Ent. News, 46:208, all castes.

Distribution in the United States: Central Atlantic states to Tennessee and North Carolina west to Indiana (5); Oklahoma (2) (3) (4).
Distribution in Oklahoma: Comanche (2) (3) (4); Harmon (4); Grady and McClain (2) (3); Pushmataha (2).

Leptothorax pergandei seems to be spread along the southern part of Oklahoma. The colonies are small and found in soil or rotting wood. The workers

according to Smith (1947), are predaceous and carnivorous.

Characteristics: Mesoepinotal suture deeply impressed. Promesothorax voluminous and strongly convex. Color blackish-brown, often with lighter colored antenna and legs. Head strongly shiny. Numerous erect hairs over body surface. Epinotum with short, stubby spines. Antenna 12-segmented with a 3-segmented club at tip of funiculus. Femur somewhat incrassated. Petiole node low. Petiole pedunculate. Eye well developed and conspicuous. Workers 3 mm. in length.

SUBGENUS LEPTOTHORAX

LEPTOTHORAX SCHAUMI Roger
(Fig. 5)

Leptothorax schaumi Roger, 1863, Berl. Ent. Zeitschr., 7:180, worker.
Leptothorax fortinodis Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:452, worker and female.
Leptothorax fortinodis var. gilvus Wheeler, 1903, Proc. Acad. Nat. Sci. Phila., p. 235, female.
Leptothorax fortinodis var. melanoticus Wheeler, 1903, Proc. Acad. Nat. Sci. Phila., p. 235, female and worker.

Distribution in the United States: New England states west to Iowa then southwest to Texas and Oklahoma (5).
Distribution in Oklahoma: Jefferson (2) (3); Caddo (1) (2); Harmon, Comanche, Latimer (2); Payne, Kay and Grady (1).

All collections of Leptothorax schaumi made by the author have been in trees. The colonies are generally in the fork of trees and are small in size. This classification includes the form fortinodis which was made a synonym of schaumi by Creighton (1950) and others. It is assumed that the Oklahoma form of this species is the old fortinodis form because all forms up until this time have been identified as fortinodis (most of the identification was done by M. R. Smith.) All of the specimens taken by the author have also been brownish-black which was the identifying characteristic of the old fortinodis. The workers collect honeydew.

Characteristics: Head and thorax opaque or feebly shiny. Mesoepinotal suture not present. Entire dorsum of thorax continuous. Antenna 11-segmented

with 3-segmented club. Antennal scape not reaching occipital border. Surface of gaster shiny. Erect hairs present on body. Epinotum armed with short, stubby spines. Color brownish-black (a yellowish form of this species occurs but has never been taken in Oklahoma.) Femur incrassated in center. Workers monomorphic. Eye well developed. Slow in movement.

LEPTOTHORAX TEXANUS Wheeler

Leptothorax texanus Wheeler, 1903, Proc. Acad. Nat. Hist. Phila., p. 245, male, female and worker.

Distribution in the United States: "Central Texas to southern Ohio" (5).
Distribution in Oklahoma: Harmon and Latimer (2) (3) (4); Comanche (2) (3).

Leptothorax texanus apparently is not common in Oklahoma. Wheeler (1903) reveals that the nests are often found in sandy, damp soil under postoak and cedar trees. The food appears to be honeydew and arthropods.

An abbreviated description is taken from Wheeler (1903) and given below.

> "Worker--length 2.25 to 2.75 mm. Head longer than broad. Eye rather large. Mandibles 5-toothed. Clypeus moderately convex, its anterior border somewhat rounded. Antenna 12-jointed; scape reaching nearly to the posterior angle of the head; funiculus terminating in a very distinct 3-jointed club, the last joint of which is somewhat longer than the two preceding joints; first funicular joint nearly as long as joints 2-5. Thorax rather short, its humeral angles rounded. Epinotal spines moderate, distinctly shorter than the declivous surface of the spinotum."

GENUS MONOMORIUM Mayr

Monomorium is represented in Oklahoma by two species. Both of these are found in houses and are commonly called grease ants. In addition to inhabiting houses, M. minimum is one of our most common ants in the field. Many have stopped to watch the tiny black lines of this ant as it wanders up a tree or across a bare spot of earth. Found in all parts of Oklahoma.

Characteristics: Epinotum without a pair of spines. Workers monomorphic. Antenna 12-segmented with 3-segmented club. Head longer than wide. Eye well developed. Antennal scape reaching occipital border. Both segments of pedicel rather high. Mandible with masticatory border bearing distinct teeth. Foraging in lines.

KEY TO THE SPECIES OF MONOMORIUM

1. Color shiny black - minimum
   Color clear yellow - pharaonis

MONOMORIUM MINIMUM (Buckley)

Myrmica minimum Buckley, 1867, Proc. Ent. Soc. Phila., 6:338, female and worker.
Monomorium minutum var. minimum Emery, 1895, Zool. Jahrb. Syst., 8:274.
Monomorium minimum Wheeler, 1914, Jour. N. Y. Ent. Soc. 22:42.
Monomorium minutum subsp. ergatogyna Wheeler, 1904, Bull. Amer. Mus. Nat. Hist. 20:269, female and worker.
Monomorium minutum subsp. emersoni Gregg, 1945, Psyche, 52:66, female and worker.

Distribution in the United States: "The northeastern United States, southwestward to the Pacific coast" (5).
Distribution in Oklahoma: Harmon, Beckham, Alfalfa and Latimer (1) (2) (3) (4); Jackson, Comanche and Cleveland (2) (3) (4); Logan (4); Washita (3) (4); Grady and McCurtain (1) (2) (3); Payne and Caddo (1) (2), Carter, Pittsburg and Choctaw (2) (3); Custer (3); Texas, Harper, Grant, Nowata, Delaware, Sequoyah, LeFlore, Pushmataha, McIntosh, Hughes, Pontotoc, Pottawatomie, Canadian, Kingfisher, Roger Mills and Greer (1).

Monomorium minimum occurs in every part of Oklahoma and is a serious house pest. It is also seen in the field, especially in wooded areas. The workers are often seen foraging in long lines.

Characteristics: Color a very deep black. Epinotum unarmed. Antenna 12-segmented. Funiculus with 3-segmented club. Eye well developed. Head and top of thorax very shiny. Both segments of the pedicel high, the petiole being the higher. Thin erect hairs over most of the body. Antennal scape reaching the occipital border. Workers monomorphic. Length 1.5 to 2.5 mm. Mesoepinotal suture well developed.

MONOMORIUM PHARAONIS (Linnaeus)
(Introduced)

Formica pharaonis Linnaeus, 1758, Syst. Natur. Ed. 10, 1:580, worker.
Monomorium pharaonis Mayr, 1862, Verh. Zool.-Bot. Ges. Wien, 12:752.

Distribution in the United States: Throughout the country in greenhouses and dwellings; in the fields only in southern Florida (5).
Distribution in Oklahoma: Payne (1).

This tiny ant is an introduced species that is found in houses and greenhouses. It probably could not maintain itself out-of-doors in this climate. Monomorium pharaonis is a serious pest in homes, cafes, hotels, etc. Its exact origin is not known (Creighton, 1950).

Characteristics: Color a clear yellow. Funiculus with 3-segmented club. Antenna 12-segmented. Epinotum unarmed. Length about 1.5 mm. Head and thorax densely punctate, rendering them opaque or very feebly shiny. Worker monomorphic. Antennal scape reaching the occipital border. Head longer than wide. Eye well developed. Humeri of prothorax well rounded.

GENUS MYRMECINA Curtis

MYRMECINA AMERICANA Emery

Myrmecina latrielle subsp. americana Emery, 1895, Zool. Jahrb. Syst. 8:271 worker.
Myrmecina graminicola subsp. quadrispina Enzmann, 1946, Jour. N. Y. Ent. Soc. 54:13.
Myrmecina graminicola subsp. americana M. R. Smith, 1947, Amer. Mid. Nat. 37:572.
Myrmecina americana Creighton, 1950, Harvard Mus. Comp. Zool. Bull. 104:248.

Distribution in the United States: Highland of Georgia and Alabama and north to New England and Iowa (5), and Oklahoma (3).
Distribution in Oklahoma: Latimer (2) (3) (4).

As far as could be determined there is only one report of Myrmecina americana occurring in Oklahoma. Smith (1935) listed it as a subspecies of graminicola, but Creighton (1950) has since raised americana to a species. Creighton states that the colonies are small, hardly ever having more than

100 workers, and that the workers are shy and feign death. He reports that the nests are usually built under stones in wet, shady areas.

Smith (1947) lists the following characteristics: Epinotum with 2 pairs of spines. All of body except thorax opaque. Sculpturing of head, thorax, and pedicel heavy. The anterior spines of epinotum much shorter. Antenna 12-segmented with a 3-segmented club at tip of funiculus. Femur and tibia incrassated. Length of worker 2 to 3 mm. Eye small. Maxillary palpus 4-segmented. Thorax stout. Prothorax with well developed humeral angles. Sutures of thorax not apparent. Petiole nonpedunculate. Apparently rare in Oklahoma.

GENUS MYRMICA Latreille

MYRMICA PINETORUM Wheeler

Myrmica punctiventris subsp. pinetorum Wheeler, 1905, Bull. Amer. Mus. Nat. Hist. 21:348, worker.
Myrmica pinetorum Creighton, 1950, Harvard Mus. Comp. Zool. Bull. 104:102.

Distribution in the United States: New England states south to North Carolina and west to Ohio (5), Oklahoma (3).
Distribution in Oklahoma: Latimer (2) (3) (4).

Myrmica pinetorum was formerly a subspecies of punctiventris but was given species status by Creighton (1950). It has been taken once from Oklahoma and is the only member of this rather large genus that occurs in this State. According to Smith (1947) the workers are carnivorous, and attend honeydew-excreting insects. The colonies are of moderate size.

Characteristics: Length of workers 3.6 to 4 mm. Sculpturing of head and thorax coarse and heavy. Sting present. Spur of middle and hind tibia pectinate. No psammophore present. Mesoepinotal constriction well developed. Antennal scape just surpassing the occipital margin. Epinotal spines a little longer than the distance that separates them. Color yellowish brown. Antenna 12-segmented. Segments at tip of funiculus enlarged but not forming a club. Apparently very rare in Oklahoma.

GENUS PHEIDOLE Westwood
(Fig. 7)

Pheidole is a large genus, which is well represented in Oklahoma. Seven species are present in this State. Its members are mainly seed feeders but will also take other food such as other arthropods. Most of the species nest in the soil but dentata is often seen nesting in rotten wood. Members of Pheidole are found in every part of Oklahoma.

Characteristics: Workers dimorphic. The head of the major worker very large in comparison to the rest of body. Head of major worker divided at the posterior end to form two occipital lobes. Minor worker has a head of normal size. Epinotum with or without spines. Antenna 12-segmented. Funiculus with distinct 3-segmented club.

KEY TO THE SPECIES OF PHEIDOLE

1. Epinotum without spines - - - - - - - - - - - - - - - - - - - morrisi impexa
   Epinotum with a pair of spines - - - - - - - - - - - - - - - - - - - 2
2. Scape equally thick throughout and curved at base - - - - - - - - - - - - 3
   Scape not bent and more narrow at base - - - - - - - - - - - - - - - - - 4
3. Head shiny. Sculpturing not heavy - - - - - - - - - - - - - - - cockerelli
   Head opaque. Sculpturing heavy - - - - - - - - - - - - - - - - - - - hyatti
4. Occipital lobes of major opaque - 5
   Occipital lobes of major shiny - 6
5. Humeral angles of pronotum of major apparent - - - - - - - - - - - pilifera
   Humeral angles of pronotum of major rounded - sitarches subsp. campestris
6. Dorsum of thorax notched, caused by depression of mesonotum - - - dentata
   Dorsum of thorax evenly curved - - - - - - bicarinata subsp. vinelandica

SUBGENUS PHEIDOLE Westwood

PHEIDOLE BICARINATA VINELANDICA Forel

Pheidole vinelandica Forel, 1886, Ann. Soc. Ent. Belg. 30:45, male, female and worker.
Pheidole laeviuscula Emery, 1895, Zool. Jahrb. Syst. 8:292.
Pheidole bicarinata subsp. vinelandica Creighton, 1950, Harvard Mus. Comp. Zool. Bull., 104:172.

Distribution in the United States: South Carolina north to southern New Jersey, then west to Ohio and southwest from there to Texas (5).

Distribution in Oklahoma: Comanche (2) (3) (4), Grady and Marshall (2) (3), Cimarron, Texas, Beaver, Harper, Woods, Woodward, Beckham, Harmon, Canadian, Payne, Washington, Craig, Ottawa, Sequoyah and LeFlore (1).

Pheidole bicarinata vinelandica occurs throughout Oklahoma. The workers are seed gatherers. The colonies are small with single openings in most cases, usually found nesting in soil, but will occasionally nest beneath stones or other objects. It is sometimes difficult to locate the major workers.

Characteristics: Epinotum armed with pair of short, blunt spines. Occipital lobes of major shiny. Scape of minor reaching the occipital lobes. Scape of major reaching only about half the distance to the occipital lobe. Humeral angles of pronotum well developed. Mesoepinotal suture well developed. Major about 2.5 mm. in length. Minor about 1.5 mm. in length. Head of major about 1.2 mm. in length, including mandibles. Color variable. Numerous erect hairs over most of body. Eye of major worker near mandible insertion. Antenna 12-segmented with a 3-segmented club at tip. Mandibles well developed with 2 apical teeth.

PHEIDOLE COCKERELLI Wheeler

Pheidole cockerelli Wheeler, 1908, Bull. Amer. Mus. Nat. Hist. 24:464, worker.

Distribution in the United States: New Mexico and Arizona from desert regions (5) southwestern Oklahoma (3).
Distribution in Oklahoma: Beckham (2) (3) (4).

This is a rather unusual report of Pheidole cockerelli since Creighton (1950) lists the range of this species as being in southern New Mexico and Arizona. Beckham county is located in the southwestern part of Oklahoma but this is still a good distance from the main range. The author has never taken this species in Oklahoma.

Wheeler (1908) describes this species as follows:

"Soldier--length 4-5 mm. Head rather small, excluding the mandibles a little longer than broad, as broad in front as behind, with deeply and angularly excised posterior border and narrow but well-developed occipital groove. Sides slightly rounded, with the rather large moderately convex eyes at the anterior third. Mandibles not very convex, with two strong apical, but no basal teeth. Clypeus faintly carinate in the middle, with a pronounced notch in the anterior border. Antennal scapes flattened and curved at the base, reaching to half way between the eyes and posterior corners of the head; funicular joints 2-8 a little longer than wide. Frontal carinae prominent, about 1/3 as long as the antennal scapes. Frontal area triangular, impressed, carinulate. Thorax in front half as broad as the head, with somewhat rounded humeri. Pronotum and base of mesonotum convex above, the latter with a transverse depression in the middle and a distinct torus. Mesoepinotal constriction prominent. Epinotal base longer than the declivity. The former grooved in the middle. Spines slender acute, 1/3 as long as the base of the epinotum, directed upward and slightly backward and outward. Petiole violin-shaped, a little more than twice as long as broad, with concave sides; node somewhat compressed anteroposteriorly, with a slightly excised upper margin. Postpetiole less than twice as broad as the petiole and less than twice as broad as long, with rounded scarcely angulated sides. Gaster as large as the head. Legs rather slender."

PHEIDOLE DENTATA Mayr

Pheidole morrisi var. dentata Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:457, male and worker.
Pheidole dentata Forel, 1901, Ann. Soc. Ent. Belg. 45:351, male and worker.
Pheidole dentata var. faisonsica Forel, 1901, Ann. Soc. Ent. Belg. 45:352.
Pheidole commutata Mayr, 1886, Verh. Zool.-Bot. Ges. Wien. 36:459, worker.
Leptothorax tennesseensis Cole, 1938, Amer. Mid. Nat. 19:238, worker.

Distribution in the United States: North Carolina south to Florida and west to east Texas (5).
Distribution in Oklahoma: Comanche (1) (2) (3) (4); Latimer (3) (4); Woods (1) (2) (3); Pittsburg, Greer, Alfalfa, Major (2) (3); Hughes and LeFlore (2); Harper, Washington, Blaine, Kingfisher, Payne, Caddo, Pontotoc, McIntosh and Sequoyah (1).

Pheidole dentata is distributed over most of Oklahoma. The nests most often occur in rotten wood of some sort, but nests sometimes are located in the soil. This is a carnivorous species; it is not a seed collector. It is one of the most common members of this genus in Oklahoma.

Characteristics: Mesonotum depressed directly posterior to the pronotum forming a distinct step. Major about 4 mm. in length. Minor about 3 mm. in length. Head of major including mandibles about 1.5 mm. Epinotum armed with a pair of spines. Scape of major worker reaching about two thirds the distance between eye and top of head. Scape of minor worker surpassing the occipital lobes. Occipital lobes strongly shiny. Humeral angle of pronotum well developed. Pronotum shiny. Epinotum opaque. Antenna 12-segmented with 3-segmented club.

PHEIDOLE HYATTI Emery

Pheidole hyatti Emery, 1895, Zool. Jahrb. Syst., 8:295, worker.
Pheidole hyatti var. ecitonodora Wheeler, 1908, Bull. Amer. Mus. Nat. Hist. 24:463, worker.

Distribution in the United States: "Western Texas through southern New Mexico and Arizona to southern California" (5). Southwestern Oklahoma (3).
Distribution in Oklahoma: Comanche and Cotton (2) (3) (4), Grady, Jackson, Tillman and Carter (2) (3).

These collections all came from the southwestern part of Oklahoma. The main range of Pheidole hyatti lies west of Oklahoma. The colonies of this species are generally more heavily populated than most Pheidole. The workers are mainly carnivorous. Wheeler (1908) states that as many as a dozen dealated females may be found in one colony.

Characteristics: Antennal scapes of major worker curved and about equal in length throughout. Antennal scapes of major almost reaching the top of head, but those of minor worker surpassing the occipital borders by a little more than one-third their length. Epinotal spines about as broad at base as high. Minor with many erect hairs. Eye prominent. Mesoepinotal impression deep. Length of major 4 to 4.5 mm. Length of minor 2.5 to 3 mm. Antenna 12-segmented with a 3-segmented club.

PHEIDOLE MORRISI IMPEXA Wheeler

Pheidole morrisi var. impexa Wheeler, 1908, Bull. Amer. Mus. Nat. Hist. 24:461.

Distribution in the United States: Oklahoma and Texas (5).
Distribution in Oklahoma: Pottawatomie (1).

The author has found only one colony of Pheidole morrisi impexa in Oklahoma. This colony was found near the middle of the State. P. morrisi impexa undoubtedly occurs in other parts of Oklahoma. This colony was large and established in the soil.

Characteristics: Epinotum without distinctly formed spines. Color golden yellow. Mesonotum forming somewhat of a step as in dentata. Epinotum opaque. Head and pronotum shiny. Numerous long erect hairs on body, gaster with many fine hairs as well. Major 4 to 5 mm. long. Minor about 3 mm. long. Scape of major failing to reach the occipital border but scape of minor surpassing the occipital border by more than one-third its length. Mesoepinotal suture well developed.

PHEIDOLE PILIFERA (Roger)

Leptothorax pilifer Roger, 1863, Berl. Ent. Zeitschr., 7:180, worker.
Pheidole pilifera Emery, 1895, Zool. Jahrb. Syst. 8:290, worker.
Pheidole pilifera var. simulans Wheeler, 1908, Bull. Amer. Mus. Nat. Hist. 24:436.
Pheidole pilifera subsp. septentrionalis Wheeler, 1908, Bull. Amer. Mus. Nat. Hist. 24:436, worker.
Pheidole pennsylvanica Roger, 1863, Berl. Ent. Zeitschr, 7:199.

Distribution in the United States: "Massachusetts to North Carolina and west to Iowa and Nebraska" (5), northwestern Oklahoma (1).
Distribution in Oklahoma: Cimarron, Texas and Woodward (1).

M. R. Smith made the determination on Pheidole pilifera. All of the collections occur in the northwestern part of Oklahoma. These are seed-feeding ants. Their nesting sites are generally in the soil. These nests may occur in the open or under some object.

Characteristics: Humeral angle of the major apparent. Color dark reddish brown. Scape of minor slightly surpassing occipital border. Scape of major reaching about one-fourth its length above the eye. Eye prominent. Length of major about 4 mm. Length of minor about 2 mm. Head, thorax and petiole of minor opaque. Numerous erect hairs on body.

PHEIDOLE SITARCHES CAMPESTRIS Wheeler

Pheidole sitarches subsp. rufescens var. campestris Wheeler, 1908, Bull. Amer. Mus. Nat. Hist. 24:443, worker.
Pheidole sitarches subsp. rufescens Wheeler, Bull. Amer. Mus. Nat. Hist. 24:443, female and worker.
Pheidole sitarches campestris Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:189.

Distribution in the United States: "Central Texas northeast to Missouri and east to Mississippi" (5).
Distribution in Oklahoma: Ottawa and Nowata (1), Comanche, Beckham, Latimer and Harmon (2) (3) (4).

Pheidole sitarches campestris is not abundant in Oklahoma but it occurs in every part of the State except the northwestern. The workers are seed gatherers. Seed is stored in the galleries of the nest which are generally located in the soil.

Characteristics: Humeral angles of pronotum rounded. Scape of minor reaching and slightly surpassing occipital border. Epinotal spines short and blunt. Eye prominent. Antenna 12-segmented; funiculus with 3-segmented club. Gaster of minor shiny. Thorax of minor punctate, feebly shiny. Head densely punctuate except in middle of vertex. Minor about 1.5 mm. in length. Major about 3 mm. in length. Scattered erect hairs on gaster of minor. Is capable of stinging.

GENUS POGONOMYRMEX Mayr
(Fig. 8)

Oklahoma, and indeed the whole Southwest, is highly populated with members of this genus. The large mounds made by these harvester ants

are one of the characteristic sights of this region. They possess a vicious sting which they employ quite readily, especially on cloudy days or at swarming time. At least 2 deaths have occurred in the State from the stings of these insects (P. barbatus). These ants are of considerable economic importance. The large mounds which they construct cause a loss of grass and crop land. It is thought that they may hinder reseeding by collecting seed.

The mound which they construct along with the cleared area around it may have a diameter of 20 feet or more, and the ants penetrate the ground to a depth of several feet. The main food of these ants is seed of various plants, but the flesh of arthropods is also readily taken. It is believed, however, that seed is the preferred food and not that it is simply the only alternative. The eastern boundary of most of the species that occur in Oklahoma is within the State. These ants become more scarce as you go east.

Characteristics: Workers monomorphic although a variation in size may occur. Antenna 12-segmented. Psammophore present in all but one species. Epinotum armed in most cases but may be unarmed. Last 4 segments of funiculus enlarged but not forming club. Sting well developed. All sutures on the thorax weak or absent. Middle and hind tibial spurs pectinate. Head and thorax usually have many rugae. No depression of the mesoepinotal region. Five species present.

KEY TO THE SPECIES OF POGONOMYRMEX

1. Psammophore present. Projections at the base of pedicel circular. (Subgenus Pogonomyrmex) - 2
   Without psammophore. Projections at base of pedicel angular. (Subgenus Ephebomyrmex) - - - - - - - - - - - - - - - - - - imberbiculus
2. Antennal scape failing to reach occipital border - - - - - - - - barbatus
   Antennal scape reaching occipital border or failing to do so by not more than the length of first funicular segment - - - - - - - - 3
3. Epinotum without spines. Color clear yellow - - - - - - - - californicus
   Epinotum with a pair of spines - 4
4. Pronotum shiny, rugae not coarse enough to dull surface - - - desertorum
   Pronotum not shiny, rugae coarse - - - - - - - - - - - - - - occidentalis

SUBGENUS POGONOMYRMEX Mayr

POGONOMYRMEX BARBATUS (F. Smith)
(Fig. 8)

Myrmica barbata F. Smith, 1858, Cat. Hym. Brit. Mus. 6:130, worker.
Myrmica molefaciens Buckley, 1860, Proc. Acad. Nat. Sci. Phila. p. 445, worker.
Pogonomyrmex barbatus Mayr, 1868, Ann. Soc. Natur. Rodena, 3:170.
Pogonomyrmex molefaciens Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:365.
Pogonomyrmex barbatus var. molefaciens Forel, 1886, Ann. Soc. Ent. Belg. 30:42.

Distribution in the United States: Southern Kansas, western half of Oklahoma, western Texas, New Mexico and Arizona. Southern Utah (5) (1).
Distribution in Oklahoma: Harmon and Latimer (1) (2) (3) (4); Jackson, Woods and Payne (2) (3) (1); Cleveland, Washita, Comanche, Beckham and Kiowa (2) (3) (4); Garvin, Jefferson, Cotton and Tillman (2) (3); Carter (2); Cimarron, Texas, Beaver, Harper, Ellis, Woodward, Alfalfa, Blaine, Kingfisher, Caddo, Canadian, Grady, Greer, Pontotoc and Johnston (1).

Pogonomyrmex barbatus is confined mainly to the western part of Oklahoma. In fact, the nest of this ant is one of the common sights in western Oklahoma. In Oklahoma, this is one of the most important species economically. Considerable damage occurs to grass and cropland when this species constructs its huge colonies. Insecticides are frequently applied to rid an area of these ants. If the stories about the Indians staking people to ant hills and leaving them to die are true, then this is more than likely the species involved. At least two deaths have occurred in Oklahoma from the stings of these ants. The sting is vicious and the workers aggressive; a combination which renders this insect formidable. Most natives of Oklahoma, as well as informed out-of-staters, have a common fear of this ant. The nests are large and contain a large number of workers. Nests are constructed in open areas. The workers store seeds which are the main food although arthropod flesh is readily taken.

Specimens collected by the author indicate that Oklahoma has either been overlooked or not sampled enough by myrmecologists working on series of P. barbatus, because any extensive collection in Oklahoma soon reveals

the inadequacy of the present keys. The author agrees with Creighton (1950) that the number of forms should be reduced, but as far as Oklahoma is concerned, his separation of two of the subspecies by color is inadequate. Many forms are frequently found in this State that do not fit in his key. If these are intergrading forms of fuscatus (above 4,000 ft.) and the typical barbatus (below 3,000 ft.), then they occur over most of the State and should or could not be divided. Extensive collections show color variations from completely brownish-black specimens, to uniform ferrugineous red ones. At Stillwater (913 to 1,000 ft.), where over 1,000 colonies were examined, forms with dark heads and thoraces and red abdomens, forms with dark abdomens and red thoraces and heads, and forms entirely dark were found, in addition to the typical red ones. All of the dark forms have been found in mixed colonies of red ones. A completely dark form was taken in copulation with a red form. Color is not the only highly variable factor concerning this species. Size of the workers, size of colonies, and type of mound are also highly variable. Perhaps many of these factors are determined by the soil type. Due to the variation in color it is believed that in Oklahoma the species should be listed as barbatus and described as having variable color. It should be noted that all these variants occur but the uniform red is by far the most abundant.

Characteristics: Rugae heavy on thorax but fine on head. Epinotal spines well developed. Scape failing to reach the occipital border. Antenna 12-segmented. Last 4 segments enlarged but not forming distinct club. Variable in length. Numerous erect body hairs. Gaster shiny. Eye prominent. Large conspicuous spiracle below and posterior to epinotal spines. sammophore well developed. Head large with strong mandibles. Sting well developed. Color variable. Mesoepinotal suture vestigial.

POGONOMYRMEX CALIFORNICUS (Buckley)

Myrmica californica Buckley, 1868, Proc. Ent. Soc. Phila. p. 336, worker.
Pogonomyrmex californicus Emery, 1895, Zool. Jahrb. Syst. 8:311.
Pogonomyrmex badius Mayr, 1868, Ann. Soc. Nat. Rodena, 3:170.

Distribution in the United States: "Southern California to western Texas" (5) and the Panhandle of Oklahoma (1).
Distribution in Oklahoma: Cimarron (1).

One other apparent record of Pogonomyrmex californicus from Oklahoma is located in the collection at the University of Oklahoma, but due to misspelling and unknown subspecies name being attached to the specimens, it was thought best not to list it as a definite collection. The location was Texas county.

The county where P. californicus was collected is the last county in the Panhandle, and in the collection, which was taken near the New Mexico border, only one weak hill was found. According to Creighton (1950) this is in the extreme northeastern part of the range of this ant. The specimens collected were compared with ones taken from Texas, which had been identified by M. R. Smith.

Characteristics: Epinotum unarmed. Color golden yellow. Scape lacking about the length of first funicular segment reaching the occipital border. Head shiny but covered with fine punctures. Numerous erect hairs over body surface. Sting well developed. Psammophore present. Eye prominent. Antenna 12-segmented, last four enlarged but not forming club. No obvious sutures on thorax.

POGONOMYRMEX DESERTORUM Wheeler

Pogonomyrmex desertorum Wheeler, 1902, Psyche, 9:387, worker.

Distribution in the United States: "Western Texas and southeastern New Mexico" (5), and southwestern Oklahoma (3).
Distribution in Oklahoma: Cotton (2) (3) (4).

This single report of Pogonomyrmex desertorum is interesting since Oklahoma lies outside the main range of this insect. According to Wheeler (1902) this ant inhibits dry, stony soil. It nests in the open with small colonies that have a central disk of about 4 to 6 inches. The author has not been fortunate enough to find a colony of desertorum so a description by Wheeler (1902) is given.

> "Worker--length 5.5 to 6.5 mm. Head rectangular, exclusive of the 7-toothed mandibles slightly broader than long; posterior margin slightly concave. Anterior border of clypeus broadly but faintly excised. Frontal area triangular as broad as long, with a distinct median carinae. Eyes in the middle of lateral sides of the head. Antennal scape reaching to midway between the eye and the posterior corner of the head. Thorax with the usual shape, with two rather long epinotal spines about as long as their distance apart at the base, directed obliquely upward, backwards and outward. Petiole compressed at base, its peduncle shorter than its node which is pointed in front so that the ascending dorsal surface forms an obtuse angle in profile; posterior descending dorsal surface gently convex; lower surface of petiole with a very distinct downwardly directed tooth. Postpetiole companulate, slightly broader than long, its ventral protruberance very small but distinct. Gaster and legs of the usual configuration."

POGONOMYRMEX OCCIDENTALIS (Cresson)

Myrmica occidentalis Cresson, 1865, Proc. Ent. Soc. Phila. 4:426, female and worker.
Myrmica seminigra Cresson 1865, Proc. Ent. Soc. Phila. 4:427, male.
Pogonomyrmex occidentalis Cresson, 1879, Trans. Amer. Ent. Soc., 7:22.
Pogonomyrmex opaciceps Mayr, 1871, Verh. Zool.-Bot. Ges. Wien, 20:971, worker.
Pogonomyrmex occidentalis subsp. ruthveni Gaige, 1914, Proc. Bio. Soc. Washington 27:93, male, female and worker.

Distribution in the United States: "Southern North Dakota to central Oklahoma and west to Nevada (5), the deserts of eastern Oregon and the arid areas in eastern Washington."
Distribution in Oklahoma: Harmon (4); Cleveland (2); Cimarron (1) (2) (3); Custer, Alfalfa, Washita, Kiowa, Greer(2) (3); Payne, Canadian, Ellis, Beckham, Woodward and Texas (1).

Pogonomyrmex occidentalis is limited to the western part of Oklahoma. It apparently occurs in the southwest but is much more common in the northwest. The furthest east that it has been taken in Oklahoma is Payne county.

After two years of collecting only 3 colonies had been found here. In one insecticide experiment in Payne county where over a thousand hills of harvesting ants were treated only one was occidentalis, the others were barbatus. In Woodward county occidentalis seems to be the more common of the two. The type of mound and the size of central disk seems to vary greatly with soil type. At Fort Reno, Oklahoma, two colonies were found that measured over 30 feet in diameter and the central disk was the typical conical one. At Fort Supply, Oklahoma, most of the colonies are less than 2 feet in diameter and have no conical mound. The number of workers also is smaller in these small nests. The soil type at the Fort Supply location is very loose and sandy, while at the Fort Reno location the soil is a much firmer type, with much more grass on it. This species like barbatus gathers seed but will take arthropod flesh. P. occidentalis is not nearly so destructive as barbatus in this State mainly because it is not as widespread. The idea that occidentalis rarely nests below 4,000 feet, as Wheeler contended, must certainly be erroneous as very little of its range in Oklahoma occurs above 4,000 feet. At El Reno, Oklahoma, the ant seems to do very well and the elevation is only 1,359 feet. At Woodward where the ant is quite numerous the elevation is only 1,906 feet.

Characteristics: Epinotal spines long and slender. Antennal scape lacking about the length of the first funicular segment reaching the occipital border. Psammophore present. Row of long hairs just above the clypeus. Head and thorax heavily sculptured with longitudinal rugae. Gaster shiny. Workers about 6 mm. in length. Workers monomorphic. Color red. Eye well developed. Sting well developed. Antenna 12-segmented with enlarged segments at tip but not forming distinct club. Numerous erect hairs over body.

SUBGENUS EPHEBOMYRMEX Wheeler

POGONOMYRMEX IMBERBICULUS Wheeler

Pogonomyrmex imberbiculus Wheeler, 1902, Amer. Naturalist, 36:86, worker.

Distribution in the United States: "Western Texas and southern New Mexico" (5), and southwestern Oklahoma (3).
Distribution in Oklahoma: Harmon (2) (3) (4); Comanche (2) (3).

Pogonomyrmex imberbiculus is the only member of the subgenus Ephebomyrmex that occurs in Oklahoma. The range of this ant in Oklahoma appears to be in the extreme southwestern tip of the State. Not much is known about the biology of this group but Wheeler (1902) states that they store grain and that they do not pass food from ant to ant by regurgitation. These ants occur in small colonies.

Wheeler (1902) gives the following description.

> "Worker--length 4 to 4.8 mm. Color rich ferruginous red, legs somewhat paler, eyes and edge of mandibles black; hairs covering body yellowish. Head quadrangular, scarcely longer than broad, its posterior margin hardly incised. Mandibles sexdentate, the two apical teeth largest, blades traversed nearly their entire length by coarse longitudinal ridges. Clypeus subopaque, with longitudinal rugae separated by a series of faint striae and provided with long anteriorly projecting hairs. Dorsal and lateral surfaces of head covered with coarse rugae. Hairs on upper and lateral surfaces of head short, erect subobtuse. Lower surface of head more delicately longitudinally rugose, with somewhat longer and more tapering hairs, which however, do not form a conspicuous beard. Promesonotal suture usually indistinct. Epinotum armed with two pair of rather blunt spines. Hairs covering the thorax short, subobtuse, and perfectly erect. Stem of petiole laterally compressed, slender provided below near its insertion with a small but distinct tooth. Postpetiole companulated. Gaster small, smooth, and shining throughout."

GENUS SOLENOPSIS Westwood

Oklahoma is fortunate in having only 3 species of the genus Solenopsis present. The species present here, however, certainly make themselves known. Members of this genus are very aggressive and can become

quite annoying. The sting is not nearly so severe as is the sting of the harvester ants, but it is none the less quite irritating when received in numbers. These ants are of considerable economic importance as they destroy seed and infest dwellings. The taxonomy of this genus on a world-wide basis is difficult, according to Creighton (1950). This difficulty is apparent in some of the species that occur in Oklahoma.

Characteristics: Workers may be monomorphic or polymorphic. Antenna 10-segmented, with a 2-segmented club at the tip of the funiculus. Epinotum without spines. Sting well developed. Most angles of the thorax smooth and shiny. Erect hairs may be numerous. Eye may be degenerate. Well developed mesoepinotal suture. Nests most commonly in the soil. Some forms minute.

KEY TO THE SPECIES OF SOLENOPSIS

1. Workers polymorphic. Larger forms - - - - - - - - - - - - - - - - - - - xyloni
   Workers monomorphic. Small forms not over 2 mm. - - - - - - - - - - - - 2
2. Segments 3, 4, 5 of funiculus wider than long. Nodes of petiole nearly equal. Tip of gaster in female pinkish - - - - - - - - - - texana
   Segments 3, 4, 5 only a little broader than long. A slightly larger and darker form - molesta

SUBGENUS SOLENOPSIS Westwood

SOLENOPSIS XYLONI McCook
(Fig. 9)

Solenopsis xyloni McCook, 1879, Comstock's Rep. Cotton Worm p. 188, female and worker.
Solenopsis geminata subsp. _xyloni_ Wheeler, 1915, Bull. Amer. Mus. Nat. Hist. 34:395, male, female and worker.
Solenopsis geminata subsp. _maniosa_ Wheeler, 1915, Bull. Amer. Mus. Nat. Hist. 34:396, male, female and worker.
Solenopsis xyloni Creighton, 1930, Proc. Amer. Acad. Arts and Sci. Bos. 66:99.
Solenopsis xyloni var. _maniosa_ Creighton, 1930, Proc. Amer. Acad. Arts and Sci. Bos. 66:102.

Distribution in the United States: "South Carolina westward to California" (5).
Distribution in Oklahoma: Comanche (1) (2) (3) (4); Johnston, Washita, Cotton, Tillman (2) (3) (4); Latimer, Grady, Kiowa, McCurtain (1) (2) (3); Garvin, Caddo, Custer, Carter, Marshall, Bryan, Choctaw

(2) (3); Cimarron, Texas, Harper, Woods, Alfalfa, Grant, Woodward, Blaine, Kingfisher, Canadian, Greer, Pontotoc, LeFlore, Pushmataha (1).

Solenopsis xyloni is one of our most common ants in all parts of Oklahoma except the northeast. It has never been taken in the northeastern portion, even in Payne county, very extensive collecting has never revealed S. xyloni. The workers are very aggressive. In areas where it occurs in large numbers, much annoyance occurs from the stings. This is especially true of people working in gardens and flower beds and on picnics. Workers are strongly predaceous. They cause economic damage by taking seed from seed beds on occasions. They even kill young newly hatched quail and chickens (Smith, 1947).

The maniosa form, which is golden yellow, also occurs in Oklahoma but is here treated as a synonym of xyloni following Creighton (1950). Single pure yellow colonies have been found in Grady, Kiowa, Woodward counties, and a large area which contained several pure yellow colonies was found in Cimarron county. No mixed colonies have ever been found; all colonies were golden yellow which is a striking contrast to the typical xyloni.

Characteristics: Workers polymorphic. Length of major worker about 5.5 mm. Length of smallest worker about 1.6 mm. Epinotum without spines. Antenna 10-segmented, with a 2-segmented club at tip. Color variable. Antennal scape failing to reach the occipital border. Body with numerous erect and suberect hairs. Upper side of head convex. Sting well developed. Mesoepinotal suture well developed.

SUBGENUS DIPLORHOPTRUM Mayr

SOLENOPSIS MOLESTA (Say)

Myrmica molesta Say, 1836, Bost. Jour. Nat. Hist. 1:293, worker.
Myrmica minuta Say, 1836, Bost. Jour. Nat. Hist. 1:293.
Myrmica exigua Buckley, 1866, Proc. Ento. Soc. Phila. 6:342, female and worker.

Solenopsis fugax Mayr, 1870, Verh. Zool.-Bot. Ges. Wien, 20:996, worker.
Solenopsis bevlis Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:461.
Solenopsis molesta Emery, 1895, Zool. Jahrb. Syst. 8:277, male, female and worker.

Distribution in the United States: "Eastern and central United States" (5).
Distribution in Oklahoma: Grady (1) (2) (3); Latimer (2) (3); McCurtain (2); Craig, Payne, Alfalfa, Kingfisher, Canadian, Pottawatomie, Choctaw, Sequoyah (1).

Solenopsis molesta is a tiny thief ant which is of considerable economic importance to Oklahoma. The workers often attack germinating seed and are especially destructive to sorghum. Colonies have even been found nesting in houses. Nests generally have one opening. This species is probably found in every part of Oklahoma.

Characteristics: Color yellowish. Workers monomorphic. Workers about 1.5 mm. in length. Antenna 10-segmented. Last two segments of funiculus enlarged forming a definite club. Epinotum unarmed. Most of body very shiny. Segments 3, 4 and 5 only a little broader than long. Mesoepinotal suture well developed. Promesonotum well rounded. Eye small with not more than 15 facets. Closely resembles S. texana.

SOLENOPSIS TEXANA Emery

Solenopsis pollux var. texana Emery, 1895, Zool. Jahrb. Syst. 8:278, worker.
Solenopsis texana Forel, 1901, Ann. Soc. Ent. Belg. 45:345.
Solenopsis roselia Kennedy, 1938, Can. Entomol. 70:232, male, female and worker.

Distribution in the United States: "Central Texas to southern Ontario and the southeastern states" (5).
Distribution in Oklahoma: Payne and Grady (1).

Solenopsis texana is very difficult to separate from molesta. It is believed however that molesta is by far the more common of the two in Oklahoma. This ant probably occurs scattered over most of the State although only two good reports are known and they are in the middle of Oklahoma. The habits are similar to those of molesta. Both of these species attend honeydew-excreting insects.

Characteristics: Color golden yellow. Length of the worker about 1.2 mm. Segments 3, 4 and 5 of the funiculus broader than long. Gaster of the female pinkish. Antenna 10-segmented. Funiculus with well developed 2-segmented club. Eye small and degenerate. Antennal scape failing to reach the occipital border. Most of body shiny. Epinotum unarmed. Mesoepinotal suture well developed. Promesonotum well rounded. Segments of pedicel subequal.

TRACHYMYRMEX Forel

TRACHYMYRMEX SEPTENTRIONALIS SEMINOLE (Wheeler)

Atta septentrionalis subsp. obscurior var. seminole Wheeler, 1911, Jour. N. Y. Ent. Soc. 19:247, male, female and worker.
Trachymyrmex septentrionalis subsp. obscurior var. seminole M. R. Smith, 1947, Amer. Mid. Naturalist, 37:590, worker.
Trachymyrmex septentrionalis seminole Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:324, worker.

Distribution in the United States: Carolinas south to Florida and eastern Gulf states (5), Oklahoma (3).
Distribution in Oklahoma: Comanche, Latimer, Beckham, Cotton and Harmon (2) (3) (4); Dewey (2).

Trachymyrmex represents the only genus of fungus-growing ants in Oklahoma. These ants live in the main from the small fungus gardens that they maintain on insect excreta and leaves. The colonies are small and the workers very timid. Only one species occurs in Oklahoma.

Characteristics: Mandibles long and scissor-like, crossing at tip. Antenna 11-segmented. Funiculus without well-defined club. Eye well developed. Scape surpassing the occipital borders by a length at least as long as the first funicular joint. Head with numerous tubercles. Epinotum with one pair of spines. Tubercle-covered carina anterior to spines. Pronotum with a pair of tubercle-covered spines on the outer border with a pair of shorter spines occurring between them. Two pairs

of tubercle-covered spines on the mesonotum. Rest of body with many small tubercles. Each tubercle has a short curved hair. Nests in soil. Not common nor conspicuous.

SUBFAMILY DOLICHODERINAE Forel

Dolichoderinae is one of the smallest subfamilies in the family Formicidae. There are only 6 genera known to occur in the United States, five of these genera are represented in Oklahoma. Although the number of species is not large the number of colonies of the existing species is quite large. Members of this genus occur in every part of the State. Most of the colonies build their nests in the soil. Some of these mounds are characteristic to a given species. The economic status of the members of this subfamily is not well known, but they are not considered to be of great importance. The feeding habits are rather general with honeydew and arthropod flesh being taken by all.

Characteristics: Movement very rapid, especially when excited. Antenna 12-segmented. Funiculus without a definite club at tip. Body integument soft or brittle. Pedicel consisting of 1 segment which may be degenerate. Sting not present. Some species have many queens per colony. Workers monomorphic. Cloacal orifice slit-shaped without circular fringe of hair. Eye well developed. Sculpturing of body not apparent in most cases but may be weakly developed. Gaster without constriction between the first and second segment. Pupae naked. Workers of individual colonies generally of uniform size. Many species move quite frequently. One of the most highly evolved subfamilies. Most species are small in size.

KEY TO THE GENERA OF THE SUBFAMILY DOLICHODERINAE

1. Epinotum with a single, sharp, vertical, tooth-like projection. Third segment of maxillary palp longer than other segments - *Dorymyrmex*
   Epinotum without tooth-like projection - - - - - - - - - - - - - - - - - 2
2. Petiole vestigial with abdomen extending anteriorly over the petiole - *Tapinoma*
   Not as above - 3
3. Integument brittle. Declivious face of the epinotum strongly concave - *Dolichoderus*
   Epinotum not as described above - 4
4. Scape and tibia without erect hairs - - - - - - - - - - - - - - *Iridomyrmex*
   Scape and tibia with erect hairs and 4-lobed calyx on proventriculus - *Forelius*

GENUS DOLICHODERUS Lund

SUBGENUS HYPOCLINEA Mayr

All of the members of this genus in the United States belong to the subgenus *Hypoclinea*. Two species of this subgenus are known to occur in Oklahoma. Neither of these species is very abundant. The nests are generally constructed beneath some plant with the roots of the plant running through the galleries. These roots serve as storage places for the brood. The workers collect honeydew (Wheeler, 1905).

Characteristics: Integument stiff and brittle. Mesoepinotal constriction deeply impressed. Declivous surface of epinotum strongly concave. Antenna 12-segmented. Head and thorax sometimes with pronounced sculpturing. Eye well developed. Workers monomorphic. Fossa of antenna touching border of clypeus. Promesonotal suture well developed (Smith, 1947).

KEY TO THE SPECIES OF DOLICHODERUS Lund
(Creighton, 1950)

1. Mesopleurae smooth and shining. Dorsum of mesonotum and epinotum with deep close-set foveolae forming reticulo-rugose pattern - *pustulatus*
2. Epinotum and mesonotum granulose or densely shagreened. Mesopleurae subopaque or dull - *mariae*

DOLICHODERUS MARIAE Forel

Dolichoderus mariae Forel, 1884, Bull. Soc. Vaud. Sci. Nat., 20:349, worker.
Dolichoderus mariae subsp. davisi Wheeler, 1905, Bull. Amer. Mus. Nat. Hist. 21:308, male, female and worker.
Dolichoderus mariae var. blatchlevi Wheeler, 1917, Proc. Ind. Acad. Sci. 37:462.

Distribution in the United States: "Southern New England south to the Gulf states and west as far as Illinois and Oklahoma. The insect is very sporadic over its entire range" (5).
Distribution in Oklahoma: Major (2) (3).

The lone report of Dolichoderus mariae in Oklahoma comes from Major county which is located in the northwestern part of the State. Wheeler (1905) gives the following habits for mariae. Colonies large with several thousand individuals, and restricted to a single nest. Nests are built in pure sand, around the roots of some plant. The larvae are kept in galleries made by removing sand from around the roots. The workers come outside to bask in the sun on warm days.

Wheeler (1905) describes mariae as follows:

> "Worker--length 3.5 to 4.5 mm. Head subelliptical, sides evenly rounded; eyes placed a little in front of the middle. Clypeus flat, its anterior border distinctly emarginate and impressed in the middle. Antennal scape curved at the base, its tip extending a distance equal to its own diameter beyond the posterior corner of the head. Funicular joints all distinctly longer than broad. Thorax in profile with rounded promesonotal surfaces, mesoepinotal constriction deep. Seen from above the prothorax is robust. There is a distinct median keel on the epinotal concavity. Petiole robust, as broad as the epinotum. Gaster broad, somewhat flattened above. Whole body smooth and shining. Body naked except for a few yellowish hairs on the clypeus, mandibles, lower surface and tip of gaster, coxae and flexor surface of the femur. Yellowish blood-red."

DOLICHODERUS PUSTULATUS Mayr

Dolichoderus pustulatus Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:436, female and worker.
Dolichoderus plagiatus subsp. pustulatus Wheeler, 1905, Bull. Amer. Mus. Nat. Hist. 21:313, female and worker.
Dolichoderus plagiatus var. beutenmuelleri Wheeler, 1905, Bull. Amer. Mus. Nat. Hist. 20:304.

Distribution in the United States: "Southern Nova Scotia south to Florida and southwestward to Texas" (5).
Distribution in Oklahoma: Cleveland (2) (3).

Only one report of Dolichoderus pustulatus has been recorded for Oklahoma. This report is from Cleveland county which is toward the central part of the State. Colonies of this species are much smaller than those of mariae (Wheeler, 1905). Odor is produced by these ants.

Characteristics: Length of worker 3 to 3.8 mm. Head and thorax shining. No erect hairs on antennal scape. Eye well developed. Clypeus notched in middle. Antennal scape curved. Antenna 12-segmented. Pungent odor. Pubesence sparse. First segment of funiculus as long as next two. Epinotal concavity shiny. Hairs whitish, erect and sparse.

GENUS DORYMYRMEX Forel
(Fig. 10)

DORYMYRMEX PYRAMICUS (Roger)

Prenolepis pyramica Roger, 1863, Berl. Ent. Zeitschr. 7:160, worker.
Formica insana Buckley, 1866, Proc. Ent. Soc. Phila. 6:165, female and worker.
Dorymyrmex pyramicus Mayr, 1886, Sitz. Akad. Wiss. Wien, 53:394.
Dorymyrmex flavus McCook, 1879, Comstock rep. Cotton Insects, p. 188, worker.
Dorymyrmex pyramicus var. flavus Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:433.
Dorymyrmex pyramicus var. nigra Pergande, 1895, Proc. Calif. Acad. Sci. 5:871.
Dorymyrmex pyramicus var. smithi Cole, 1936, Ent. News, 47:120, worker.

Distribution in the United States: "The insect is absent from the northeastern United States and its range begins in Illinois. To the west, the range passes through Iowa, North Dakota, southern Montana, and Idaho and then blankets the entire west. The range also runs southeastward from Illinois through Tennessee and the northern portions of Mississippi, Alabama, and Georgia and Gulf Coast region and Florida" (5).
Distribution in Oklahoma: Comanche, Harmon, Beckham, Greer (1) (2) (3) (4); Alfalfa, Cherokee (4); Cleveland, Tillman, Latimer, McClain, Washita, Kiowa (2) (3) (4); Cotton (3) (4); Custer, Bryan, Carter, Garvin, Jefferson, Dewey and Caddo (2) (3); Cimarron, Texas, Beaver, Harper, Woodward, Alfalfa, Ellis, Roger Mills, Blaine, Canadian, Grady, Pottawatomie, Hughes, McIntosh and McCurtain (1).

Dorymyrmex pyramicus is a very highly versatile species. The distribution of D. pyramicus is from North Dakota to Argentina (Creighton 1950). This is a very wide range which helps prove that this species has amazing abilities to adapt to varied conditions. In Oklahoma this species has many different nesting sites, but all are in the open and exposed to the direct rays of the sun--most of the time. Observations by the author, in Oklahoma, have never revealed a single colony under a stone or other object.

Dorymyrmex pyramicus is the species of ants often encountered in most Oklahoma cotton fields. It is often seen running over the leaves and blossoms. It is thought that it must be taking some sweet liquid from the cotton plant, or that it is searching for aphids or other honeydew excreting insects. Cotton fields are cultivated quite often and late in the summer in some areas of Oklahoma. The fact that D. pyramicus will quickly establish itself in these fields is further proof that it has the ability to adapt to varying conditions.

It has been said by Wheeler (1910) that this species might be in the beginning stages of becoming a parasite of the harvesting ants (Pogonomyrmex barbatus and P. occidentalis). The reasoning for this is based on the fact that this species is often found nesting within the cleared areas of the nests of these harvesting ants. Wheeler (1910) was of the opinion that these ants either feed off the refuse left around the nest or that they attack the harvester ant workers and compel them to give up their food. He also states that the harvester ants do not molest the workers of the D. pyramicus colony. It is the opinion of the author that D. pyramicus nests on the hills of harvester ants because it is a nice, cleared area and for no other reason.

Dorymyrmex pyramicus is one of the most common ants occurring in Oklahoma. It is found in great numbers in most parts of the State except the northeast. It nests in the soil with small craters being formed. The workers feed on honeydew and arthropod flesh. They are very quick in movement. Many times the colonies are located within the cleared area of the Texas harvester ant. It is the opinion of the author that there are intergrading forms of this species in the western half of Oklahoma. But it is believed that any attempt to show this would only confuse the matter. Also, ecological differences occur in color types within the middle of the State. Here again the evidence is not strong enough to allow separation.

Characteristics: Epinotum with hornlike protrusion. First segment of maxillary palp longer than next three. Psammophore weakly developed. Mesoepinotal and promesonotal sutures apparent. Eye large. Thorax without erect hairs. Color variable. Gaster subopaque. Integument thin. First tooth of mandible much longer than remaining teeth. Length of workers about 3 mm. Scape surpassing the occipital border at about the length of the first funicular segment.

GENUS FORELIUS Emery

FORELIUS FOETIDA (Buckley)

Formica foetida Buckley, 1866, Proc. Ento. Soc. Phila., 6:167, female and worker.
Iridomyrmex maccooki Forel, 1878, Bull. Soc. Vaud. Sci. Nat., 15:382.
Forelius maccooki Emery, 1888, Zeitschr. Wiss. Zool. 46:389.
Forelius foetida Wheeler, 1902, Trans. Texas Acad. Sci. 4:24.

Distribution in the United States: Oklahoma and Texas to California (5).
Distribution in Oklahoma: Pittsburg (2) (3); Payne, McCurtain and Grady (1); Harmon (1) (3) (4); McClain (4); Cotton, Logan, Washita, Cleveland and Comanche (3) (4); Coal, Custer, Jackson, Tillman, Carter, Marshall and Jefferson (3).

The workers of Forelius foetida are very hard to distinguish from those of Iridomyrmex pruinosus analis, a species which occurs more commonly in

Oklahoma than does foetida. The nests of this species are in the soil most often. The food is honeydew and arthropods. It occurs in all parts of the State.

Characteristics: Proventriculus with a 4-lobed calyx. Color generally yellowish with brown extremities, but is sometimes more brownish. Length of worker about 2.5 mm. Antenna 12-segmented. Mesoepinotal and promesonotal suture medianly impressed. Scape and tibia with erect hairs. Petiole concealed by overhanging gaster. Eye conspicuous. Integument thin and flexible.

GENUS IRIDOMYRMEX Mayr

IRIDOMYRMEX PRUINOSUM ANALIS (E. Andre)

Tapinoma anale E. Andre, 1893, Rev. Ent. p. 148, worker.
Tapinoma pruinosum var. anale Emery, 1895, Zool. Jahrb. Syst. 8:333, worker.
Iridomyrmex pruinosum var. testaceus Cole, 1936, Ent. News 47:121.
Iridomyrmex pruinosum analis Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:343.

Distribution in the United States: Kansas, Texas and Oklahoma west to California (5).
Distribution in Oklahoma: Beckham and Harmon (1) (3) (4); Greer (1) (4); Tillman, Comanche, Washita and Cleveland (3) (4); Logan and McClain (3); Latimer (1) (3); Cimarron, Texas, Beaver, Harper, Woods, Alfalfa, Grant, Osage, Washington, Nowata, Ellis, Woodward, Roger Mills, Beckham, Blaine, Kingfisher, Canadian, Grady, Pottawatomie, Pontotoc, Johnston, Hughes, McIntosh, Adair, Sequoyah, LeFlore (1); McCurtain and Pushmataha (1) (2); Dewey, Mayes and Carter (2).

Iridomyrmex pruinosum analis is one of the most widespread ants in Oklahoma. The taxonomy of this species is very difficult. The western analis and the typical pruinosum probably meet in this area; couple this with the fact that Forelius foetida also occurs in Oklahoma and you have a difficult time separating the forms. Here the species is listed under analis because the yellow form with the small brown tip on the abdomen is by far the most common form taken from this area. If the other forms

were listed it is believed that so many intergrading forms occur that separation of the two would be impossible in most cases.

This ant is so common in most areas that a short walk will turn this species up. The nests are in soil with craters being formed. Several queens can be found in a single hill. The workers move very rapidly. These ants often invade kitchens in their search for food.

Characteristics: Length of workers 2 to 2.5 mm. Pubescence fine and closely appressed. Scape and tibia without erect hairs. Petiole not completely overshadowed by the gaster. Antenna 12-segmented. Color variable usually yellow with tip of gaster and other extremities brown. Eye conspicuous. Mesoepinotal and promesonotal sutures impressed. Antenna just surpassing the occipital border.

GENUS TAPINOMA Forester
(Fig. 13)

TAPINOMA SESSILE (Say)

Formica sessilis Say, 1836, Bost. Jour. Nat. Hist. 1:287, female.
Tapinoma sessilis F. Smith, 1858, Cat. Hym. Brit. Mus. 6:57.
Tapinoma boreale Roger, 1863, Berl. Ent. Zeitschr. 7:165, female and worker.
Formica gracilis Buckley, 1866, Proc. Ent. Soc. Phila. 6:158, female and worker.
Formica parva Buckley, 1866, Proc. Ent. Soc. Phila. 6:159.
Tapinoma sessile Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 46:434.

Distribution in the United States: Entire United States except desert areas of southwest (5).
Distribution in Oklahoma: Woods, Oklahoma and Cleveland (2) (3); Woodward, Kay, Payne, Adair, Sequoyah and McCurtain (1).

Only one member of the genus Tapinoma occurs in Oklahoma. It is not common but seems to be located over most of the State except the southwest where it has not been reported thus far. Tapinoma sessile emits a distinctive odor. It invades houses on occasions. It nests in the soil under objects and in a variety of other places. It is often seen foraging in trees. It attends honeydew excreting insects and takes the flesh of other arthropods.

Characteristics: Scale of petiole vestigial, completely hidden by the overhanging gaster. Color dark brown. Length of workers about 2.5 mm. Antennal scape surpassing the occipital lobes by at least the length of the first funicular segment. Pubescence rather heavy but not obscuring the shiny surface of the body. Tibia of middle leg longer than the second tarsal segment. Mesoepinotal and promesonotal sutures medianly impressed. Erect hairs sparse on body. Declivous surface of epinotum flattened.

SUBFAMILY FORMICINAE

Formicinae is the second largest subfamily in the family Formicidae. Formicinae has nine genera in the United States (Creighton, 1950). Eight of these occur in Oklahoma. These ants are sometimes of considerable economic importance. The cornfield ant which harbors, protects, and transports corn root aphids is a good example of the economic importance of this subfamily. Several of these species are known to infest houses; however, the damage they do is not well understood in many cases. Food habits are very diverse; ranging from honeydew to arthropod flesh. Many of the members of this subfamily nest in dead or decaying wood. This is not a restriction; however, and other nesting sites are used. The number of individuals per colony is highly variable. In at least one genera, repletes are formed. Every part of Oklahoma contains some species of these ants. The genus Camponotus is most often encountered, especially in wooded areas.

Characteristics: Antenna with 9 or 12 segments. Cloacal orifice circular and surrounded by a fringe of hair that forms a definite ring. Workers may be monomorphic or polymorphic. Some colonies docile or seek escape. Integument less rigid than Myrmicinae. No sting present. Eye well developed. Pupae either in cocoons or naked--most frequently the former. Pedicel consists of one segment. No constriction between the first and second gasteral segments. Sculpturing not heavy or dense as in Myrmicinae. Thorax without spines or other sharp protrudence. Ocelli present in some genera. Most genera with well developed sutures on the dorsum of the thorax.

KEY TO THE GENERA OF FORMICINAE

1. Antenna with 9 segments. Not more than 2 mm. in length -- *Brachymyrmex*
   Antenna with 12 segments ---------- 2
2. Psammophore. Maxillary palp with 3rd and 4th segment greatly enlarged. In western part of State ---------- *Myrmecocystus*
   Not as above ---------- 3
3. Thorax evenly convex, or if not, head truncate in front. Antenna inserted near posterior border of clypeus ----- *Camponotus*
   Not agreeing with one or more characteristics above ---------- 4
4. Maxillary palp with 3 segments ---------- *Acanthomyops*
   Maxillary palp with 6 segments ---------- 5
5. Distinct ocelli present. Frontal carina present ---------- *Formica*
   Ocelli indistinct or not present ---------- 6
6. Thorax constricted in the mesonotal region giving hour-glass appearance to thorax. Entire thorax slender. Antennal scape greatly surpassing occipital lobes when in repose ----- *Prenolepis*
   Thorax not as described above ---------- 7
7. Antennal scape surpassing occipital margin by at least 1/3 its length ---------- *Paratrechina*
   Antennal scape not surpassing occipital margin ---------- *Lasius*

GENUS ACANTHOMYOPS Mayr

Acanthomyops was formerly treated as a subgenus of *Lasius* but was given generic rank by Creighton (1950). According to Wheeler (1916), all forms have large colonies. He further states that all species are aphidicolous. Creighton (1950) states that the nests are usually found under stones or some similar object and less often in soil that is without covering. When the nests are built in the open, they have a low mound. Creighton also reports that the workers can be found above the ground during the marriage flight, but this is about the only time they come out; the remainder of time is spent in a subterranean existence. The members of this genus have not been located often in Oklahoma; this is probably due to the subterranean existence that makes collecting very difficult. Three species are known from Oklahoma. Wheeler (1916) reports that the members of *Acanthomyops* emit a lemon-verbena odor.

The following description is abstracted from Smith (1947): Length of the workers 2.5 to 5 mm. Body robust. Indistinct ocelli. Small eyes.

Maxillary palpus 3-segmented. Labial palpus 4-segmented. Dorsal spiracles of each side of a well defined mesoepinotal impression. Body shiny. Hairs barbed. Petiole visible under the gaster.

KEY TO THE SPECIES OF ACANTHOMYOPS
(From Creighton (1950)

1. Antennal scapes surpassing the occipital border by an amount at least as long as the greatest thickness of its tip - - - - interjectus
   Antennal scapes not surpassing the occipital border or not surpassing by this much - 2
2. Petiole sharp at crest with well defined median impression - - - claviger
   Petiole blunt at crest and without median impression - - - - - - latipes

ACANTHOMYOPS CLAVIGER (Roger)

Formica claviger Roger, 1862, Berl. Ent. Zeitschr. 6:241, worker.
Acanthomyops claviger Mayr, 1862, Verh. Zool.-Bot. Ges. Wien, 12:700, worker.
Lasius (Acanthomyops) claviger Mayr, 1870, Verh. Zool.-Bot. Ges. Wien, 20:950.

Distribution in the United States: New England south to Tennessee and North Carolina and west to the Rockies (5).
Distribution in Oklahoma: Cleveland (2) (3).

Acanthomyops claviger is reported from the southcentral part of Oklahoma. This form undoubtedly occurs in other parts of the State, but due to its subterranean habitat it has not been taken more. It is reported by Wheeler (1916) that this species nests under stones near the edges of woods, in spots where there is plenty of warmth and moisture. He further states that the reproductive forms can be found in the nests from the middle of August to the latter part of September.

ACANTHOMYOPS INTERJECTUS (Mayr)

Lasius interjectus Mayr, 1866, Zool.-Bot. Ges. Wien, 16:888, female.
Formica flava Leidy, 1877, Proc. Acad. Nat. Sci. Phila. p. 145, worker.
Lasius (Acanthomyops) interjectus M. R. Smith, 1947, Amer. Mid. Nat. 37:610.
Acanthomyops interjectus Creighton, 1950, Harvard Bull. Mus. Comp. Zool. 104:430.

Distribution in the United States: Entire northern United States (5), Oklahoma (3).
Distribution in Oklahoma: Comanche and Latimer (2) (3) (4); Jefferson and Woods (2) (3); Adair (2).

Acanthomyops interjectus is apparently the most abundant member of this genus that occurs in Oklahoma and probably occurs throughout the State. The habits are similar to those of the preceding species. They are aphidicolous and subterranean. Wheeler (1916) states that the nests are constructed in old logs and stumps which are located in open woods. He reports that they sometimes make rough mounds or excavate galleries under large stones.

ACANTHOMYOPS LATIPES (Walsh)

Formica latipes Walsh, 1862, Proc. Ent. Soc. Phila. 1:311, male, female and worker.
Lasius latipes Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 16:889.
Acanthomyops latipes Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:431.

Distribution in the United States: Entire northern United States (5), Oklahoma (3).
Distribution in Oklahoma: Comanche county (2) (3) (4).

The record of Acanthomyops latipes in Oklahoma is a lone report and is from the dry southwestern part of Oklahoma, but it, like claviger, probably occurs in other parts of the State. The habits are similar to the preceding species. Wheeler (1916) states that they are common in grass fields under stones. He says that some colonies have dimorphic females, one of which is very hairy with a much flattened femur; the other form is intermediate between this form and the female of claviger.

Characteristics: Walsh (1862) reports that the workers are from .13 to .15 of an inch in length, and yellow in color. He states that the males have a wide quadrangular carina, eyes that are almost round, and an abdominal scale slightly emarginate above.

GENUS BRACHYMYRMEX Mayr

BRACHYMYRMEX DEPILIS Emery

Brachymyrmex heeri subsp. depilis Emery, 1893, Zool. Jahrb. Syst. 7:635, male, female and worker.
Brachymyrmex nanellus Wheeler, 1903, Psyche, 10:102, male and worker.
Brachymyrmex depilis Santschi, 1923, Am. Mus. Hist. Nat. Buenos-Aires, 31:653.

Distribution in the United States: "New England southward to Texas, New Mexico and Colorado" (5).
Distribution in Oklahoma: Cleveland (2) (3).

Smith, in his list of the Oklahoma ants (1935) reports that the genus Brachymyrmex has been taken from Cleveland county, but he did not identify it to species. Creighton (1950) lists only one species from the United States, and this was depilis so it has been assumed in this paper that the species listed by Smith was depilis.

Smith (1947) characterizes the genus as follows: Antenna 9-segmented. Funiculus without club. Workers monomorphic. Length of workers 1.5 to 2 mm. Integument soft. Eye well developed. Maxillary palpus with 6 segments. Thorax short and stout. Mesoepinotal suture impressed. Pubescence fine. Hairs sparse.

GENUS CAMPONOTUS Mayr
(Fig. 11)

The large black carpenter ants (pennsylvanicus) which are so common in most of the wooded areas of Oklahoma belong to this genus, as do several other species. In fact, this is the largest genus of ants as far as the number of species is concerned; because there are eleven in Oklahoma. Many members of this group are large and conspicuous. Some species nest in wood such as pennsylvanicus, while others, (C. vicinus) at least in this State, are found nesting in the soil. The wood-nesting forms are generally found more commonly in the east since the western part of Okla-

homa is largely grassland; however, woodland does occur in the west and with it, wood-nesting forms can generally be found. The food varies but most forms will eat arthropods and honeydew. This genus has 4 subgenera in Oklahoma and represents a very diverse group.

Characteristics: Thorax evenly convex or if not the head is truncate anteriorly. Antennal insertion near the posterior border of the clypeus. Cloacal orifice circular. Sting not present. Workers polymorphic or dimorphic. Generally of large size. Some species hide when approached. Eye well developed. Antenna 12-segmented. Pedicel consisting of one segment. Many forms capable of very quick movement.

KEY TO THE SPECIES OF CAMPONOTUS

1. Head of major vertically truncate anteriorly, circular posteriorly to truncated part - 2
   Not as above - 4
2. Rim at the angle where the side of head meets truncated area - *mississippiensis*
   Rim not apparent - 3
3. Mesoepinotal suture of minor deeply impressed. Epinotum angular - *pylartes*
   Epinotum of minor rounded - *impressus*
4. Clypeus with triangular impression behind a median notch - - - - - - - - 5
   Without combination of characteristics above - - - - - - - - - - - - - - 7
5. Foveolae on cheeks of major, oval with erect hairs. Head and thorax reddish, gaster black - - - - - - - - - - - *carvae* subsp. *discolor*
   Foveolae on cheeks of major small and hairless - - - - - - - - - - - - - 6
6. Head and thorax yellowish-red. Occipital border concave - - - - *rasilis*
   Color not as above. Occipital border straight or nearly so - *nearcticus*
7. Clypeus with distinct carina or if not carinate, scape is flattened - 8
   Clypeus without distinct carina. Scape never flattened - - - - - - - - 10
8. Flattened portion of the scape forming lateral flank or lobule - *maccooki*
   Not as above - 9
9. Color castaneous brown. Sides of head shiny - - - - - - - - - *castaneus*
   Head and abdomen black, pedicel and thorax red. Sides of head dull -*vicinus*
10. Gaster shiny. Color variable - - - - - - - - - - - - - - - - - *americanus*
    Only narrow band at posterior of each segment of gaster shiny, rest with heavy pubescence. Color black - - - - - - - - *pennsylvanicus*

SUBGENUS CAMPONOTUS Mayr

CAMPONOTUS AMERICANUS Mayr

Camponotus americanus Mayr, 1862, Verh. Zool.-Bot. Ges. Wien, 12:661, female and worker.
Camponotus castaneus Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:420.
Camponotus castaneus subsp. americanus Emery, 1893, Zool. Jahrb. Syst. 7:674.
Camponotus castaneus subsp. rufinasis Santschi, 1936, Rev. Entomol. 6:204.

Distribution in the United States: "New England and southern Ontario south to the Gulf coast and as far west as Iowa, Missouri, Oklahoma and Texas" (5).
Distribution in Oklahoma: Comanche (1) (2) (3) (4); Latimer (2) (3) (4); Kay (1) (2) (3); Payne and Adair (1); Sequoyah, Carter and Jackson (2) (3).

Color variation of Camponotus americanus is shown within Oklahoma. Collections made by the author from Payne, Adair, and Kay counties all produced the forms with light tan abdomen and thorax, and black head. Later, however, forms that were entirely dark were found in Comanche and Payne counties. All nests observed have been under some object, such as a log; and, all have been in wooded areas.

Characteristics: Gaster shiny. Pubescence fine. Scattered erect hairs on gaster. Color variable. Pedicel directed anteriorly. Row of erect hairs at crest of scale. Major workers about 9 mm. in length. Pro-meso- and mesoepinotal sutures apparent. Prothorax wider than the succeeding parts. Epinotum compressed laterally. Eye large and conspicuous. Antenna slender and longer. Scape surpassing the occipital border by a varying amount according to caste. Top of head shiny. Mandible broad and with five teeth; the apical one being the larger.

CAMPONOTUS PENNSYLVANICUS (DeGeer)
(Fig. 11)

Formica pennsylvanica DeGeer, 1773, Mem. Hist. Insect. 3:603, male, female, and worker.
Camponotus pennsylvanicus Mayr, 1862, Verh. Zool.-Bot. Ges. Wien, 12:666.
Camponotus herculeanus subsp. pennsylvanicus Forel, 1879, Bull. Soc. Vaud. Sci. Nat. 16:57.

Camponotus herculeanus var. herculeano-pennsylvanicus Forel, 1879, Bull. Soc. Vaud. Sci. Nat. 16:56.
Camponotus herculeanus var. mahican Wheeler, 1910, Ann. N. Y. Acad. Sci. 20:338.

Distribution in the United States: East of hundredth meridian (5).
Distribution in Oklahoma: Haskell and Comanche (2) (3) (4); Kay, Payne, Delaware, Adair, Latimer, McCurtain (1) (2) (3); Choctaw, Ottawa, Osage, Bryan, Cleveland, Jackson and Pawnee (2) (3); Alfalfa, Ellis, Pushmataha, Cimarron, McIntosh, Caddo and Mayes (2).

This large black carpenter ant is the most abundant species of the genus Camponotus present in Oklahoma. It nests in decaying wood. It is often found living in the decaying wood of buildings. Many people believe that the presence of this ant, nesting in the decayed wood of a tree or building, shows that they are causing damage to the wood; it is believed however, that much of the damage was done to the wood before the ants arrived. This species can be seen to forage in trees or on the ground. When approached they attempt to hide and will literally fall off a tree when disturbed. If captured they may employ their mandibles. Sweet material of almost any kind will attract this species. Arthropod flesh is also a main source of nourishment. It appears to be more common in the eastern half of Oklahoma, which is probably due to the fact that much less wood occurs in the western half of the State than in the eastern.

Characteristics: Heavy pubescence on gaster which renders all of gaster dull except a narrow band at the posterior of each segment. Major worker about 11 mm. in length. Minor worker about 7 mm. in length. Color black. Antenna surpassing the occipital border. Head and thorax of minor shiny. Antenna long and slender. Promesonotal and mesoepinotal sutures apparent. Head of major about 3.5 mm. long and 2.5 mm. wide.

SUBGENUS COLOBOPSIS Mayr

CAMPONOTUS IMPRESSUS (Roger)

Colobopsis impressa Roger, 1863, Berl. Ent. Zeitschr. 7:160, worker.
Camponotus impressus Emery, 1893, Zool. Jahrb. Syst. 7:681.

Distribution in the United States: "Southeastern United States north to latitude 35 degrees and west to central Texas" (5).
Distribution in Oklahoma: Okmulgee (2) (3).

Camponotus impressus and indeed the entire subgenus of Colobopsis has unique habits. According to Wheeler (1904) Colobopsis nests in hollow twigs and galls. The nests have only one opening which is guarded by the major workers. The guarding is done by placing the truncate part of the head into the opening. When a worker wants in he strokes the head with his antenna. The truncate part of the head of the major is like a cork in a jug. Only one report of this species occurs in Oklahoma and this is toward the eastern side.

This description is abstracted from Wheeler (1904):

> "Soldiers--length 4.3 to 6 mm. Head subcylindrical from above rectangular, but little longer than broad, sides parallel. Mandibles small, with flattened lower surfaces 4-toothed, with a short toothless proximal portion to the blade. Clypeus on the truncated surface twice as long as broad. There is a distinct median keel running the full length of the clypeus. Eyes moderate. Antennal scapes curved, slender at base, gradually enlarging towards their tips which extend beyond the posterior corners of the head to a distance about equal to their transverse diameter. Thorax robust. Mesoepinotal constriction broad and pronounced. Petiole low, convex, and rounded in front and above. Gaster rather broad, flattened dorso-ventrally. Legs short, femur compressed, anterior pair distinctly dialated."

CAMPONOTUS MISSISSIPPIENSIS M. R. Smith

Camponotus mississippiensis M. R. Smith, 1923, Psyche, 30:83, worker.

Distribution in the United States: Texas and Louisiana coast region (5) Oklahoma (3).
Distribution in Oklahoma: Cleveland county (2) (3).

Camponotus mississippiensis is presumed to have habits similar to those mentioned in connection with the previous species. Honeydew probably makes up a large part of their diet. The only report of this species from Oklahoma is from the southcentral part of the State. The

ant undoubtedly occurs in other parts but due to difficult collecting procedure it has not been taken.

The following description was taken from M. R. Smith (1923):

> "Soldier--length 4.5 to 5 mm. Head subcylindrical from above rectangular, longer than broad, sides divergent anteriorly, occipital border convex, anterior truncated surface deeply concave, its edges sharply marginate along the sides but less so in the clypeal region. Mandibles small, with flattened bentral surfaces 4-toothed with a short toothless proximal portion to the blade. Clypeus on the truncated surface about one and a half times longer than broad, upper portion on truncated area more divergent than the lower portion. There is a distinct median keel running the full length of the clypeus on the front, carinae far apart with sides converging anterior. Eyes moderate, oblong, convex. Antennal scapes curved, slender at base, gradually enlarging toward their tips. All the funicular joints except the first subequal, first almost equal to the next 2 in length. Thorax robust pronotum about as long as broad as long, convex. Mesoepinotal constriction distinct but not deep. Epinotal base and declivity meeting in such a way as to form a decided angle. Petiole low, convex, and rounded in front and above, flattened behind the posterior dorsal edge of the node faintly impressed in the middle but not excised or emarginate. Gaster oblong. Legs short, femora compressed, anterior pair distinctly dilated."

CAMPONOTUS PYLARTES Wheeler

Camponotus pylartes Wheeler, 1904, Bull. Amer. Mus. Nat. Hist. 20:147, worker and female.

Distribution in the United States: Texas and Louisiana coast region (5), Oklahoma (3).
Distribution in Oklahoma: Cleveland (2) (3).

The only record of Camponotus pylartes comes from the middle of Oklahoma but, like the previous species, it probably is present in other parts also. According to Creighton (1950) the main range of this insect is along the gulf coast region of Texas and Louisiana. It would seem that Oklahoma is north of the main range of this species, which is a possible explanation why it has not been collected more often in Oklahoma.

The following is a description of the major which was abstracted from Wheeler (1904).

> "Soldier--length 4.5 to 5 mm. Head subcylindrical, somewhat longer than broad, decidedly wider in front than behind. Anterior truncated surface oblique, in profile distinctly concave. Mandibles larger than those of impressus, with more convex ventral margins; blade with four distinct apical teeth and a toothless basal portion. Eyes, clypeus, frontal carinae and antennae as in impressus. Petiole low, robust, as broad above as below."

SUBGENUS MYRMENTOMA Forel

CAMPONOTUS CARYAE DISCOLOR (Buckley)

Formica discolor Buckley, 1866, Proc. Ent. Soc. Phila., 6:166, female and worker.
Camponotus marginatus subsp. discolor Emery, 1893, Zool. Jahrb. Syst. 7:677.
Camponotus fallax subsp. discolor Wheeler, 1910, Jour. N. Y. Ent. Soc. 18:330.
Camponotus caryae discolor Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:386.

Distribution in the United States: "Southern Alabama west to Texas and northward through the Mississippi Valley to Iowa, Illinois and southern Ohio" (5).
Distribution in Oklahoma: Cleveland (2) (3) (4); Comanche (2); Pontotoc (2) (3).

Two records of Camponotus caryae discolor come from the south central part of Oklahoma. The colonies are small and the nests are constructed most often in wooded areas. The workers collect honeydew. Their occurrence in Oklahoma appears to be rather infrequent.

Characteristics: Length of major 6.5 to 7.5 mm. Funiculus often infuscated toward the tips. Surface of body shiny. Elongate foveolae, numerous on cheeks and clypeus. Each foveolae bears a stubby hair. Mesonotum convex. Angles of epinotum much rounded. Length of minor 3.5 to 5.5 mm.

CAMPONOTUS NEARCTICUS Emery

Camponotus marginatus var. nearcticus Emery, 1893, Zool. Jahrb. Syst. 7:675.
Camponotus marginatus var. decipiens Emery, 1893, Ibid, 6:676.
Camponotus marginatus var. minutus Emery, 1893, Ibid, 6:676.
Camponotus fallax var. nearcticus Wheeler, 1910, Jour. N. Y. Ent. Soc. 18:222.
Camponotus fallax var. decipiens Wheeler, 1910, Ibid, 18:227.
Camponotus fallax var. minutus Wheeler, 1910, Ibid, 18:224.
Camponotus fallax var. pardus Wheeler, 1910, Ibid, 18:225.
Camponotus fallax rasilis var. pavidus Wheeler, Ibid, 18:228.
Camponotus fallax var. tanquaryi Wheeler, 1910, Ibid, 18:226.
Camponotus caryae Wheeler, 1917, Psyche, 24:27.
Camponotus caryae subsp. nearcticus M. R. Smith, Amer. Mid. Nat. 37:604.
Camponotus nearcticus Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:388.

Distribution in the United States: "New England south to Florida and southwest to Texas. In the northern states the range terminates in the Dakotas but resumes again in the Pacific northwest. The insect occurs from British Columbia south to California with an eastward extension reaching Idaho" (5).
Distribution in Oklahoma: Comanche (2) (3) (4); Latimer and Jefferson (2) (3).

According to Creighton (1950) the taxonomy of Camponotus nearcticus has been difficult. This species now includes the varieties pardus, tenquaryi, pavidus and decipiens. With this difficulty in view it is perhaps fortunate that this species does not occur commonly in Oklahoma.

The following description of the major was abstracted from Wheeler (1910). Length 5.5 to 7.5 mm. Body shiny and finely shagreened. Head and thorax a bit more dull than the gaster. Small scattered foveolae on the front and sides of the head. Thorax laterally compressed behind. Hairs sparse and long. Cheek and clypeus without erect hairs. Pubescence scattered. Legs and scapes naked. Minor 4 to 5.5 mm. in length.

CAMPONOTUS RASILIS Wheeler

Camponotus fallax subsp. rasilis Wheeler, 1910, Jour. N. Y. Ent. Soc. 18:227.
Camponotus rasilis Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:389, worker.

Distribution in the United States: "Gulf coast states from Florida to Texas and sporadically westward to southern Arizona" (5) Oklahoma (1) (3).
Distribution in Oklahoma: Comanche (2) (3) (4); Payne (1) (2) (3); Pontotoc, Latimer and McClain (2) (3); Woodward, Kay, Logan, Kingfisher, Blaine, Dewey, Roger Mills and Grady (1).

Camponotus rasilis is by far the most common species of this subgenus occurring in Oklahoma. It often invades houses in search of sweet material. This is a cause of annoyance to many housewives. The workers also collect honeydew. The nests are generally constructed in decaying wood of some kind. Although collections of this species are more numerous in the western part of Oklahoma, it probably also occurs throughout the State.

Characteristics: Head and thorax yellowish-red. Gaster dark brownish-black. Major worker about 6 mm. in length. Finely shagreened head and thorax. Gaster with fine pubescence and scattered erect hairs. Body shiny to slightly dull. Promesonotal and mesoepinotal sutures impressed but not breaking up the even contour of the thoraic outline. Antenna slender with the scapes surpassing the occipital border of the major at least the length of the first funicular segment. Eye well developed. Head and thorax with a few scattered long erect hairs. Pedicel rounded anteriorly and flat posteriorly. Pedicel directed slightly forward and with a row of erect hairs across the top.

SUBGENUS TANAEMYRMEX Ashmead

CAMPONOTUS CASTANEUS (Latreille)

Formica castaneus Latreille, 1802, Fourmis, p. 118, female and worker.
Formica mellea Say, 1836, Bost. Jour. Nat. Hist. 1:286, male.
Camponotus melleus Mayr, 1866, Sitz. Akad. Wiss. Wien, 53:485.
Camponotus castaneus Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:420.

Distribution in the United States: "Southern New England to the Gulf states. The western boundary of the range extends from Iowa to eastern Texas" (5).
Distribution in Oklahoma: Latimer (2) (3); LeFlore (2).

Camponotus castaneus was formerly placed in the subgenus Camponotus but was transferred to this subgenus by Creighton (1950). Oddly enough C. americanus was formerly classed as a subspecies of this form. The only two collections that appear, were made in the eastern part of Oklahoma; this is in line with the range set for this species by Creighton (1950). Nests are in the soil.

Characteristics: Length of major worker 9 to 10 mm. Length of scape 3 mm. Length of hind tibia 3.4 mm. Eye convex. Mandibles 6 to 7-toothed. Clypeus convex centrally. Antennal scapes surpassing the posterior border of the head by 1/3 their length. Thorax laterally compressed. Thick petiole which is rounded anteriorly and flat posteriorly. Body shiny.

CAMPONOTUS MACCOOKI Forel

Camponotus sylvaticus subsp. maccooki Forel, 1879, Bull. Soc. Vaud. Sci. Nat. Hist. 16:69.
Camponotus maculatus subsp. maccooki Emery, 1893, Zool. Jahrb. Syst. 7:672.
Camponotus maculatus subsp. vicinus var. semitestacea Emery, 1893, Zool. Jahrb. Syst. 7:672.
Camponotus maculatus subsp. dumetorum Wheeler, 1910, Am. N. Y. Acad. Sci. 20:354, male and worker.
Camponotus maculatus subsp. maccooki var. berkeleyensis Forel, 1914, Deutsche Ent. Zeitschr. p. 619, worker.
Camponotus maccooki Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:377, worker.

Distribution in the United States: "Washington and Oregon south through California into lower California" (5), Oklahoma (3).
Distribution in Oklahoma: Cimarron and Comanche (2) (3) (4).

Both of these records are from the western half of Oklahoma. One is from the southwest and the other from the last county in the Panhandle. It is rather surprising that Camponotus maccooki should be found in Oklahoma at all since Creighton (1950), places the range as being along the west coast.

The following description of the major worker was abstracted from Wheeler (1910). Length of body 10 to 13 mm. Length of antennal scape

2.7 mm. Hind tibia 3.6 mm. long. Antennal scapes flattened at base with small rounded lobe on outer side. Five to six teeth on the mandible. No hairs on the cheeks. Sides of the head with small punctures or foveolae. Minor worker 6 to 8 mm. in length.

CAMPONOTUS VICINUS Mayr

Camponotus vicinus Mayr, 1870, Verh. Zool.-Bot. Ges. Wien, 20:940, worker.
Camponotus maculatus subsp. vicinus Emery, 1893, Zool. Jahrb. Syst. 7:671, female and worker.
Camponotus maculatus subsp. vicinus var. nitidiventris Emery, 1893, Ibid, 7:672.
Camponotus maculatus subsp. vicinus var. infernalis Wheeler, 1910, Ann. N. Y. Acad. Sci. 20:305, male and worker.
Camponotus maculatus subsp. vicinus var. maritimus Wheeler, 1910, Ibid, 20:305.
Camponotus maculatus subsp. vicinus var. luteangulus Wheeler, 1910, Ibid, 20:304.
Camponotus maculatus subsp. vicinus var. plorabilis Wheeler, 1910, Ibid. 20:303.
Camponotus maculatus subsp. vicinus var. subrostratus Forel, 1914, Deutsche Ent. Zeitschr, p. 620, worker.

Distribution in the United States: Rocky Mountains to Pacific Ocean (5), western Oklahoma (3).
Distribution in Oklahoma: Cimarron (1) (2) (3); Ottawa (2) (3); Roger Mills (1).

All of the Oklahoma records of Camponotus vicinus except one, occur in the western part of the State. It is interesting to note, however, that Smith (1935) lists the ant from Ottawa county which is located in the extreme northeastern tip of Oklahoma. Creighton (1950) lists the range as being on the west coast. Collections made by the author, and identified by M. R. Smith, revealed seven colonies in one locality in the Kenton area of Cimarron county. Smith also lists the ant from this area, back in 1935. The author's collections were made in 1954. It would seem then that although the species may not be abundant this far east, it certainly must be well established in the Kenton area. Only one colony was found in Roger Mills county.

All of the colonies found were located in the soil. The one from Roger Mills county was located under a small tree which stood alone in the middle of a pasture. All of the colonies from Cimarron county were located in sandy soil, on open grassland.

Characteristics: Major worker--length about 12 mm. Head and abdomen blackish. Thorax and pedicel reddish. Shagreening on head heavy especially on the sides. Scape just surpassing the occipital border. Promesonotal suture more deeply impressed than the mesoepinotal suture. Thorax laterally compressed posteriorly. Erect hairs rather numerous and long on the gaster. Pubescence fine on the gaster. Pedicel narrowing toward base, appearing paddle-like. Pedicel well rounded on all angles, flattened posteriorly and rounded anteriorly. Minor 7 mm. in length.

GENUS FORMICA Linneaus
(Fig. 12)

Genus Formica is not overly abundant in Oklahoma, either in number of species or in individuals. This is rather unusual since, according to Creighton (1950), this is the largest genus in the United States. The author has found most of the colonies on the flat prairie land in the western half of Oklahoma. Members of this genus are both slave makers and slaves. The species pallidefulva, which is one of the most common in Oklahoma, is very docile. The food varies from arthropods to honeydew. The most common species in Oklahoma are approximately 4 mm. in length.

Characteristics: Ocelli very distinct. Pedicel consisting of 1 segment--the petiole. Workers polymorphic. Cloacal orifice circular and surrounded by a fringe of hair. Epinotum bare. Antenna 12-segmented. Compound eyes well developed. Frontal carinae prominent. Maxillary palp consisting of 6 segments. Antennal scapes inserted near posterior border of clypeus.

KEY TO THE SPECIES OF FORMICA

1. Concave impression in middle of anterior part of clypeus. Head and thorax reddish, gaster blackish - - - - - - - - - - - - - - - - - perpilosa
   Clypeus without median impression - 2
2. Crest of pedicel evenly rounded - - - - - - - - - schaufussi subsp. dolosa
   Crest of pedicel angular. Color golden yellow - - - - - - - - pallidefulva

SUBGENUS RAPTIFORMICA Forel

FORMICA PERPILOSA Wheeler

Formica fusca subsp. subpolita var. perpilosa Wheeler, 1902, Mem. Revist. Soc. Sci. Ant. Alzata, 17:141, worker.
Formica perpilosa Wheeler, 1913, Bull. Mus. Comp. Zool. Harvard, 53:421.

Distribution in the United States: "Western Texas to Arizona and southern Nevada" (5), western Oklahoma (1) (3).
Distribution in Oklahoma: Cimarron (2) (3); Woodward (1).

Only two records of Formica perpilosa come from Oklahoma, and both are from the northwestern part of the State. Smith lists this species from the Black Mesa country of Cimarron county. The author has found this species in only one location, which was in Woodward county along a dry stream bed. Here some vegetation existed and almost all the weeds had workers of perpilosa on their tops. It was assumed that the workers were collecting honeydew. Fifteen colonies were located in this one area. The hills contained many workers and were constructed around some type of vegetation. This species is not known to be a slave maker like so many of the species in this subgenus.

Characteristics: workers 3 to 5 mm. in length. Reddish head and thorax, and blackish gaster. Body hairs long and numerous. Body shiny. Eye large and convex. Ocelli distinct. Epinotum much lower than remainder of thorax, in profile. Thorax constricted at mesoepinotum. Promesonotal suture well developed. Prothorax large and voluminous. Scapes surpassing the occipital border by one half their length in some

cases. Maxillary palp reaching the head-thorax junction. Clypeus with median impression on anterior surface. Head widened posteriorly.

SUBGENUS NEOFORMICA Wheeler

FORMICA PALLIDEFULVA Latreille
(Fig. 12)

Formica pallidefulva Latreille, 1802, Fourmis p. 174, worker.
Formica pallidefulva var. succinea Wheeler, 1904, Bull. Amer. Mus. Nat. Hist. 20:369.

Distribution in the United States: "Central Texas east to Florida and northeastward to southern Virginia." (5).
Distribution in Oklahoma: Payne (1); Kay, Comanche and McClain (2) (3).

Formica pallidefulva is probably the most abundant species of this genus in Oklahoma. In Payne county 5 hills of pallidefulva have been found in two years. These nests were all on open ground and were constructed around the roots of bunch grass, usually blue stem. Dirt was piled up around the openings. The workers are very timid. This docile nature renders the species a target for slave-making ants. Fortunately for pallidefulva, no slave-making species have been found in this area.

Characteristics: Color clear, golden yellow. Length of worker 5 to 7 mm. Scape of antenna surpassing the occipital border by almost half its length. Compound eye large, black, convex, and oblong. Antennal scape gradually widening toward tip. Antenna slender in appearance. Legs long, femur of hind leg reaching the head when extended. Ocelli apparent. Crest of scale of pedicel sharp and forming angles with sides. Erect hairs numerous. Promesonotal constriction apparent.

FORMICA SCHAUFUSSI DOLOSA Wheeler

Formica pallidefulva subsp. schaufussi var. meridionalis, Wheeler, 1904, Bull. Amer. Mus. Nat. Hist. 20:370, worker.
Formica pallidefulva subsp. schaufussi var. dolosa Wheeler, 1912, Psyche, 19:90.
Formica schaufussi dolosa Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:551.

Distribution in the United States: "Central Texas east to Florida and northeastward to southern Virginia" (5).
Distribution in Oklahoma: Comanche (2) (3) (4); Latimer and Jackson (2) (3).

Formica schaufussi dolosa is, according to Wheeler (1913), a southern form of the typical schaufussi. He also states that it is very timid, and will not defend its nest. Its nesting habits seem to be somewhat like those of pallidefulva. The food is arthropod flesh or honeydew. It is apparently uncommon in Oklahoma, or at least not very conspicuous.

Characteristics: Length of worker 5 to 7 mm. Erect hairs long and numerous. Pubescence long and distinct. Maxillary palp shorter than pallidefulva. Gaster little or no darker than the thorax. Gaster pubescence thick enough to hide surface.

GENUS LASIUS Fabricius
(Fig. 14)

The genus Lasius is of considerable importance because of the unusual habits of all its members which are attenders of some species of coccids or aphids. It is thought that honeydew makes up a large part of the diet of these ants. The nesting site is highly variable. Some members of this genus are temporary parasites of other members of this same genus. In short, temporary parasitism may be described by stating that the female of the parasitic species gains excess to the nest of the species being parasitized in one fashion or another. She then destroys the egg-producing capacity of the invaded colony by eliminating the host queen. This leaves only the parasitic queen and with the maturing of her offspring, and the gradual dying off of the members of the original colony a point is reached at which all members are offspring of the parasitic queen. From this point on, the colony maintains normal habits.

Characteristics: Antennal scape short, never surpassing occipital margins. Body hairs short, fine and yellow. Eye usually well developed.

Pedicel consisting of 1 segment. Cloacal orifice circular and surrounded by a fringe of hair. Antenna 12-segmented. A strong odor apparent on many species. Ocelli absent or indistinct. Some forms with barbed hair. Present in all parts of Oklahoma.

KEY TO THE SPECIES OF LASIUS

Scapes with erect or suberect hairs - - - - - - - - *niger* subsp. *neoniger*
Scapes without erect or suberect hairs - - - - - - - *alienus* subsp. *americanus*

SUBGENUS LASIUS Fabricius

LASIUS ALIENUS AMERICANUS Emery

Lasius niger var. *aliena* Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:429.
Lasius alienus Provancher, 1887, Addit. Faume Canada Hym. p. 236.
Lasius niger var. *americanus* Emery, 1893, Zool. Jahrb. Syst. 7:639.
Lasius niger subsp. *alienus* var. *americanus* Wheeler, 1917, Proc. Amer. Acad. Arts. Sci. Boston 52:525, female and worker.
Lasius alienus americanus Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:419.

Distribution in the United States: Entire United States except southern Florida and Texas and arid regions (5).
Distribution in Oklahoma: Has not been recorded.

No record of *Lasius alienus americanus* occurs for Oklahoma, but the possibility of its being taken here is so great that it was thought best to place it in the key. It is surprising that the species has not been taken from Oklahoma. According to Gregg (1945) the nesting sites vary from damp rotting wood in forests, to dry, sandy soil which is fully exposed to the sun.

Characteristics: Gregg (1945) states that the workers are about 3 mm. long. The color is light to dark brown. Tibiae and scapes without erect or suberect hairs. Pilosity of body sparse.

LASIUS NIGER NEONIGER Emery
(Fig. 14)

Lasius niger var. neoniger Emery, 1893, Zool. Jahrb. Syst., 7:639.
Lasius niger subsp. sitkaensis Pergande, 1900, Proc. Wash. Acad. Sci. 2:519.
Lasius niger subsp. alienus var. americanus M. R. Smith, 1947, Amer. Mid. Nat. 37:614.

Distribution in the United States: Coast to coast in northern part of country (5).
Distribution in Oklahoma: Cherokee, McClain, Cleveland, Washita, Greer, Cotton and Comanche (2) (3) (4); Hughes, Grady, Jefferson, Woods and Major (2) (3); Beckham (1) (4); Cimarron, Texas, Canadian, Caddo, Payne, Sequoyah and Pittsburg (1).

The cornfield ant is the only species of Lasius that has actually been reported from Oklahoma. It is believed to cause damage to such crops as corn, by harboring aphids on the roots of these plants. Nests are in the soil. These nests may be around or near the roots of some plants but are often found in cleared spots several feet from the roots of any plant. They are common in Oklahoma.

Characteristics: Length of worker 3 mm. Color light to dark brown. Tibia and scape without erect hairs. Pilosity dense over most of body. Eye well developed. Erect hairs rather numerous on gaster. Promesonotal suture apparent. Maxillary palp 6-segmented with the segments subequal. Gaster large and voluminous. Scape surpassing the occipital border by at least the length of the first funicular segment.

GENUS MYRMECOCYSTUS Wesmael
(Fig. 15)

MYRMECOCYSTUS MELLIGER Forel

Myrmecocystus melliger Forel, 1886, Ann. Soc. Ent. Belg. 30:202, worker.

Distribution in the United States: Southern boundary from Texas to Arizona (5) Oklahoma (3).
Distribution in Oklahoma: Comanche and Washita (2) (3) (4); Roger Mills (1).

This interesting genus is represented by Myrmecocystus melliger in Oklahoma. The main range of this genus lies further west than Oklahoma. Some members of this genus have repletes that are ants which have been fed large quantities of liquids, such as honeydew, when they were young. The abdomen of the repletes becomes extended to such an extent that they cannot move by themselves; they simply hang from the galleries provided for them by the other workers. These repletes are a source of stored food, as the other workers obtain food by regurgitation from them. It is said that the Indians valued these honey ants highly and would spend many hours digging for them just to get the tiny nibble of sweet food. The preferred habitat is the dry arid plains. This was the case of the only nest found by the author. This hill was found in the extreme western part of Oklahoma, in dry, stony soil during one of the dryest summers ever recorded from this area (1954). The other two records of this species were also in the western part of Oklahoma.

In this paper the species has been treated as the typical melliger since no workers with orbicular heads were found in the colony. Smith (1935) lists no subspecies, so it is assumed that these were of this form also.

Characteristics: Length of the largest worker about 8 mm. Mandible 7-toothed. Ocelli large and conspicuous. Psammophore present. Maxillary palpus longer than the head. Third and fourth segment of maxillary palpus very long. Scape of antenna surpassing the occipital border by half their length. Erect hairs numerous and of unequal lengths. Pubescence dense. Promeso- and mesoepinotal sutures apparent. Mesothorax constricted. Pedicel higher than broad. Gaster voluminous. Legs long and slender.

GENUS PARATRECHINA Motschoulsky

Paratrechina, a genus of small ants, is not very well represented in Oklahoma. Reports of only two species have been found; these are melanderi and longicornis. In this paper a third species parvula is included because of the great likelihood that this species also occurs in Oklahoma. Of the two species found here, only one, melanderi, seems to be found in any numbers and it is not overly common. The other species, longicornis, is an introduced species, which probably cannot exist outdoors this far north for any period of time. According to Creighton (1950) they feed on honey-dew, nectar, and arthropod flesh. Smith (1947) reports that the members of this genus are much more common in the eastern half of the United States than the western half. The author's experience with melanderi in Oklahoma shows that the ant is picked up here and there, never very abundantly and not more than one nest has been found at any one place.

Characteristics: Antennal scape surpassing the occipital border by at least one-third its length. Eye large and near the anterior border of head. Body not over 4 mm. in length. Body hairs may be numerous. Maxillary palpus 6-segmented. Antenna 12-segmented. Head oval in outline.

KEY TO THE SPECIES OF PARATRECHINA

1. Body with bluish reflection. Scape about twice as long as head - longicornis
   Not as above - 2
2. Scapes without erect hairs - - - - - - - - - - - - - - - parvula
   Scapes with row of erect hairs - melanderi

SUBGENUS PARATRECHINA Motschoulsky

PARATRECHINA LONGICORNIS (Latreille)
(Introduced)

Formica longicornis Latreille, 1802, Fourmis, p. 113, worker.
Formica vagans Jerdon, 1851, Madras, Jour. Lit. Sci. 17:124, worker.
Formica gracilescens Nylander, 1856, Ann. Sci. Nat. Zool. 5:73.

Tapinoma gracilescens F. Smith, 1858, Cat. Hym. Brit. Mus. 6:56.
Paratrechina currens Motschoulsky, 1863, Bull. Soc. Nat. Moscow, 36:14.
Prenolepis longicornis Roger, 1863, Verz. Formicid., p. 10.
Paratrechina longicornis Emery, 1925, Wytsman Genera Insectorum Fasc. p. 183.

Distribution in the United States: "Florida to South Carolina and west to Texas and sporadically in residences, warehouses and greenhouses over much of the eastern United States" (5).
Distribution in Oklahoma: Pittsburg (2) (3).

The so-called crazy ant has only been reported from Oklahoma one time, and has never been known to be a problem in hotels and cafes. According to Smith (1947) it can maintain itself out-of-doors in the far south; this is probably not the case in Oklahoma. Smith says that the original home of this ant is probably India and that it gets its name "crazy ant" from the crazy, senseless way that it moves. It infests houses and feeds largely on juices of vegetables and fruits and arthropod flesh.

The following description is abstracted from Smith (1947): Length of worker 2.2 to 3 mm. General appearance is slender. Antennal fossa close to the posterior border of clypeus. Scape very long. Eye prominent. Sometimes small ocelli present. Frontal area indistinct. Maxillary palpus 6-segmented and long. Body with long suberect or erect hairs.

SUBGENUS NYLANDERI Emery

PARATRECHINA MELANDERI (Wheeler)

Prenolepis melanderi Wheeler, 1903, Psyche, 10:104.
Paratrechina vividula subsp. melanderi Emery, 1906, Ann. Soc. Ent. Belg. 50:132.
Paratrechina melanderi Creighton, 1950, Bull. Harvard Mus. Comp. Zool. 104:407.

Distribution in the United States: "Tennessee to western Texas" (5).
Distribution in Oklahoma: Harper, Kingfisher, Payne, Adair, Latimer and Grady (1).

Paratrechina melanderi is the only member of this subgenus in Oklahoma and it is not very abundant. Although it is apparently located in every part of Oklahoma, it has not been found in numbers. The workers are small

and inconspicuous, which makes them easily overlooked. The nesting sites seem to vary. Food is honeydew and arthropod flesh.

Characteristics: Erect hairs on the scape. Color brownish. Eye large and nearer to the posterior border of head. Erect hairs fairly numerous. Antennal scape surpassing the occipital border by about one-third its length. Head convex in profile when viewed from the side. Mesoepinotal and promesonotal sutures lightly but distinctly impressed. Mesonotal region with conspicuous spiracles. Petiole small and widening toward the top. Gaster voluminous. Length of worker about 2 mm.

PARATRECHINA PARVULA (Mayr)

Prenolepis parvula Mayr, 1870, Verh. Zool.-Bot. Ges. Wien, 20:948.
Prenolepis vividula subsp. parvula Forel, 1884, Bull. Soc. Vaud. Sci. Nat. 20:348.
Prenolepis parvula var. grandula Forel, 1923, Rev. Suisse Zool. 30:98.
Paratrechina parvula M. R. Smith, 1947, Amer. Mid. Nat. 37:610.

Distribution in the United States: "Southern New York west to Iowa south to Florida and southwest to Texas."
Distribution in Oklahoma: Not recorded.

Paratrechina parvula has not been reported from Oklahoma but the great likelihood that it might occur here seems to make it necessary to include it in a classification of the ants of Oklahoma. It is separated from melanderi by the fact that it has no erect hairs on the scape. According to Wheeler (1905) this species nests under stones and gravelly, sunny places. The reproductives spend the winter in the parental nest, making the nuptial flight in the spring.

GENUS PRENOLEPIS Mayr
(Fig. 16)

PRENOLEPIS IMPARIS (Say)

Formica imparis Say, 1836, Bost. Jour. Nat. Hist. Soc. 1:278.
Prenolepis imparis Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:431.
Prenolepis imparis var. minuta Emery, 1893, Zool. Jahrb. Syst. 7:636.

Prenolepis imparis var. testacea Emery, 1893, Ibid, 7:636.
Prenolepis imparis pumila Wheeler, 1930, Ann. Ent. Soc. Amer. 23:21.
Prenolepis nitens Mayr, 1886, Verh. Zool.-Bot. Ges. Wien, 36:431.
Prenolepis nitens var. americana Forel, 1891, Grandidier, Hist. Nat. Madagascar, 20:94.

Distribution in the United States: "New York and southern New England south to the end of the Appalachian Highlands and west to Wisconsin, Iowa and Missouri. The insect also occurs sporadically in the Gulf Coastal Plain" (5).
Distribution in Oklahoma: Washita, Latimer and Comanche (3) (4); Payne (1); McClain, Cleveland (2) (3); Dewey and Caddo (2).

Prenolepis imparis seems to be more abundant in the eastern part of Oklahoma. The nests are most often found in moist, shady places in the soil. The nests, as a rule, have only one opening. According to Wheeler (1913) this ant rarely nests under stones. The workers feed on sweet liquids of many kinds including honeydew and plant juices. The crop is capable of great extention to allow the ant to take on a large load of nectar; in fact, the load may be so great that an ant which was formerly quick of movement becomes quite sluggish. This was regarded by Wheeler (1913) as an intermediate form between the true honey ants (Myrmecocystus) and the non honey ants. In the true honey ants, only certain members become extended, while in the Prenolepis every member of the workers can become extended. The crop of the true honey ants remain extended, but that of Prenolepis goes down by process of regurgitation, to fellow colony members. Myrmecocystus ranges mainly in the western arid regions while Prenolepis is dominant in the east. This is the only species of Prenolepis in the United States.

Characteristics: Mesonotum strongly compressed. Two conspicuous elevated spiracles at this point. Petiole widening toward the top with broad median impression. Length of workers about 3.5 mm. Scapes long, surpassing the occipital border by almost half their length. Eye large. First segment of the gaster deeply impressed. Antenna 12-segmented. Legs long. Erect hairs numerous, except on thorax. Body appears shiny. Scape widening toward tip.

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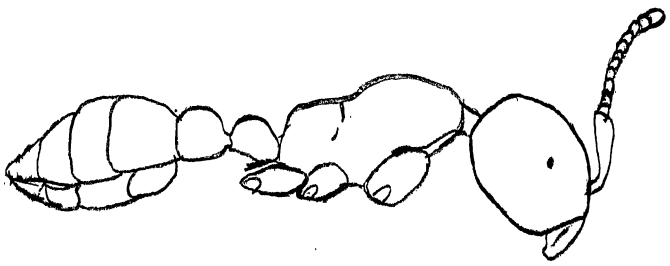

Fig. 1 Eciton pilosum

Fig. 2 Ponera trigona opaciv

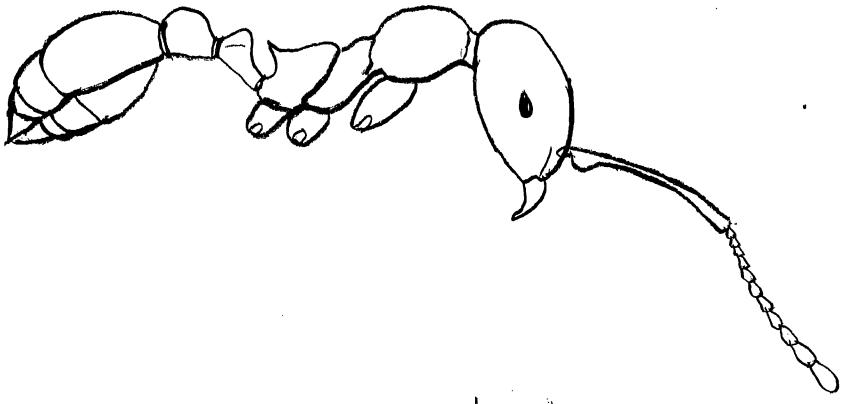

Fig. 3 APhaenogaster treatae pluteicornis

Fig. 4. Crematogaster laeviuscula

Fig. 5. Leptothorax schaumi

Fig. 6. Pheidole dentata (Major)

Fig. 7. Pheidole dentata (Minor)

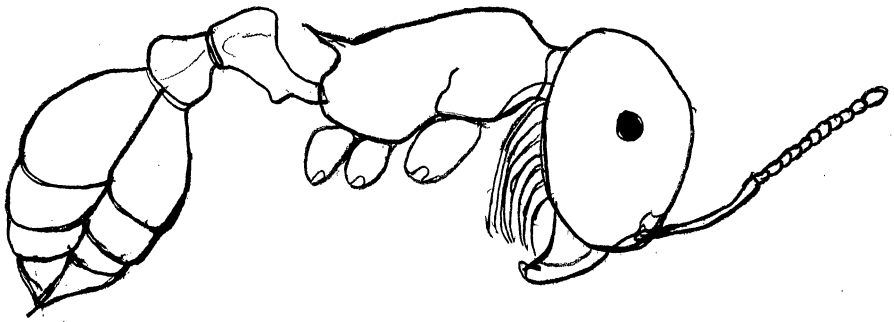

Fig. 8. Pogonomyrmex barbatus

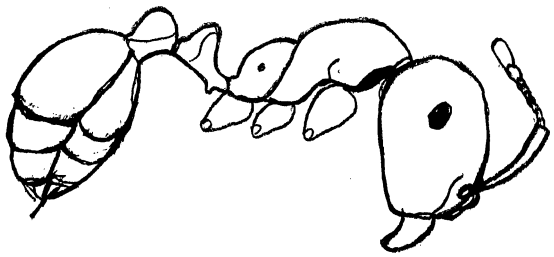

Fig. 9. Solenopsis xyloni

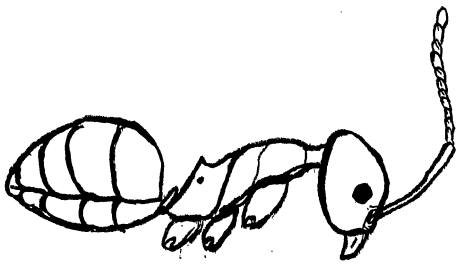

Fig. 10. Dorymyrmex pyramicus

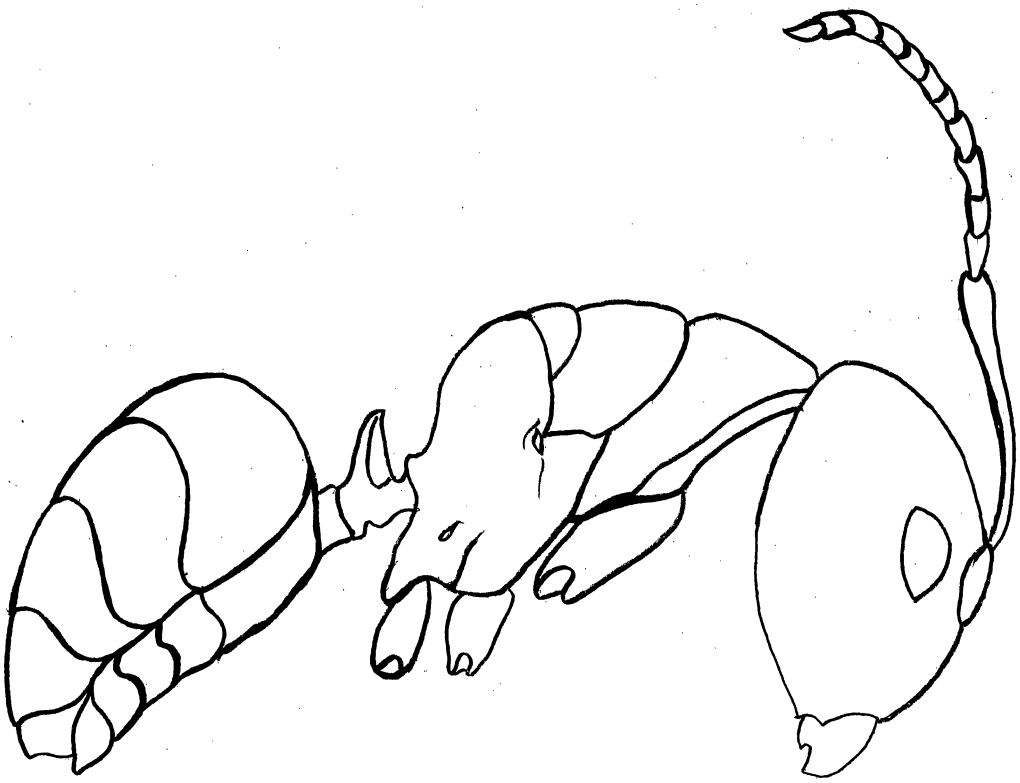

Fig 11 Camponotus pennsylvanicus

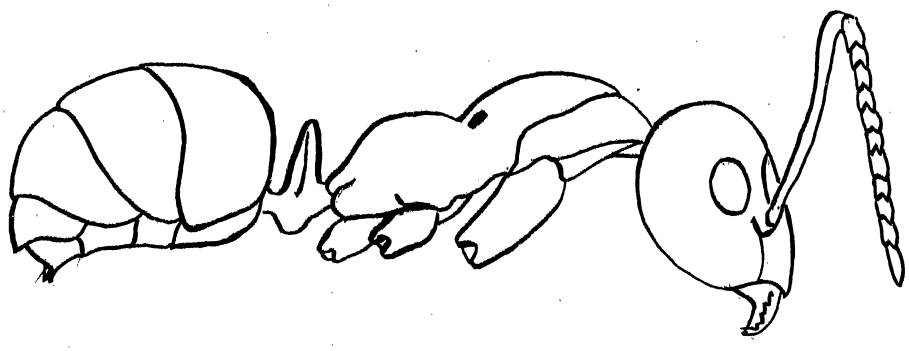

Fig 12 Formica pallidefulva

Fig 13 *Tapinoma sessile*

Fig 14 *Lasius niger neoniger*

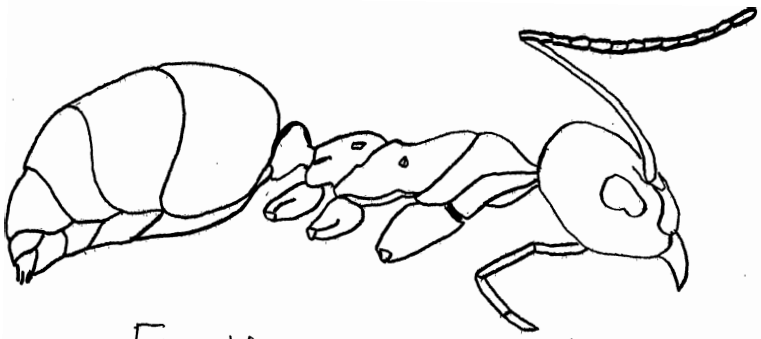

Fig. 15. *Myrmecocystus mellinger*

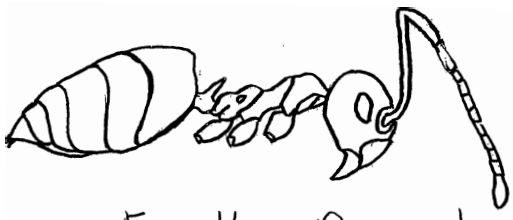

Fig. 16 *Prenolepis impavis*

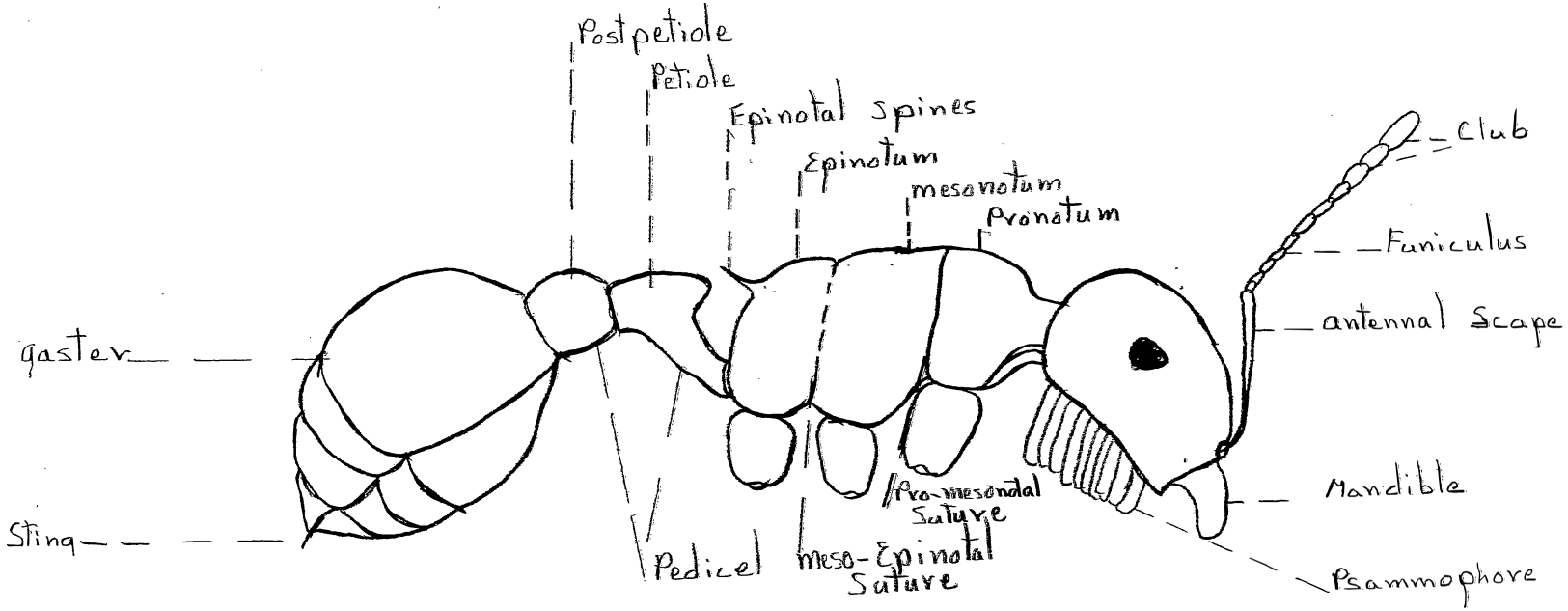

Fig 17 External Structures

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