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A LIST OF IOWA ANTS[1]

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Since the publication of the author's preliminary list of Iowa ants (1941a), extensive collecting in many parts of Iowa has made possible a more complete list, comprising 97 forms. Five of these forms are new to science.

The writer believes that the listed forms comprise a large percentage of the ants which exist in Iowa. Ten or perhaps even 20 additional species might be collected. To do so, however, would take years of intensive collecting and a systematic survey of every county. No such survey was possible for the writer. Instead, an attempt was made to collect in all the different ecological areas, and to find as many good collecting areas as possible. In the search for the latter the numerous state parks of Iowa proved very helpful. Backbone State Park in Delaware County deserves particular mention. At this park a new and extraordinary species, *Lasius* (*A.*) *plumopilosus* Buren, was found, along with several other species rare or lacking in other parts of the state.

In general there are only two main faunal areas in Iowa. The first and by far the largest may be termed the Mississippi area. It occupies the large portion of Iowa within the Mississippi River drainage system. It is characterized by an ant fauna much like that of the states farther east. The genera richest in species are *Formica* and *Lasius,* and to a lesser extent *Camponotus, Leptothorax, Aphaenogaster,* and *Myrmica.*

The second area is much smaller, comprising only the bluffs along the Missouri River. These bluffs consist of loess soil and are very steep and quickly drained, ecologically simulating the arid southwestern states or the Great Plains. This condition is reflected in the ant fauna. *Eciton* and *Iridomyrmex,* two genera found in these bluffs, are not represented in the rest of the state. Also found in this region are *Pheidole sitarches* Wheeler, *Paratrechina* (*N.*) *arenivaga* Wheeler, *Dorymyrmex pyramicus* (Roger), *Crematogaster minutissima missouriensis* Emery, *Camponotus caryae rasilis* Wheeler, and *Formica pallidefulva dolosa* Wheeler, species not found in the Mississippi area.

The area drained by the rivers and streams which flow into the Missouri River seems transitional between the Mississippi River drainage

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area and the Missouri River bluff area, and contains elements of both faunas.

At least two species, *Aphaenogaster treatae* Forel and *Ponera trigona opacior* Forel, have a discontinuous distribution, being found only in the bluffs of the Mississippi and Missouri rivers. These are southern species which appear to have crept northward only along the large rivers.

Two species, *Pogonomyrmex occidentalis* (Cresson) and *Formica fusca neoclara* Emery, were found in the Iowa State College collection labeled Sioux City, Iowa. Since both these species have heretofore been known only from the Great Plains and Rocky Mountains, their existence in Iowa should remain in doubt until validated. If these two species do occur in Iowa, they belong to the Missouri River bluff fauna.

In the following list, the writer has recognized only one infraspecific variant, the subspecies, in contradistinction to most of the older, and many of the recent, authors who recognize both subspecies and varieties. For as Creighton has shown (1938), there is no valid difference between the subspecies and the variety, and the retention of both ranks only complicates the nomenclature. The author has, therefore, raised all forms in this list formerly considered as varieties to subspecific rank. In some instances the raising of certain varieties to subspecific rank seems to cast doubt on their validity, and the author has discussed their taxonomic status.

Creighton states (1938) that all variants are probably geographical races. It seems likely, however, that many variants are ecological races rather than geographical ones. One race, for instance, may live in woodland, while another may prefer prairie or open fields. Such variants may occur in the same locality with little intergradation. An example of this is *Myrmica sabuleti trullicornis* n. subsp., a woodland form, whose closest relative is *Myrmica sabuleti americana* Weber, a prairie form.

No forms or records have been included in the list unless the specimens were seen and studied by the author. All collections were made by the author unless otherwise stated. Holotypes of the new species are in the author's collection, and paratypes will be given to the National Museum, Iowa State College, and other institutions and individuals.

For entomologists who may wish to identify Iowa ants, keys for the separation of all forms listed are included.

Key to Subfamilies of Formicidae

1. Pedicel of abdomen 2-jointed 2
   Pedicel of abdomen 1-jointed 3
2. Frontal carinae usually somewhat separated and at least partially covering the antennal insertions ..... 3. *Myrmicinae*
   Frontal carinae approximate, linear, not at all covering antennal insertions ..... 2. *Dorylinae*
3. A distinct constriction between the first and second segments of the gaster; sting developed ..... 1. *Ponerinae*
   Without a constriction between first and second segments of gaster; sting vestigial or absent 4

4. Apex of hypopygium with a circular, hair-fringed opening[3] for the ejaculation of the poison .....5. *Formicinae*
Hypopygium without such an opening .....4. *Dolichoderinae*

1. SUBFAMILY PONERINAE

KEY TO GENERA OF PONERINAE

1. Mandibles falcate, their teeth bifurcated.....1. *Stigmatomma* (one Iowa species, *S. pallipes subterranea* Creighton)
Mandibles and their teeth normal.....2
2. Tip of gaster strongly deflected ventrally and anteriorly, petiole nodiform .....2. *Sysphincta* (one Iowa species, *S. pergandei* Emery)
Tip of gaster not bent anteriorly underneath; petiole with a large erect scale .....3. *Ponera*

1. Stigmatomma

1. *Stigmatomma pallipes subterranea* Creighton

1940 *S. pallipes subterranea* Creighton, Amer. Mus. Nov., No. 1079:8. ☿

Records: Ames, Burlington, Bellevue. Also Sioux City (C. N. Ainslie).

The writer has taken this form under rocks in woodlands at Burlington and Bellevue and in an open field at Ames. It can be found only in the spring or fall when the ground is moist. Never more than seven specimens were found at one time.

2. Sysphincta

1. *Sysphincta pergandei* Emery

1895 *S. pergandei* Emery, Zool. Jahrb. Syst., 8:264. ☿

Record: Bellevue.

Apparently this species is extremely rare in Iowa as it is in all parts of its range. The writer possesses only a single specimen found under a log in wooded pasture land. Much digging and searching failed to produce any more specimens. This ant is extremely hypogeic.

3. Ponera

KEY TO SPECIES OF PONERA

1. Middle tibial spurs more than one-half the length of hind tibial spurs; erect hairs numerous .....1. *P. coarctata pennsylvanica*
Middle tibial spurs less than one-half the length of hind spurs; erect hairs sparse .....2. *P. trigona opacior*

[3] Although some recent authors are still calling this opening the anus, Emery (1922a) has conclusively shown that the anus or cloacal opening of the Formicinae is between the hypopygium and pygidium, as in every other subfamily of Formicidae.

1. *Ponera coarctata pennsylvanica* Buckley

1866 *P. pennsylvanica* Buckley, Proc. Ent. Soc. Philad., 6:171. ☿
1895 *P. coarctata pennsylvanica* Emery, Zool. Jahrb. Syst., 8:267. ☿ ♀ ♂

Records: Ames, Clinton, Inwood, Muscatine, Oak Grove State Park, Sabula. Also Sioux City (C. N. Ainslie).

This species is the commonest Ponerine in Iowa. It is common near Ames and probably occurs over much of the state. My list of localities could probably be greatly expanded if a more intensive search were made for it. *P. pennsylvanica* is rather hypogeic in habit and nests in small colonies.

2. *Ponera trigona opacior* Forel

1893 *P. trigona* var. *opacior* Forel, Trans. Ent. Soc. Lond., p. 363. ☿ ♀
1895 *P. trigona* var. *opacior* Emery, Zool. Jahrb. Syst., 8:268. ☿ ♀ ♂

Records: Clinton, Glenwood, Little Sioux.

Iowa probably marks the northern limit of the range of this species. Since it was found only on opposite sides of the state, *opacior* has probably managed to creep sporadically northward only along the bluffs of the Mississippi and Missouri rivers.

2. SUBFAMILY DORYLINAE

1. Eciton

KEY TO SPECIES OF ECITON

1. Head and thorax entirely opaque.....1. *E. nigrescens*
   Head and pleurae of prothorax shining .....2. *E. opacithorax*

1. *Eciton* (*Neivamyrmex*) *nigrescens* (Cresson)

1872 *Labidus nigrescens* Cresson, Trans. Amer. Ent. Soc., 4:194. ♂
1894 *Eciton* (*Acamatus*) *schmitti* Emery, Bull. Soc. Ent. Ital., 26:183. ☿
1908 *Eciton* (*Acamatus*) *nigrescens* Wheeler, Bull. Amer. Mus. Nat. Hist., 24:417. ♂
1938 *Eciton* (*Acamatus*) *nigrescens* M. R. Smith, Proc. Ent. Soc. Wash., 40(6):157–160. ☿ ♂
1940 *Eciton* (*Neivamyrmex*) *nigrescens* Borgmeier, Rev. de Ent. Brasil, 11:606.

Records: Little Sioux, Sioux City. Also Sioux City (C. N. Ainslie).

This species can be found in Iowa only along the bluffs of the Missouri River. After rains they may be found marching in long columns. Sioux City is the farthest north that any Doryline ant has ever been taken, but since they appear to closely follow the Missouri River bluffs, it is quite possible that the range of *nigrescens* extends into South Dakota.

2. *Eciton* (*Neivamyrmex*) *opacithorax* Emery

1894 *E.* (*Acamatus*) *californicum opacithorax* Emery, Bull. Soc. Ent. Ital., 26:184. ☿
1900 *E.* (*Acamatus*) *opacithorax* Emery, Mém. Accad. Sci. Bologna, 8(5):23 ☿
1901 *E.* (*Acamatus*) *opacithorax* Wheeler and Long, Amer. Natur., 35:163, 173. ♀ ♂

Record: Glenwood.

This species, found accidentally, was tunneling an inch or two beneath the ground. This is the farthest north this species has been taken. It is rarer than *nigrescens*, but it is quite possible that its range extends as far north.

3. SUBFAMILY MYRMICINAE

KEY TO GENERA OF MYRMICINAE

1. Postpetiole articulated to dorsal surface of gaster, which is flattened dorsally, more convex ventrally, and pointed at the tip ..... 7. *Crematogaster*
   Postpetiole articulated to anterior end of gaster, which is of a different shape ... 2
2. Antennae 6-jointed; the scapes retractible into long scrobes; head cordiform ..... 11. *Strumigenys*
   Antennae with more than six joints 3
3. Antennae 10-jointed, funicular clubs 2-jointed. ..... 9. *Solenopsis*
   [one Iowa species, *S. molesta* (Say)]
   Antennae different 4
4. Epinotum with two pairs of spines (anterior pair feeble and dorsally projecting) ..... 10. *Myrmecina*
   (one Iowa species, *M. graminicola americana* Emery)
   Epinotum different 5
5. Last three joints of the funiculus forming a club as long as or longer than the remainder 6
   Last three joints not as long as the remainder of the funiculus, although the last three joints may form an indistinct club 8
6. Thorax without any trace of teeth or spines ..... 8. *Monomorium*
   Epinotum with at least feeble spines; integument often strongly sculptured..... 7
7. Workers strongly dimorphic, usually without intermediates; scapes of minor workers reaching beyond the head ..... 5. *Pheidole*
   Workers monomorphic; scapes usually not reaching the hind border of the head ..... 6. *Leptothorax*
8. Gula with a basket of long hairs ..... 2. *Pogonomyrmex*
   [one Iowa species, *P. occidentalis* (Cresson)]
   Gula with only normal hairs 9
9. Posterior tibial spurs pectinated; head and thorax strongly rugose... 1. *Myrmica*
   Posterior tibial spurs simple 10
10. Small hypogeic species with vestigial eyes and two keels on the clypeus.... ..... 3. *Stenamma*
    Medium-sized epigeic species with well-developed eyes and no keels on the clypeus ..... 4. *Aphaenogaster*

1. Myrmica

KEY TO SPECIES OF MYRMICA

1. Scape without a lobe or lamina at the bend near the base; gaster punctate ..... 4. *M. punctiventris*
   Scape with a lobe or lamina at the bend 2
2. Lamina of the scape carried partially around the bend and then ventrad along the medial side of the base of the scape; postpetiole convex beneath in profile.. ..... 3. *M. schencki emeryana*
   Lamina carried completely around the bend and attached to both sides of the scape distal to the bend; postpetiole straight beneath..... 3
3. Lamina of the scape produced into a large spoon-shaped lobe..... ..... 1. *M. sabuleti trullicornis*
   Lamina of the scape not produced into a lobe..... 2. *M. sabuleti americana*

1. **Myrmica sabuleti** subsp. **trullicornis** n. subsp.

WORKER. Length about 5.5 mm.

Head, excluding the mandibles, slightly (about one-twentieth) longer

than broad, with moderately convex sides, and feebly convex or slightly excised posterior border. Frontal carinae produced into large lobes projecting dorso-laterally from the head, strongly converging behind. Scape bent at right angles near the base, the bend fitted on the dorsal side with a relatively enormous lobe much larger than in any other previously described North American form except *schencki spatulata* M. R. Smith. When seen from above, this lobe is rather circular in outline and distinctly concave so that it appears much like a ladle. Its very sharp edges are produced along each side of the scape for a short distance.

Thorax with obtuse mesoepinotal impression. Epinotal spines about one-half again as long (about .38 mm. long) as the distance between their bases. In profile the petiole as high as the distance between its ventral tooth and the postpetiole; dorsal surface of petiolar node nearly straight for a short distance before dropping abruptly behind. Postpetiole six-sevenths as long as high, with very convex dorsum in profile, ventral surface nearly straight as in *sabuleti americana* Weber.

Clypeus and mandibles longitudinally striate. Frontal area striato-punctate. Front with about 13 strong longitudinal striae which tend to diverge behind and fuse with the strong reticulate sculpture of the rest of the head. Thorax longitudinally rugose, the rugae larger, and more vermiculate on the pronotum than behind. On the pleurae of the epinotum the rugae converge toward and disappear upon the epinotal spines, about 8–10 rugae taking part in this effect on each side. Dorsa and pleurae of petiole and postpetiole rugose, more irregularly and not so deeply rugose on the dorsa. Gaster smooth and shining.

Pilosity much as in *americana*, the erect hairs moderately abundant, those on the occiput and thorax with blunt tips. Hairs on the scapes oblique, those on the legs subappressed to oblique. Pubescence sparse on all parts.

Color blackish brown; dorsum of the head and gaster darker than the other regions.

FEMALE. Not differing appreciably from the female of *americana* Weber except in having large ladle-shaped lobes on the scapes, somewhat finer sculpture, and darker color.

Described from 34 workers collected April 30, 1941, 4 workers collected August 5, 1939, from woodland colonies near Ames (type locality), and 11 workers and a female from woods near Boone, collected May 3, 1941.

The very similar manner in which the ladle-shaped lobes are attached to the scapes, the almost identical shape of the postpetiole, and many other similarities, show *trullicornis* to be most closely related to *americana* Weber. *M. trullicornis* may be distinguished from *americana* by the large lobe on the scape, which in *americana* is produced only as a small lamina curved around the bend. The sculpture of *trullicornis* seems finer, and the color is darker. *M. trullicornis* also seems to be a woodland form whereas *americana* prefers prairies and open fields. The writer possesses

a series of workers from Sauk Rapids, Minnesota, showing well-marked intergradation between *trullicornis* and *americana.* These forms therefore seem to be no more than subspecifically distinct.

The placement of *trullicornis* and *americana* under *sabuleti* Meinert seems somewhat incongruous as the lamina of the scape is quite differently constructed in this species. Possibly *americana* will prove specifically distinct from *sabuleti,* and *trullicornis* can then be placed as a subspecies of *americana,* and considered as an ecological race of it.

M. sabuleti trullicornis should not be confused with *M. schencki spatulata* M. R. Smith. The frontal carinae are not at all produced into lobes in *spatulata,* the shape and attachment of the large lobe on the scape are quite different, the sculpture is coarser, and the postpetiole is convex beneath.

2. *Myrmica sabuleti americana* Weber

1939 *M. sabuleti americana* Weber, Lloydia, 2:144.

Records: Ames, Boone, Clinton, Keokuk, Jewell, Oak Grove State Park, Granite. Also Sioux City (C. N. Ainslie).

This ant seems common all over Iowa. It prefers to nest in open fields.

3. *Myrmica schencki emeryana* Forel

1914 *M. scabrinodis schencki* var. *emeryana* Forel, Deutsche Ent. Zeitschr., p. 617. ☿ ♀ ♂

Records: Ames, Spirit Lake, Boone, Clinton, Sabula, Inwood.

This ant is fairly common in woodlands in Iowa.

4. *Myrmica punctiventris* Roger

1863 *M. punctiventris* Roger, Berlin Ent. Zeitschr., 7:190. ☿
1886 *M. punctiventris* Mayr, Verh. Zool.-bot. Ges. Wien, 36:450. ☿ ♀
1895 *M. punctiventris* Emery, Zool. Jahrb. Syst., 8:312. ♂

Record: Belle Plaine.

M. punctiventris prefers to live in dense woodlands and is probably much rarer in Iowa than in the eastern states.

2. Pogonomyrmex

1. *Pogonomyrmex* (*Pogonomyrmex*) *occidentalis* (Cresson)

1865 *Myrmica occidentalis* Cresson, Proc. Ent. Soc. Philad., 4:426. ☿ ♀
1882 *Pogonomyrmex occidentalis* McCook, The Honey Ant, etc., p. 123–162. ☿ ♀ ♂

Record: Sioux City (C. N. Ainslie).

This record may be the result of mislabeling. The writer has failed to take this species in Iowa, even along the Missouri River bluffs area. It is, of course, possible that it may sporadically occur in this area.

3. Stenamma

KEY TO SPECIES OF STENAMMA

1. Eyes with approximately 30 facets, head and thorax uniformly opaque .... 1. *S. brevicorne*
   Eyes with about 15 facets; pronotum somewhat shining; mesoepinotal impression deeper ..... 2. *S. brevicorne impressum*

1. *Stenamma brevicorne* (Mayr)

1886 *Aphaenogaster brevicorne* Mayr, Verh. Zool.-bot. Ges. Wien, 36:447. ☿ ♀
1895 *Stenamma brevicorne* Emery, Zool. Jahrb. Syst., 8:298. ☿ ♀ ♂

Records: Ames, Clinton, McGregor, DeWitt. Also Arnolds Park (Judson McQuire); Sioux City (C. N. Ainslie).

This ant is probably common in woodlands over much of the state. It is hypogeic in habit. The winged forms apparently overwinter in the nests as adults or pupae, as they may be found in the nests in early spring.

2. *Stenamma brevicorne impressum* Emery

1895 *S. westwoodi diecki* var. *impressum* Emery, Zool. Jahrb. Syst., 8:301. ☿ ♀
1901 *S. brevicorne diecki* var. *impressum* Forel, Ann. Soc. Ent. Belg., 45:347.

Record: Tama.

As this subspecies is represented by only one specimen, it must be a rare form in Iowa. The specimens which the author previously referred to *impressum* (1941a) belong to the typical *brevicorne*.

4. Aphaenogaster

KEY TO SPECIES OF APHAENOGASTER

1. Scape with a flattened lobe at the base ..... 5. *A. treatae*
   Scape without a lobe at the base 2
2. Basal third of first gastric segment striate ..... 3. *A. mariae*
   First gastric segment not striate 3
3. Epinotal spines longer than the base of the epinotum; few or no hairs on gaster; color deep red ..... 4. *A. tennesseensis*
   Epinotal hairs much shorter than the base of the epinotum; gaster hairy; reddish brown to black 4
4. Reddish brown ..... 1. *A. fulva aquia*
   Deep brown or black ..... 2. *A. fulva picea*

1. *Aphaenogaster* (*Attomyrma*) *fulva aquia* (Buckley)

1867 *Myrmica* (*Monomorium*) *aquia* Buckley, Proc. Ent. Soc. Philad., 6:431. ☿
1895 *Stenamma* (*Aphaenogaster*) *fulva aquia* Emery, Zool. Jahrb. Syst., 8:304. ☿ ♀ ♂
1922 *Aphaenogaster* (*Attomyrma*) *fulva aquia* Emery, Gen. Insec., fasc. 174:57.

Records: Ames, Boone, Holy Cross, Clinton, Dubuque.

Common in all wooded portions of the state.

2. *Aphaenogaster* (*Attomyrma*) *fulva picea* Emery

1895 *Stenamma* (*Aphaenogaster*) *fulva aquia* var. *picea* Emery, Zool. Jahrb. Syst., 8:305. ☿ ♀ ♂

1922 *Aphaenogaster (Attomyrma) fulva aquia* var. *picea* Emery, Gen. Insec., fasc. 174:57.

Records: Ames, Backbone State Park, Glenwood, Waubonsie State Park, Oak Grove State Park, Clinton.

This variant does not seem very distinct. Perhaps it may be more distinct in the Eastern States but intergrades with *aquia* rather readily in Iowa. Its colonies always seem rather depauperate compared with those of *aquia*.

3. *Aphaenogaster (Attomyrma) mariae* Forel

1886 *Aph. mariae* Forel, Ann. Soc. Ent. Belg., 30(C.R.):41. ☿

Record: Ames.

The host of this ant is *Aphaenogaster fulva aquia*. The writer on three occasions found *mariae* with *aquia* near Ames. It is much rarer than *tennesseensis*, a very similar and probably closely related species.

4. *Aphaenogaster (Attomyrma) tennesseensis* (Mayr)

1862 *Atta tenneseensis* Mayr, Verh. Zool.-bot. Ges. Wien, 12:743. ☿
1922 *Aphaenogaster (Attomyrma) tenneseensis* Emery, Gen. Insec., fasc. 174:60.

Records: Ames, Oak Grove State Park, Rice Lake State Park, Clinton, Belle Plaine, Denison, Boone. Also Sioux City (C. N. Ainslie).

The temporary host of this ant is *A. fulva aquia*, with which it is occasionally found under rocks. When the colonies are fully developed they can be found only in rotting wood.

5. *Aphaenogaster (Attomyrma) treatae* Forel

1886 *Aph. treatae* Forel, Ann. Soc. Ent. Belg., 30(C.R.):40 ☿ ♀ ♂

Records: Little Sioux, Glenwood, Sioux City, Princeton, DeWitt.

As has been stated in the introduction, this species seems to have a discontinuous distribution in Iowa, occurring only in the extreme eastern and western parts of the state.

5. Pheidole

KEY TO SPECIES OF PHEIDOLE

1. Thorax and gaster with only sparse, clavate hairs ..... 3. *P. sitarches*
   Thorax and gaster with numerous, slender hairs 2
2. Soldiers with occipital lobes of head shining; workers with shining heads .... 1. *P. bicarinata*
   Occipital lobes of soldiers reticulate-rugose; workers with heads punctate and opaque ..... 2. *P. pilifera*

1. *Pheidole (Pheidole) bicarinata* Mayr

1870 *Ph. bicarinata* Mayr, Verh. Zool.-bot. Ges. Wien, 20:982, 989. ♂

Records: Clinton, Ames, Akron, Burlington, Oak Grove State Park, McGregor, Hinton. Also Sioux City (C. N. Ainslie).

This species is common over most of Iowa. It seems to thrive well in our cities and towns, even though it was originally a member of the prairie fauna. It is less granivorous than *pilifera*.

In the author's preliminary list (1941a) *bicarinata* was misidentified as *P. vinelandica* Forel, a closely related species.

2. *Pheidole* (*Pheidole*) *pilifera* (Roger)

1863 *Leptothorax pilifer* Roger, Berlin Ent. Zeitschr., 7:180. ☿
1886 *Pheidole pennsylvanica* Mayr, Verh. Zool.-bot. Ges. Wien, 36:455. ♀ ☿ ♀ ♂
1895 *Pheidole pilifera* Emery, Zool. Jahrb. Syst., 8:290.

Records: Ames, Bellevue, DeWitt, Princeton.

This ant is numerous in prairie lands. It does not thrive well in our cities and towns, but the writer has occasionally seen it in such situations. *P. pilifera* will accept dead insects if offered, but is largely granivorous.

3. *Pheidole* (*Pheidole*) *sitarches* Wheeler

1908 *Ph. sitarches* Wheeler, Bull. Amer. Mus. Nat. Hist., 24:440. ♀ ☿ ♀

Record: Glenwood.

This species was originally described from Texas and apparently occurs in Iowa only in the extreme southwestern part of the state along the bluffs of the Missouri River.

6. Leptothorax

KEY TO SPECIES OF LEPTOTHORAX

1. Antennae 11-jointed 2
   Antennae 12-jointed 6
2. Thorax with a faint but distinct mesoepinotal constriction (subgenus *Mychothorax*) ..... 6. *L. acervorum canadensis* Provancher
   Thorax without a mesoepinotal constriction 3
3. Epinotal spines very short, dentiform; color black.... 4. *L. fortinodis melanotica*
   Epinotal spines longer 4
4. Head shining; color black..... 3. *L. longispinosus laeviceps*
   Head sculptured; color yellow 5
5. Spines long and curved, their bases approximate..... 1. *L. curvispinosus*
   Spines shorter and straight, their bases farther apart..... 2. *L. ambiguus*
6. Without mesoepinotal constriction; postpetiole much broader than petiole.... ..... 5. *L. tricarinatus*
   With deep mesoepinotal constriction; petiole pedunculate (subgenus *Dichothorax*) ..... 7. *L. pergandei*

1. *Leptothorax* (*Leptothorax*) *curvispinosus* Mayr

1886 *L. curvispinosus* Mayr, Verh. Zool.-bot. Ges. Wien, 36:451, 453. ☿ ♀
1886 *L. curvispinosus* Mayr, Verh. Zool.-bot. Ges Wien, 36:451, 453. ☿ ♀

Records: Ames, Clinton, Tama, Waubonsie State Park, Belle Plaine, Denison, Granite. Also Sioux City (C. N. Ainslie).

A common woodland form. Several colonies have been found nesting in dried hollow stems of plants near Ames.

2. *Leptothorax (Leptothorax) ambiguus* Emery

1895 *L. curvispinosus ambiguus* Emery, Zool. Jahrb. Syst., 8:320. ☿
1940 *L. ambiguus* Wesson and Wesson, Amer. Midl. Nat., 24(1):97.

Records: Boone, Ames.

A much rarer ant than *curvispinosus*. No nests were found. All specimens were either caught in sweeping or with an aspirator as they were crawling on the ground.

3. **Leptothorax (Leptothorax) longispinosus** subsp. **laeviceps** n. subsp.

WORKER. Length, 2.2 mm.

Head oblongate, one-eighth longer than broad, excluding the mandibles. Antennae 11-jointed; scapes nearly reaching the posterior corners of the head. Funicular joints 2–7 broader than long; club one-fifth longer than rest of funiculus. Dorsum of thorax moderately and evenly convex in profile. Epinotal spines long, straight, sharp, somewhat diverging seen from above, projecting backwards and slightly upward, about one-third as long as the distance from bases to neck of pronotum. Petiole and postpetiole much as in *longispinosus* s. str. Petiole a little larger in profile than postpetiole, the anterio-ventral spine very weak, node bluntly subtriangular in profile and not quite as high as in typical *longispinosus*.

Head smooth and shining except for the cheeks, which are striate. Median lobe of clypeus rather indistinctly striate. Thorax striato-punctate, especially on the pleurae; the dorsum feebly shining. The interrugal spaces of the thorax are distinctly wider than in typical *longispinosus*. Petiole and postpetiole punctate.

Erect hairs somewhat clavate, arranged as in typical *longispinosus*.

Dark brownish black.

Described from 12 specimens found under a stone on the high Mississippi River bluffs near McGregor, Iowa, June 10, 1940. The typical *longispinosus* apparently does not range as far west as Iowa. *L. laeviceps* may therefore be regarded as a depauperate, geographical race.

L. laeviceps differs from *longispinosus* s. str. in being smaller, and having the sculpturing distinctly less coarse on all parts. The striae on the thorax are farther apart, leaving room for large interrugal punctures. The dorsum of the thorax is a little more convex in profile, and the epinotal spines project a little upward rather than being horizontal. The petiole and postpetiole are not quite as robust. The color of *longispinosus* is often pitch black. The sculpture of the head of *laeviceps* is probably much like that of *L. schmittii* Wheeler, but this species has 12-jointed antennae and much shorter epinotal spines.

4. *Leptothorax (Leptothorax) fortinodis melanotica* Wheeler

1903 *L. fortinodis* var. *melanotica* Wheeler, Proc. Acad. Nat. Sci. Philad., 55:235. ☿ ♀
1940 *L. schaumi* var. *fortinodis* Wesson and Wesson, Amer. Midl. Nat., 24(1):96.

Records: Ames, DeWitt, Clinton.

As Wesson and Wesson have stated (*loc. cit.*) this form may be synonymous with the typical *fortinodis* Mayr, which in turn may be no more than a subspecies of *schaumi* Roger. The author would point out, however, that even though specimens referable to *melanotica* may intergrade indistinguishably with *fortinodis* in the East, *melanotica* may be a valid geographical race in the Middle West, from which region it was described. All the author's specimens are pitch black as described.

5. *Leptothorax (Leptothorax) tricarinatus* Emery

1895 *L. tricarinatus* Emery, Zool. Jahrb. Syst., 8:321. ☿

Records: Inwood, Oak Grove State Park. Also Sioux City (C. N. Ainslie).

This species may be distinguished immediately from all the other species of typical *Leptothorax* in Iowa by its 12-jointed antennae and large postpetiole. *L. tricarinatus* is not related to the members of the subgenus *Dichothorax* which also have 12-jointed antennae.

L. tricarinatus nests in the ground in small colonies.

6. *Leptothorax (Mychothorax) acervorum canadensis* Provancher

1887 *L. canadensis* Provancher, Addit. Faune Canada, Hym., p. 245. ☿ ♀ ♂
1903 *L. acervorum canadensis* Wheeler, Proc. Acad. Nat. Sci. Philad., 55:225. ☿ ♀

Record: Spirit Lake.

This species was found nesting under the bark of a log. *L. acervorum canadensis* is a boreal species, apparently rare in Iowa even in the northern part.

7. *Leptothorax (Dichothorax)* pergandei Emery

1895 *L. (D.) pergandei* Emery, Zool. Jahrb. Syst., 8:318, 323. ☿ ♀ ♂

Records: Boone, Elkader, Glenwood, Bellevue, Dubuque, Sabula.

This ant nests in soil on sunny hillsides. It seems more xerophilous and moves more rapidly than the species of typical *Leptothorax*. It is common nowhere but, nevertheless, cannot be considered very rare in Iowa.

7. Crematogaster

Key to Species of Crematogaster

1. Black in color; thorax opaque (subgenus *Crematogaster* s. str.) 1. C. *lineolata* (Say)
Mostly yellow; thorax shining (subgenus *Orthocrema*) ..... 2. C. *minutissima missouriensis* Emery

1. *Crematogaster (Crematogaster) lineolata* (Say)

1836 *Myrmica lineolata* Say, Boston Jour. Nat. Hist., 1:290. ☿ ♀ ♂
1863 *Crematogaster lineolata* Roger, Verz. Formicid., p. 37.

Records: Ames, Mt. Vernon, Sabula, Keokuk, Muscatine, McGregor, Dubuque, Glenwood.

This species occurs all over the state but does not seem especially common.

2. *Crematogaster (Orthocrema) minutissima missouriensis* Emery

1895 *C. victima missuriensis* Emery, Zool. Jahrb. Syst., 8:288 (in footnote). ☿
1939 *C. (O.) minutissima missouriensis* Creighton, Psyche, 46(4):138.

Records: Little Sioux, Glenwood, Sioux City. Also Sioux City (C. N. Ainslie).

This ant is abundant along the Missouri River bluffs but lacking in other parts of the state. It nests in the ground in small colonies.

8. Monomorium

Key to Species of Monomorium

1. Black; all surfaces shining.....1. *M. minimum*
Yellow; head and thorax finely reticulate-punctate ..... 2. *M. pharaonis*

1. *Monomorium (Monomorium) minimum* (Buckley)

1867 *Myrmica (Monomorium) minima* Buckley, Proc. Ent. Soc. Philad., 6:338. ☿ ♀
1895 *Monomorium minutum* var. *minimum* Emery, Zool. Jahrb. Syst., 8:274. ☿ ♀ ♂
1914 *Monomorium minimum* Wheeler, Jour. New York Ent. Soc., 22:42.

Records: Little Sioux, Inwood, Tama, Ames, Boone. Also Sioux City (C. N. Ainslie).

This minute species usually builds small crater nests in the ground. The writer has once taken it from beneath the bark of a log.

2. *Monomorium (Monomorium) pharaonis* (Linné)

1758 *Formica pharaonis* Linné, Syst. Nat., ed. 10, 1:580.
1862 *Monomorium pharaonis* Mayr, Verh. Zool.-bot. Ges Wien, 12:752.

Record: Ames.

This species does not live out-of-doors in these latitudes. It is occasionally found in buildings and houses, where it apparently nests in the walls.

9. Solenopsis

1. *Solenopsis (Diplorhoptrum) molesta* (Say)

1836 *Myrmica molesta* Say, Boston, Jour. Nat. Hist., 1:293. ♀
1895 *Solenopsis molesta* Emery, Zool. Jahrb. Syst., 8:277. ☿ ♀ ♂

Records: Ames, Sioux City, Boone, Marshalltown, Inwood, Tama, Belle Plaine. Also Sioux City (C. N. Ainslie).

Probably very abundant over the entire state.

10. Myrmecina

1. *Myrmecina graminicola americana* Emery

1895 *M. latreillei americana* Emery, Zool. Jahrb. Syst., 8:271. ☿
1922 *M. graminicola americana* Emery, Gen. Insec., fasc. 174:232.

Records: DeWitt, Clinton, Ames, Boone.

Winged males were found in a nest in late August. This ant is strictly hypogeic.

M. americana differs from the typical European *graminicola* rather distinctly. The scapes of *americana* are not flattened and broad at the base but are circular in cross section; the clypeal teeth are less distinct and the median clypeal carina nearly absent, the head is slightly broader than long rather than a little longer than broad, and is also distinctly excised behind. The thorax is a little broader in proportion to its length, and the anterior epinotal spines are better developed. *M. americana* may thus deserve to rank as a good species.

11. Strumigenys

Key to Species of Strumigenys

1. Visible portion of mandibles one-third as long as the head, a basal tooth visible just before the clypeus ..... 1. *S. pergandei*
   Visible portion of mandibles one-fifth as long as the head, no basal tooth visible ..... 2. *S. pulchella*

1. *Strumigenys (Cephaloxys) pergandei* Emery

1895 *S. pergandei* Emery, Zool. Jahrb. Syst., 8:326. ☿ ♀ ♂
1931 *S. (C.) pergandei* M. R. Smith, Ann. Ent. Soc. Amer., 24(4):698.

Records: Boone, Holy Cross, Bellevue.

A rare species in Iowa. It is usually found near the nests of other ants.

2. *Strumigenys (Cephaloxys) pulchella* Emery

1895 *S. pulchella* Emery, Zool. Jahrb. Syst., 8:327. ☿
1931 *S. (C.) pulchella* M. R. Smith, Ann. Ent. Soc. Amer., 24(4):702. ☿

Record: Ames.

This species is either extremely rare or extremely hypogeic in Iowa. In the spring, single workers can rarely be found under rocks in damp soil.

4. SUBFAMILY DOLICHODERINAE

Key to Genera of Dolichoderinae

1. Epinotum with a conical point ..... 2. *Dorymyrmex*
   Epinotum without a conical point 2

2. Petiolar scale very small and strongly inclined forward, not distinct..3. *Tapinoma*
[one Iowa species, *T. sessile* (Say)]
Petiolar scale distinct, more erect, sharply pointed above.....1. *Iridomyrmex*
[one Iowa species, *I. pruinosum analis* (Ern. André)]

1. Iridomyrmex

1. *Iridomyrmex pruinosum analis* (Ern. André)

1893 *Tapinoma anale* Ern. André, *Rev. Entom.*, p. 148. ☿
1895 *Tapinoma pruinosum* var. *anale* Emery, Zool. Jahrb. Syst., 8:333.
1912 *Iridomyrmex analis* Emery, Gen. Insec., fasc. 137:26.

Records: Glenwood, Inwood, Oak Grove State Park, Little Sioux. Also Sioux City (C. N. Ainslie).

This species is common along the Missouri River bluffs and also in prairie remnants in the area drained by the Missouri River system. It does not occur in central or eastern Iowa.

2. Dorymyrmex

Key to Species of Dorymyrmex

1. Head and thorax brown, lighter than gaster.....1. *D. pyramicus*
Color uniformly black .....2. D. *pyramicus niger*

1. *Dorymyrmex pyramicus* (Roger)

1863 *Prenolepis pyramica* Roger, Berl. Ent. Zeitschr., 7:160. ☿
1886 *Dorymyrmex pyramicus* Mayr, Verh. Zool.-bot. Ges. Wien, 36:365, 433. ☿♀
1895 *Dorymyrmex pyramicus* Emery, Zool. Jahrb. Syst., 8:331. ♂

Records: Sioux City, Little Sioux, Oak Grove State Park, Inwood. Also Sioux City (C. N. Ainslie).

The distribution of this species in Iowa is the same as that of *Iridomyrmex analis*. Some of the author's specimens seem somewhat transitional to *D. pyramicus niger*.

2. *Dorymyrmex pyramicus niger* Pergande

1895 *D. pyramicus* var. *niger* Pergande, Proc. Calif. Acad. Sci., 5(2):871.

Record:—Ames:

Besides the darker, uniform color of the specimens the writer has referred to *niger*, there are also these differences between them and typical *pyramicus*. The head of *niger* is a little more elongate, the scapes slightly longer, the second funicular joint shorter, the mesoepinotal suture not deeply impressed, and the petiole smaller and blunter.

This form nests only in virgin prairie or open fields. On a virgin prairie remnant near Ames it was especially abundant, more abundant than any other ant. It seems probable that this form was a dominant species in the original prairie fauna of Iowa before cultivation extinguished it. *D. niger* can be found occasionally in pasture lands but does

not thrive in such situations. Recently the virgin prairie remnant mentioned above has been overgrazed and the prairie flora has disappeared. The writer has noticed a decrease in the number of *D. niger* there, apparently correlated with this change.

3. Tapinoma

1. *Tapinoma sessile* (Say)

1836 *Formica sessilis* Say, Boston Jour. Nat. Hist., 1:287. ♀
1863 *Tapinoma boreale* Roger, Berl. Ent. Zeitschr., 7:165. ☿♀
1895 *Tapinoma sessile* Emery, Zool. Jahrb. Syst., 8:332. ♀♂

Records: Ames, Clinton, Burlington, Tama, Inwood. Also Sioux City (C. N. Ainslie).

This species is so common in woodlands near Ames that it undoubtedly is common over most of the state. The writer has not seen it on the Missouri River bluffs, where *Iridomyrmex analis* apparently takes its place.

5. SUBFAMILY FORMICINAE

Key to Genera of Formicinae

1. Antennae 9-jointed ..... 1. *Brachymyrmex* (one Iowa species, *B. depilis* Emery)
   Antennae with 12 joints 2
2. Metathoracic spiracles on the sides of the thorax; insertions of the antennae relatively distant from the clypeus ..... 2. *Camponotus*
   Metathoracic spiracles on the dorsum near the mid-line; insertions of the antennae close behind the clypeus 3
3. Clypeal fossae separate from the antennal fossae; petiolar scale inclined forward.. 4
   Clypeal fossae confluent with the antennal fossae; petiolar scale erect 5
4. Mesothorax strongly constricted ..... 4. *Prenolepis* [one Iowa species, *P. imparis* (Say)]
   Mesonotum not constricted; an impressed suture just behind metathoracic spiracles ..... 3. *Paratrechina*
5. Second and third funicular joints together at least slightly shorter than the first; second to fifth joints shorter than the succeeding joints; ocelli usually absent ..... 5. *Lasius*
   Second and third funicular joints together at least slightly longer than the the first; second to fifth joints at least as long as succeeding joints; ocelli present 6
6. Mandibles falcate, their teeth vestigial ..... 7. *Polyergus*
   Mandibles normal in shape, with broad dentate apical borders..... 6. *Formica*

1. Brachymyrmex

1. *Brachymyrmex* (*Brachymyrmex*) *depilis* Emery

1893 *B. heeri depilis* Emery, Zool. Jahrb. Syst., 7:635. ☿♀♂
1923 *B.* (*B.*) *depilis* Santschi, An. Mus. Hist. Nat. Buenos Aires, 31:653, 663. ☿

Records: McGregor, Oak Grove State Park.

Besides the two listed localities I have also seen fragments of these

ants in excreta of shrews from the vicinity of Ames. It is probably a common species but because of its extremely small size and hypogeic habits, not often found.

2. Camponotus

Key to Species of Camponotus

1. Clypeus entire anteriorly or only very broadly notched, large species up to 13 mm.....2
   Clypeus notched; small species up to 7 mm. (subgenus *Myrmentoma*).....5
2. Head of major worker longer than wide; body somewhat shining.....3
   Head of major worker wider than long; body more opaque 4
3. Head black, thorax and gaster dark brown .....4. *C. castaneus americanus*
   Head dark brown; thorax and gaster tan, scarcely infuscated.....3. *C. castaneus*
4. Thorax black, gaster with long pubescence .....1. *C. herculeanus pennsylvanicus*
   Thorax red, gaster with only short pubescence..2. *C. herculeanus novaeboracensis*
5. Cheeks and clypeus with elongate, piligerous foveolae 6
   Cheeks and clypeus without elongate, piligerous foveolae 7
6. Head and thorax largely black or dark brown.....8. *C. caryae subbarbatus*
   Head and thorax red .....7. *C. caryae discolor*
7. Head and thorax largely black .....5. *C. caryae nearcticus*
   Head and thorax red .....6. *C. caryae rasilis*

1. *Camponotus (Camponotus) herculeanus pennsylvanicus* (Degeer)

1773 *Formica pennsylvanica* Degeer, Mém. Hist. Insect., 3:603. ☿♀♂
1879 *Camponotus herculeanus pennsylvanicus* Forel, Bull. Soc. Vaud. Sci. Nat., 16:57.

Records: Ames, Princeton, Little Sioux, Glenwood, Sioux City, Ruthven. Also Sioux City (C. N. Ainslie).

This species always lives in galleries which it excavates in solid or rotten wood. It occasionally nests in the beams of frame houses, weakening them considerably. Incipient colonies consisting of a female and several minor workers can often be found just under the bark of logs. The above list of localities could be considerably lengthened as *pennsylvanicus* is common in every woodland.

2. *Camponotus (Camponotus) herculeanus novaeboracensis* (Fitch)

1854 *Formica novaeboracensis* Fitch, Trans. New York State Agric. Soc., 14:52. ☿
1910 *Camponotus herculeanus ligniperda* var. *noveboracensis* Wheeler, Ann. New York Acad. Sc., 20:340. ☿ ♀ ♂
1925 *Camponotus (C.) herculeanus* var. *novaeboracensis* Emery, Gen. Insec., fasc. 183:72.

Records: Ames, Estherville, Holy Cross, Spirit Lake, Backbone State Park, Rice Lake State Park. Also Indianola (D. T. Jones).

This ant nests in wood as *pennsylvanicus* does. It appears to have a more boreal distribution than *pennsylvanicus* and does not occur in the southern part of Iowa. *C. novaeboracensis* and *pennsylvanicus* sometimes occur in the same locality, apparently without intergradation. It seems, therefore, that they could be considered specifically, rather than only subspecifically distinct.

3. *Camponotus* (*Camponotus*) *castaneus* (Latreille)

1802 *Formica castanea* Latreille, fourmis, p. 118. ☿ ♀ ♂
1886 *Camponotus castaneus* Mayr, Verh. Zool.-bot. Ges. Wien, 36:420.

Record: Burlington.

This southern species seems to reach its northern limit in southeastern Iowa. The colony the writer found was nesting under a flat rock in woodland.

4. *Camponotus* (*Camponotus*) *castaneus americanus* Mayr

1862. *C. americanus* Mayr, Verh. Zool.-bot. Ges. Wien, 12:661. ☿ ♀
1893 *C. castaneus americanus* Emery, Zool. Jahrb. Syst., 7:674.

Records: Ames, Clinton, Backbone State Park, Inwood.

This ant nests in the ground, never in wood. It prefers woodlands, however. Winged males and females were taken in nests in early April and May, so evidently these casts overwinter as adults. The winged casts of *herculeanus pennsylvanicus* often overwinter as adults, also.

5. *Camponotus* (*Myrmentoma*) *caryae nearcticus Emery*

1893 *C. marginatus var. nearcticus* Emery, Zool. Jahrb. Syst., 7:675. ☿ ♀
1910 *C. fallax* var. *nearcticus* Wheeler, Jour. New York Acad. Sci., 18:222. ☿ ♀ ♂
1917 *C. (Camponotus) caryae* Wheeler, Psyche, 24:27.

Records: Ames, Tama, Holy Cross, Clinton.

This ant nests in the dead branches of hickory and oak trees. Specimens are not often taken, but it is probably a fairly common woodland form in Iowa.

6. *Camponotus* (*Myrmentoma*) *caryae rasilis* Wheeler

1910 *C. fallax rasilis* Wheeler, Jour. New York Ent. Soc., 18:227. ☿ ♀ ♂
1917 *C. caryae rasilis* Wheeler, Psyche, 24:28.

Record: Sioux City (C. N. Ainslie).

This is another of the southern forms which appear to have extended their range northward along the Missouri River bluffs. The Iowa specimens of *rasilis* collected by Ainslie are all much smaller than the typical *rasilis* of the southern states.

7. *Camponotus* (*Myrmentoma*) *caryae discolor* (Buckley)

1866 *Formica discolor* Buckley, Proc. Ent. Soc. Philad., 6:166. ☿ ♀
1893 *Camponotus marginatus discolor* Emery, Zool. Jahrb. Syst., 7:277. ☿ ♀ ♂
1917 *Camponotus caryae discolor* Wheeler, Psyche, 24:28.

Records: Ames, Boone.

This subspecies apparently has the same nesting habits as *nearcticus*. It is rarer in Iowa than *nearcticus*.

8. *Camponotus* (*Myrmentoma*) *caryae subbarbatus* Emery

1893 *C. marginatus subbarbatus* Emery, Zool. Jahrb. Syst., 7:676: ☿ ♀ ♂
1917 *C. caryae subbarbatus* Wheeler, Psyche, 24:28.

Records: Ames, Boone.

The two colonies of this rare ant that the writer has found have been under or in rotting wood in the ground. It may thus prove to have different nesting habits than the tree-dwelling *nearcticus* and *discolor*.

Several forms of *caryae* other than the four above were included in the writer's preliminary list. These were based on old, faded or otherwise poor material reposing in the Iowa State College collection. The author has decided that their identifications are too doubtful to be included in the present paper.

3. Paratrechina

Key to Species of Paratrechina

1. Scapes with erect hairs; yellow ..... 1. *P. arenivaga*
   Scapes without erect hairs; black ..... 2. *P. parvula*

1. *Paratrechina (Nylanderia) arenivaga* (Wheeler)

1905 *Prenolepis arenivaga* Wheeler, Bull. Amer. Mus. Nat. Hist., 21:391. ☿ ♂
1925 *Paratrechina (N.) arenivaga* Emery, Gen. Insec., fasc. 183:221.

Records: Sioux City, Blencoe, Little Sioux.

A rather common member of the Missouri River bluff fauna but not found in any other part of the state. It builds small crater nests in the loess soil of these bluffs.

2. *Paratrechina (Nylanderia) parvula* (Mayr)

1870 *Prenolepis parvula* Mayr. Verh. Zool.-bot. Ges. Wien, 20:948. ☿ ♂ ♀
1925 *Paratrechina (N.) parvula* Emery, Gen. Insec., fasc. 183:222.

Records: Ames, Clinton, Inwood, Dubuque, DeWitt.

This species is fairly common in Iowa. It usually nests under rocks in sunny places. The sexual phases apparently overwinter in the nests since they may be found in the nests in early spring.

4. Prenolepis

1. *Prenolepis imparis* (Say)

1836 *Formica imparis* Say, Boston Jour. Nat. Hist., 1:287. ♀ ♂
1886 *Prenolepis imparis* Mayr, Verh. Zool.-bot. Ges. Wien, 36:431.

Records: Ames, Backbone State Park, Clinton.

The sexual casts of *P. imparis* overwinter in the nest and fly in the first warm days of spring. This ant is common in woodlands and also in our cities and towns. It rarely appears above ground except in cool, damp weather.

5. Lasius

Key to Species of Lasius

1. Maxillary palpi 6-jointed 2
   Maxillary palpi 3-jointed (subgenus *Acanthomyops*) 7
2. Last three joints of maxillary palpi subequal in length; eyes large 3
   Last two joints shorter than the fourth joint; eyes small 4
3. Erect hairs present on the scapes ..... 1. *L. niger neoniger*
   Erect hairs lacking on the scapes ..... 2. *L. niger americanus*
4. Scapes not reaching the posterior corners of the head ..... 3. *L. brevicornis*
   Scapes surpassing the posterior corners of the head 5
5. Scapes slightly surpassing the posterior corners of the head; last joint of maxillary palpi as long as the preceding joint; light yellow in color ..... 4. *L. flavus nearcticus*
   Scapes distinctly surpassing posterior corners; last joint of maxillary palpi shorter than preceding joint; color darker (subgenus *Chthonolasius*) 6
6. No or very few erect hairs on gula or legs; gastric pubescence sparse revealing the shining surface ..... 6. *L. umbratus epinotalis*
   Erect hairs present on gula and legs; gastric pubescence dense ..... 5. *L. umbratus aphidicola*
7. Hairs plumose at the distal ends ..... 10. *L. plumopilosus*
   Hairs simple or only feebly barbellate 8
8. Petiole blunt; erect hairs numerous on all femora ..... 9. *L. latipes*
   Petiole sharper and notched above; erect hairs not present on all femora 9
9. Scapes surpassing posterior corners of the head; penultimate joints of funiculi longer than broad ..... 8. *L. interjectus*
   Scapes not or scarcely surpassing posterior corners of the head; penultimate joints slightly broader than long ..... 7. *L. claviger*

1. *Lasius* (*Lasius*) *niger neoniger* Emery

1893 *L. niger* var. *neoniger* Emery, Zool. Jahrb. Syst., 7:639. ☿ ♀ ♂

Records: Ames, Marshalltown, Princeton, Spirit Lake.

This species could probably be found in every square mile in Iowa except along the Missouri River bluffs. It may be our commonest species.

2. *Lasius* (*Lasius*) *niger americanus* Emery

1893 *L. niger* var. *americanus* Emery, Zool. Jahrb. Syst., 7:639. ☿ ♀ ♂
1917 *L. niger alienus* var. *americanus* Wheeler, Proc. Amer. Acad. Art. Sci. Boston, 52:525.

Records: Ames, Clinton.

The paucity of records is due to neglect in collecting the species. In all probability it is at least the second commonest ant in Iowa. It does not thrive well in our cities and towns as *neoniger* does.

Lasius (*Lasius*) *brevicornis* Emery

1893 *L. brevicornis* Emery, Zool. Jahrb. Syst., 7:639. ☿ ♀ ♂

Records: McGregor, Sabula.

This species seems rare in Iowa although undoubtedly many more collections could be made in the northeastern part of the state. It does not occur near Ames.

4. *Lasius (Lasius) flavus nearcticus* Wheeler

1906 *L. flavus nearcticus* Wheeler, Psyche, 13:38.

Records: Ames, Belle Plaine, Spirit Lake.

Apparently rather rare in Iowa. It is found in woodlands under rocks or logs in moist soil. The color of this species is usually given as very light yellow with the gaster whitish. In the writer's opinion the whiteness of the gaster is caused by fading in alcohol. Although somewhat lighter than *umbratus aphidicola,* the true color of *nearcticus* is as dark as that of *brevicornis.*

5. *Lasius (Chthonolasius) umbratus aphidicola* (Walsh)

1862 *Formica aphidicola* Walsh, Proc. Ent. Soc: Philad., 1:310. ☿ ♂
1893 *Lasius umbratus mixtus* var. *aphidicola* Emery, Zool. Jahrb. Syst., 7:640. ☿ ♀ ♂

Records: Ames, Tama, Rice Lake State Park, Sabula, Belle Plaine, Clinton, Marshalltown.

The writer has found a female of *aphidicola* with a depauperate colony of *flavus nearcticus.* This seems to indicate that *nearcticus* is the host or at least an alternate host of *aphidicola.*

6. **Lasius (Chthonolasius) umbratus** subsp. **epinotalis** n. subsp.

WORKER. Length, 3.5 mm.

Head a little longer than broad, with straight posterior border and moderately convex sides. Mandibles 8–9-toothed. Scapes extending beyond posterior corners of head by about one-fourth of their length. Penultimate joints of funiculi a little longer than broad. Eyes with approximately 65 facets. Epinotum usually rounded and without a distinct angle between the base and declivity, the declivity not greatly longer than the base. Petiole cuneate in profile, ordinarily sharp and excised above. Legs rather elongate.

All surfaces shining, especially the gaster. Erect hairs somewhat thicker and longer than on *aphidicola.* Hairs on head and thorax rather long and flexuous, those on the gaster shorter, straight, and numerous. No or very few hairs on gula and legs. Pubescence moderately dense on head and thorax but not concealing the shining surface; rather sparse on the gaster.

Head and thorax sordid yellow; gaster sometimes infuscated.

Described from twenty-six specimens taken under a rock in wooded pasture land near Bellevue, Iowa, June 17, 1941.

The rounded epinotum of this subspecies is very suggestive of the species of the subgenus *Acanthomyops.* All other species of the subgenera *Lasius* s. str. and *Chthonolasius* known to the writer have a more angular epinotum with the declivity usually much longer than the base.

L. epinotalis appears closely related to *aphidicola,* but the longer, more slender antennae, less angular epinotum, smaller eyes, sparser pub-

escence, longer, less fine, rather flexuous erect hairs, which are lacking on gula and legs, and smaller size show it to be distinct.

L. umbratus speculiventris may be easily distinguished from *epinotalis* by the numerous erect hairs on scapes and legs, and lack of pubescence on the gaster. *L. umbratus subumbratus* is perhaps most closely related to *epinotalis* but differs in its larger size, more angular epinotum, somewhat more numerous hairs and pubescence, and in having hairs on the gula. The antennae of *subumbratus* are a little less slender, the eyes a little smaller, and the promesonotum a little more convex, also.

In the author's unpublished thesis this subspecies is described under the manuscript name *L. lucidiventris.*

7. *Lasius (Acanthomyops) claviger* (Roger)

1862 *Formica clavigera* Roger, Berl. Ent. Zeitschr., 6:241. ♀
1870 *Lasius (A.) claviger* Mayr, Verh. Zool.-bot. Ges. Wien, 20:950. ☿ ♀ ♂

Records: Ames, Burlington, Muscatine, Bellevue, Sabula, Boone, Belle Plaine, Inwood, Backbone State Park, Marshalltown.

This species is common in woodlands all over the Mississippi River drainage area. Very probably it is parasitic on *Lasius niger neoniger.* Wedding flights take place in late August, September, and even October. Females can sometimes be found in early spring under logs and rocks. These are always without eggs or larvae and probably are females which failed to find a suitable host colony after their wedding flight the previous fall.

8. *Lasius (Acanthomyops) interjectus* Mayr

1866 *L. (A.) interjectus* Mayr, Verh. Zool.-bot. Ges. Wien, 16:888. ♀
1886 *L. (A.) interjectus* Mayr, Verh. Zool.-bot. Ges. Wien, 36:430. ☿ ♀ ♂

Records: Ames, Boone, Clinton. Also Sioux City (C. N. Ainslie); Des Moines (collector ?).

This species has been previously reported (Buren, 1941a) as undertaking wedding flights in warm basements in midwinter. Females taken in similar circumstances in Des Moines have been sent to the Department of Zoology and Entomology, Iowa State College. The normal wedding flight takes place in July or early August.

9. *Lasius (Acanthomyops) latipes* (Walsh)

1862 *Formica latipes* Walsh, Proc. Ent. Soc. Philad., 1:311. ☿ ♀ ♂
1866 *Lasius (A.) latipes* Mayr. Verh. Zool.-bot. Ges. Wien, 16:889.
1903 *Lasius (A.) latipes* Wheeler and McClendon, Biol. Bull., 4:149–155. Female α female β.

Records: Ames, Clinton, Spirit Lake.

This species seems rather rare in Iowa. At least the writer has had poor luck in finding it. The wedding flights take place in August, sometimes on the same day as its probable host, *Lasius niger neoniger.*

10. *Lasius (Acanthomyops) plumopilosus* Buren

1941 *L. (A.) plumopilosus* Buren, Iowa State Coll. Jour. Sci., 15(3):231–235. ☿ ♀ ♂

Type locality: Backbone State Park.

This species may prove to be a temporary social parasite of *L. (A.) claviger*, which would make it one of the rare social hyperparasites. Since the publication of the original description the writer has failed to find this species in any other place except on the hillside where it was first found. There appear to be two or three nests of *plumopilosus* and six or more nests of *claviger* on this hillside.

6. Formica

Key to Species of Formica

1. Second and third funicular joints together little longer than the first, the third never longer than the penultimate; small shining species (subgenus *Proformica*) 2
   Third funicular joint longer or as long as the penultimate, second and third joints together usually distinctly longer than the first; mostly medium to large-sized species; often opaque or the colors red and black 5
2. Scapes with erect hairs ..... 26. *F. neogagates vetula*
   Scapes without erect hairs 3
3. Gaster yellow or tan like the head and thorax ..... 28. *F. neogagates morbida*
   Gaster black or very dark brown 4
4. Whole body black or very dark brown ..... 25. *F. neogagates*
   Thorax lighter than the head and gaster ..... 27. *F. neogagates vinculans*
5. Median joints of funiculi 1½ times or more as long as broad; head and thorax long and slender (subgenus *Neoformica*) 6
   Median joints of funiculi less than 1½ times as long as broad; head and thorax usually more robust (subgenus *Formica* s. str.) 9
6. Erect hairs present on gula and petiole; hairs on gaster slender 7
   Erect hairs absent on gula and petiole; hairs on gaster shorter and blunter 8
7. Hairs on gula and petiole conspicuous; pubescence on gaster longer and denser ..... 30. *F. pallidefulva dolosa*
   Hairs often lacking on gula or petiole; pubescence on gaster shorter and sparser; color usually darker ..... 29. *F. pallidefulva incerta*
8. Head and thorax brown or reddish ..... 31. *F. pallidefulva nitidiventris*
   Head and thorax black or very dark brown ..... 32. *F. pallidefulva fuscata*
9. Clypeus with an anterior median notch (*sanguinea* group) 10
   Clypeus unnotched 13
10. Few or no hairs on dorsal surfaces of head and thorax 11
    Erect hairs present on upper surfaces of head and thorax 12
11. Dorsal surfaces of head infuscated, or the head at least darker than the thorax; both dark red ..... 21. *F. sanguinea aserva*
    Head not darker than the thorax; both lighter red ..... 24. *F. sanguinea subnuda*
12. Gaster brown ..... 23. *F. sanguinea subintegra*
    Gaster black ..... 22. *F. sanguinea rubicunda*
13. Ground color of head and thorax red, although sometimes heavily infuscated; frontal area smooth and shining 14
    Ground color of head and thorax black or at least not red; frontal area pubescent and rather opaque; hairs on gaster blunt (*fusca* group) 28
14. Head deeply excised behind (*exsecta* group) 27
    Head at most feebly excised behind 15
15. Petiole blunt, rather truncate or excised above 16
    Upper border of petiole convexly or angularly produced, although sometimes with a notch in the middle 17
16. Eyes hairy ..... 13. *F. reflexa*
    Eyes hairless ..... 12. *F. dakotensis montigena*

17. Erect hairs and pubescence nearly absent; gaster strongly shining..10. *F. fossaceps*
Erect hairs or pubescence more numerous; integument more opaque.....18
18. Clypeal fossae deep; gaster rather sparsely pubescent, the surface not concealed.19
Clypeal fossae shallow; gaster often densely pubescent.....20
19. Smaller workers infuscated, majors and medium-sized workers with at least the scale of the petiole infuscated .....9. *F. rufa clivia*
Smaller workers hardly darker than the majors, these with the petiole clear red .....8. *F. rufa obscuriventris*
20. Erect hairs absent from dorsal surfaces of head and gaster.....11. *F. prociliata*
Erect hairs present on the dorsa of head and gaster 21
21. Eyes hairy, erect hairs numerous 22
Eyes hairless, erect hairs moderately abundant or sparse 24
22. Erect hairs present on cheeks, oblique hairs on scapes.....14. *F. knighti*
No erect hairs on cheeks, no hair other than the pubescence on scapes; large robust forms 23
23. Pubescence dense on gaster, concealing the surface.....6. *F. rufa obscuripes*
Pubescence scarce on gaster .....7. *F. rufa melanotica*
24. Gaster rather shining, sparsely pubescent.....17. *F. nepticula*
Gaster opaque, densely pubescent 25
25. Hairs apparently clavate; cheeks densely pubescent.....26
Hairs slender; cheeks sparsely pubescent .....18. *F. difficilis*
26. Hairs numerous, present on occipital corners of head....15. *F. microgyna spatulata*
Hairs sparse, not present on occipital corners.....16. *F. indianensis*
27. Front and vertex of head heavily infuscated; pronotum with numerous erect hairs .....20. *F. ulkei*
Head not or scarcely infuscated; pronotum with no or very few hairs.....
.....19. *F. exsectoides*
28. Long erect hairs present on the gula.....5. *F. cinerea neocinerea*
Gula without erect hairs 29
29. Thorax yellowish .....4. *F. fusca neoclara*
Thorax black 30
30. Pubescence long and dense on all parts, giving a silvery appearance.....
.....3. *F. fusca argentea*
Pubescence shorter or less dense; body without a silvery appearance.....31
31. Pubescence dense on the gaster .....1. *F. fusca subsericea*
Pubescence on gaster rather sparse; body more shining..2. *F. fusca subaenescens*

1. *Formica (Formica) fusca subsericea* Say

1836 *F. subsericea* Say, Boston Jour. Nat. Hist., 1:289. ☿ ♀
1913 *F. (Formica) fusca* var. *subsericea* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:398, 499. ☿ ♀ ♂
1925 *F. (Serviformica) fusca subsericea* Emery, Gen. Insec., Fasc. 183:248.

Records: Ames, Clinton, Jewell, Spirit Lake, Backbone State Park, Carroll, Mt. Vernon, Oak Grove State Park. Also Sioux City (C. N. Ainslie).

This ant is common in all woodlands and in our cities and towns. It is the host of a number of parasitic *Formica*.

2. *Formica (Formica) fusca subaenescens* Emery

1893 *F. fusca* var. *subaenescens* Emery, Zool. Jahrb. Syst., 7:659. ☿
1913 *F. (F.) fusca fusca* var. *subaenescens* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:399, 504. ☿ ♀ ♂

Record: Backbone State Park.

This variant is an inhabitant of deep woods where it nests in damp soil under rocks and logs. Apparently it is rare or absent in central Iowa where woodlands are rather scattered and usually somewhat open. *F.*

subaenescens may be the normal host of *Polyergus rufescens bicolor,* as will be shown in the discussion of the latter.

3. *Formica (Formica) fusca argentea* Wheeler

1902 *F. fusca* var. *argentata* Wheeler, Amer. Nat., 36:952 (in footnote). ☿ (nom. praeocc.)
1912 *F. fusca* var. *argentea* Wheeler, Psyche, 19:90. (nom. nov.)
1913. *F. (Formica) fusca fusca* var. *argentea* Wheeler, Bull. Mus. Comp. Zool., Cambridge, 53:398, 501. ☿ ♀ ♂
53:398, 501. ☿ ♀ ♂
1925 *F. (Serviformica) fusca subsericea* var. *argentea* Emery, Gen. Insec., fasc. 183:248.

Record: Stanhope (from prairie) (G. O. Hendrickson).

This species was probably a member of the original prairie fauna which has now been displaced in a large part by cultivation.

4. *Formica (Formica) fusca neoclara* Emery

1893 *F. fusca* var. *neoclara* Emery, Zool. Jahrb. Syst., 7:661. ☿
1913 *F. (Formica) fusca fusca* var. *neoclara* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:398, 509. ☿ ♀ ♂
1925 *F. (Serviformica) fusca subsericea* var. *neoclara* Emery, Gen. Insec., fasc. 183:248.

Record: Sioux City (C. N. Ainslie).

The validity of this record is somewhat doubtful as this variant is usually found only in the foothills of the Rocky Mountains. The writer suspects the specimens purported to be from Iowa may have been mislabeled.

5. *Formica (Formica) cinerea neocinerea* Wheeler

1902 *F. cinerea* Wheeler, Amer. Nat., 36:947.
1910 *F. cinerea* var. *neocinerea* Wheeler, Ants, p. 571. ☿
1913 *F. (Formica) cinerea cinerea* var. *neocinerea* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:399, 524. ☿ ♀ ♂
1925 *F. (Serviformica) cinerea* var. *neocinerea* Emery, Gen. Insec., fasc. 183:246.

Records: Jewell, Ames, Spirit Lake.

This ant prefers to nest in the tops of boggy hummocks in pasture land, and probably could be found in any part of the state where such hummocks are present. It is more aggressive than the forms of *fusca.*

6. *Formica (Formica) rufa obscuripes* Forel

1886 *F. rufa st. obscuripes* Forel, Ann. Soc. Ent. Belg., 30 (C.R.):29. ☿
1913 *F. (F.) rufa aggerans* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:392, 394, 430. ☿ ♀ ♂
1940 *F. rufa obscuripes* Creighton, Amer. Mus. Nov., 1055:1, 7.

Records: Oak Grove State Park, Inwood, McGregor, Spencer. Also Ruthven (J. B. Low); Thompson (T. S. Baskett); Ocheyedan, Stanhope, Thompson, Westfield (G. O. Hendrickson).

This ant is often called the "thatching ant" because of the large

mound nest composed of twigs and other plant debris which these ants construct. All specimens from Iowa show more melanism, even in the largest workers, than is common in specimens of *obscuripes* from the Great Plains. Thus they may be considered transitional to the following variant, *melanotica.*

7. *Formica (Formica) rufa melanotica* Emery

1893 *F. rufa obscuriventris* var. *melanotica* Emery, Zool. Jahrb. Syst., 7:644, 650. ☿
1913 *F. (F.) aggerans* var. *melanotica* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:392, 394, 432. ☿ ♀ ♂
1940 *F. (F.) rufa melanotica* Creighton, Amer. Mus. Nov., 1055:1, 7.

Record: Denison.

The several nests of this variant near Denison were found in pasture land densely covered by scrub oaks so that all nests were shaded. This is in contradistinction to the nests of the form the writer has referred to *obscuripes,* whose nests were chiefly in virgin prairie, or at least exposed to the sun.

8. *Formica (Formica) rufa obscuriventris* Mayr

1870 *F. rufa obscuriventris* Mayr, Verh. Zool.-bot. Ges. Wien, 20:951. ☿
1913 *F. (Formica) rufa obscuriventris* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:392, 394, 445. ☿ ♀ ♂

Records: Backbone State Park, Dubuque, Muscatine, Mt. Vernon.

This variant constructs its nests in old, dry, rotted stumps or logs, filling up the cavities with plant debris. It is very fierce and aggressive in the defense of its nest, like *obscuripes* and *melanotica.* In macroscopic aspect, color, size, aggressiveness, nesting habits, etc., this ant is almost identical with *F. sanguinea aserva.*

9. *Formica (Formica) rufa clivia* Creighton

1917 *F. (F.) rufa obscuriventris* var. *aggerans* Wheeler, Proc. Amer. Acad. Arts Sci., 52:540.
1940 *F. (F.) rufa clivia* Creighton, Amer. Mus. Nov., 1055:8.

Records: Spirit Lake. Also Okoboji (F. S. Stancliffe).

The erect hairs of this variant seem rather deciduous. Therefore single workers are not easily identified. The nests found by the writer were under rocks banked with plant debris. This variant is apparently rare in Iowa, as it is more properly a member of Merriam's Transition Zone. The writer has not seen any specimens from Iowa which he considers intergrades between *clivia* and *obscuriventris,* although, according to Creighton (1940a), they occur in Minnesota.

10. *Formica (Formica) fossaceps* Buren

1942 *F. fossaceps* Buren, Iowa State Coll. Jour. Sci., 16(3):402-405. ☿ ♀ ♂

Type locality: Winterset.

The temporary host of this species is probably *F. fusca subsericea.*

11. *Formica (Formica) prociliata* Kennedy and Dennis

1937 *F. prociliata* Kennedy and Dennis, Ann. Ent. Soc. Amer., 30:531. ☿ ♀ ♂

Records: Sabula, Bellevue, Winterset, Denison, Inwood.

This species lives in fairly populous colonies and constructs a low, flattened mound of earth about 2 or 3 feet in diameter. At Gotham, Wisconsin, the author found a female of *prociliata* which had been adopted by a depauperate colony of *F. (neoformica) pallidefulva nitidiventris*. *F. nitidiventris* may, therefore, be considered as the host or at least an alternate host of *prociliata*.

12. *Formica (Formica) dakotensis montigena* Wheeler

1904 *F. montigena* Wheeler, Bull. Amer. Mus. Nat. Hist., 20:374. ☿ ♀ ♂
1913 *F. (F.) dakotensis* var. *montigena* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:391, 394, 463. ☿ ♀ ♂

Record: Cherokee County (Prof. H. E. Jaques' Nat. Hist. Survey).

The writer has not taken specimens of this species from Iowa but has seen a specimen belonging to this form and collected in Iowa in the National Museum.

13. *Formica (Formica) reflexa* Buren

1942 *F. reflexa* Buren, Iowa State Coll. Jour. Sci., 16(3):399-402. ☿ ♀ ♂

Record: Spirit Lake.

Several colonies of this interesting species were taken at the above locality. In each case the colony consisted of only a few *reflexa* workers but numerous workers of the host, *F. fusca subsericea*. As the writer has stated (1942), this species may possibly be a nondulotic, permanent social parasite. This type of parasitism has been hitherto unknown in the genus *Formica*.

14. **Formica (Formica) knighti** n. sp.

WORKER. Length of major worker, 7.5 mm.

Head, excluding mandibles, about as broad as long, with posterior border feebly excised in the middle, the posterior corners rounded, and sides slightly convex; scarcely narrower in front than behind. Mandibles 8-toothed. Clypeus rather angularly produced. Frontal area small, much wider than high. Frontal carinae evenly diverging, their length equal to twice the diameter of the antennal foramina. Eyes hairy. First funicular joint one-fourth again as long as the second, the second slightly longer than the third, and each joint to the penultimate in turn slightly longer than the succeeding, the second almost one-half again as long as the penultimate. Promesonotal outline strongly convex. Mesoepinotal impression deep and wide in large workers; marked by sutures before and behind. Declivity of epinotum a little longer than the base, meeting the latter with an angle of approximately 120–130 degrees. Petiole cuneate in profile, anterior and posterior faces weakly convex. Superior border

rather sharp; seen from behind angularly produced upward but usually notched at the tip.

All surfaces opaque except the frontal area, which is smooth and shining, and the mandibles, which are moderately shining and longitudinally striate.

Erect hairs numerous, short, bristle-like, yellow, usually pointed at the tip but on the thoracic dorsum and gaster sometimes blunt or slightly clavate. Hairs present on all regions, even a few on the cheeks; few, however, on the gula. The numerous hairs on the scapes and legs short and strongly oblique or subappressed. Pubescence dense in all regions.

Ground color of head and thorax yellowish red, but usually heavily infuscated with black, even in the largest workers. Smaller workers have the head and thorax nearly as black as the gaster.

Described from numerous workers taken from a single nest near Bonaparte, July 13, 1941. The nest was located in pasture land covered with a rather dense growth of scrub oaks. The nest was well hidden under low bushes, and considerable plant debris had been used in the construction of a low dome, immediately under which were numerous workers and the brood.

This species has about the same coloration as *F. postoculata* Kennedy and Dennis but does not seem closely related to it. *F. postoculata* has no hairs on the eyes, and no pilosity on the scapes or tibiae. It is much smaller in size, and there are several other differences in pilosity and in the shape of the head and thorax.

F. knighti appears most closely related to *F. impexa* Wheeler, which it strongly resembles in the number and arrangement of the hairs. *F. knighti* may be distinguished immediately from *impexa* by the color of the head and thorax, which is deep red in *impexa* and scarcely infuscated except in the smaller workers. The head of *impexa* is less robust, more slender, and narrower in front; the clypeus is less produced and is rounded in front; the thorax appears less robust, and the mesoepinotal constriction is shallow and narrow; the petiole is blunter and more rounded when seen from behind; the erect hairs are blunt or clavate, and the hairs on the scapes and legs are blunter and erect. The erect hairs on the gaster are more numerous and larger and more conspicuous in *impexa*. The pubescent hairs also seem a little denser but shorter on *impexa*. The eyes of *impexa* are not distinctly hairy as in the new species. *L. knighti*, incidentally, is one of the few microgynous species with hairy eyes.

Since the queen is unknown, there is no actual evidence that *knighti* is a microgynous species, but its general habitus and close resemblance to *impexa* lead the writer to believe so. It is certainly distinct from any species in the *rufa* group known to the author. *F. knighti* would perhaps key down to *F. oreas* Wheeler in Wheeler's key to the *Formica* (1913), but workers of *oreas* may be distinguished immediately by the extremely abundant, very fine white hairs covering all parts. Many other differences show that *oreas* is not closely related to *knighti*.

F. knighti is probably a temporary social parasite of *F. fusca subsericea*.

I take great pleasure in dedicating this species to Dr. H. H. Knight, Professor of Entomology, Iowa State College.

In the author's unpublished thesis, this species had a manuscript name.

15. **Formica (Formica) microgyna** subsp. **spatulata** n. subsp.

WORKER. Length of largest worker, 7.0 mm.

Head a little longer than broad, with slightly convex posterior border and sides, somewhat narrower in front than behind. Clypeus subangularly produced. Basal funicular joints longer than penultimate joints. Pro- and mesonotum moderately convex. Mesoepinotal impression shallow. Epinotum rounded, the declivity rather gently sloped. Petiole narrow, blunt, and angularly produced upward, the apex sometimes truncated or notched, however.

Nearly all surfaces opaque. Frontal area shining. Erect hairs short, spatulate, becoming very wide and flattened toward the apex; rather abundant on nearly all surfaces, including the occipital corners. Not present on scapes or tibiae. The tips of the hairs appear somewhat frayed under high power of the binoculars. Pubescence dense and fine on all parts, adding to the opaque appearance.

Head and thorax orange-red to brownish red, apparently depending on the age of the individual. Gaster black.

FEMALE. Length, 5.7 mm.

Head much smaller than in major worker, posterior border more rounded. Eyes a little smaller in absolute size, but larger and more convex in proportion to the head. Thorax narrower than the head, elongate. Epinotum rather sloping. Petiole much as in the worker.

Less opaque than in the worker. Erect hairs spatulate but much longer than in the worker; present on the same regions. Pubescence dense.

Ground color of head and thorax yellowish red, but these regions, especially the dorsal surfaces, rather infuscated. Gaster black. Wings pale.

MALE. Length, 7.0 mm.

Mandibles pointed, edentate. Thorax narrower than the head. Petiole blunt, not or only slightly notched. Erect hairs somewhat more abundant than in the female, a little shorter, and only feebly spatulate. Pubescence sparser than in the female. Color black, with tibiae and tarsi yellowish. Wings pale hyaline.

Two nests of this form were found under rocks along the shore of a small lake near Spirit Lake, Iowa (type locality). Also included in the type series are some specimens (workers and females) from Wheaton, Minnesota.

This ant seems to be another geographical race of the widely distributed *Formica microgyna* Wheeler. *Spatulata* is more slender-bodied than most of these variants, the promesonotal outline is less convex, and the epinotum is more obtuse. The hairs are quite short and are more widened and flattened toward the apex than in any of the *microgyna* variants seen by the author.

From typical *microgyna, spatulata* may be easily distinguished by the lack of erect hairs on the scapes and the more spatulate hairs on the body, as well as the more slender body, less convex promesonotum, and more obtuse epinotum. From *microgyna rasilis,* with which it is perhaps most closely related, *spatulata* may be distinguished by the more numerous erect hairs and their presence on the occipital corners of the head, as well as the body proportions mentioned above. The same differences will also apply to *F. querquetulana* Kennedy and Dennis.

The female of *spatulata* is somewhat more slender-bodied than females of *microgyna, microgyna rasilis,* and *querquetulana,* and the same differences in pilosity mentioned for the workers are applicable. The petiole of the *spatulata* female is narrower than that of the *querquetulana* female.

F. microgyna spatulata may be distinguished immediately from all other Iowa species of *Formica* by the beautiful, dull, orange-red color of the head and thorax, which is especially striking in the younger workers.

The temporary host is *Formica fusca subsericea* Say, specimens of which were found in one of the Spirit Lake nests.

16. *Formica (Formica) indianensis* Cole

1940 *F. indianensis* Cole, Amer. Midl. Nat. 23:224-226. ☿ ♂

Record: Oak Grove State Park.

The author has taken 24 workers from at least two nests on a virgin prairie remnant at Oak Grove State Park. Stray workers were picked up, but the actual nests were not found and must have been small and well hidden.

The writer has taken a series of workers from a single nest at Inwood, Iowa, which shows all possible intergradations with *F. nepticula. F. indianensis* must therefore be closely related to *nepticula* in spite of their dissimilar appearance.

F. indianensis is probably a temporary social parasite of *F. fusca subsericea* or possibly *F. fusca argentea.*

17. *Formica (Formica) nepticula* Wheeler

1905 *F. nepticula* Wheeler, Bull. Amer. Mus. Nat. Hist., 21:270. ☿ ♀ ♂
1913 *F. (F.) nepticula* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:394, 396, 475. ☿ ♀ ♂

Record: Denison.

The nests of this species are usually located in and under small rotting limbs; some plant debris is used. Winged females were found in a nest in July.

18. *Formica (Formica) difficilis* Emery

1893 *F. rufa difficilis* Emery, Zool. Jahrb. Syst., 7:651. ☿ ♀ ♂
1913 *F. (F.) difficilis* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:395, 477. ☿ ♀ ♂

Records: Boone, Ames, Bellevue.

On a smaller scale, the nest architecture is like that of *F. rufa obscuriventris*. *F. difficilis* is more timid and less aggressive than many ants of the *rufa group*. Its host is undoubtedly some form of *F. pallidefulva* Latreille.

19. *Formica (Formica) exsectoides* Forel

1886 *F. exsectoides* Forel, Ann. Soc. Ent. Belg., 30(C.R.):38. ☿ ♀
1913 *F. (F.) exsectoides exsectoides* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:396, 481. ☿ ♀ ♂

Records: Inwood, Denison, Mt. Vernon.

This species does not seem to thrive well in Iowa. The mounds that the writer has seen were rather small and scarcely conical. *F. exsectoides* often lives in huge aggregate colonies consisting of numerous mounds. In Iowa the writer has been unable to find more than a single mound in any one locality.

20. *Formica (Formica) ulkei* Emery

1893 *F. ulkei* Emery, Zool. Jahrb. Syst., 7:653. ☿
1913 *F. (F.) ulkei* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:396, 485. ☿ ♀ ♂

Record: Spirit Lake.

F. ulkei is apparently not common in any part of its range, and in Iowa must be very rare even in the northern part. The colony found by the writer was rather depauperate.

21. *Formica (Formica) sanguinea aserva* Forel

1901 *F. sanguinea aserva* Forel, Ann. Soc. Ent. Belg., 45: 395. ☿ ♀
1913 *F. (Formica) sanguinea aserva* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:389, 404. ☿ ♀ ♂
1925 *F. (Raptiformica) sanguinea aserva* Emery, Gen. Insec., fasc. 183:260.

Record: Rice Lake State Park.

This form has a rather boreal distribution. The writer has found it to be common in Minnesota and Wisconsin, but it seems rare even in the northern portions of Iowa. This ant is very fierce and aggressive but does not have dulotic habits. Its favorite nesting sites are old rotting stumps, a certain amount of plant debris being used around the base and in the large cavities.

22. *Formica (Formica) sanguinea rubicunda* Emery

1893 *F. sanguinea rubicunda* Emery, Zool. Jahrb. Syst., 7:647. ☿ ♀
1913 *F. (Formica) sanguinea rubicunda* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:390, 406. ☿ ♀ ♂
1925 *F. (Raptiformica) sanguinea rubicunda* Emery, Gen. Insec., fasc. 183:260.

Records: Dennison, Ames, Sabula, Oak Grove State Park, Clinton.

This ant is much more common in woodlands than *subintegra* but does not live in cities or towns. This is another example of how civilization has changed the fauna, reducing the numbers of some species, increasing those of others.

23. *Formica* (*Formica*) *sanguinea subintegra* Emery

1893 *F. sanguinea rubicunda* var. *subintegra* Emery, Zool. Jahrb. Syst., 7:648. ☿ ♀
1913 *F. (Formica) sanguinea subintegra* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:390, 410. ☿ ♀ ♂
1925 *F. (Raptiformica) sanguinea subintegra* Emery, Gen. Insec., fasc. 183:260.

Records: Ames, DeWitt.

This form seems to thrive well in lawns in cities and towns, unlike *rubicunda*, which is never found in such a situation. It is common within Ames, and the writer has also seen it at Clinton.

24. *Formica* (*Formica*) *sanguinea subnuda* Emery

1895 *F. sanguinea rubicunda* var. *subnuda* Emery, Zool. Jahrb. Syst., 8:335. ☿
1913 *F. (Formica) sanguinea subnuda* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:389, 409. ☿ ♀ ♂
1925 *F. (Raptiformica) sanguinea subnuda* Emery, Gen. Insec., fasc. 183:260.

Record: Sioux City (C. N. Ainslie).

Represented by six specimens found in the collection of the late C. N. Ainslie.

The epinotum is angulate in these specimens as in the preceding forms. They do not agree in this particular with Emery's description of *subnuda* (1894), and therefore may not actually be *subnuda*. For the present the writer prefers to regard them as such. The pilosity is the same as that of *aserva*, but *aserva* has a much darker colored and broader head.

25. *Formica* (*Proformica*) *neogagates* Emery

1893 *F. fusca subpolita* var. *neogagates* Emery, Zool. Jahrb. Syst., 7:661. ☿ ♀ ♂
1913 *F. (P.) neogagates neogagates* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:400, 536. ☿ ♀ ♂

Records: Ames, Tama, Spirit Lake.

A rather rare species. Only two small nests have been found under stones near Ames. The Tama and Spirit Lake records are from single specimens whose nests could not be located.

The specimens listed as *neogagates* in the writer's preliminary list (1941a) are *neogagates vinculans*.

26. *Formica* (*Proformica*) *neogagates vetula* Wheeler

1895 *F. lasioides* var. *picea* Emery, Zool. Jahrb. Syst., 8:335. ☿ (nom. praeocc.)
1912 *F. (P.) neogagates lasioides* var. *vetula* Wheeler, Psyche, 19:90. (nom. nov.)
1913 *F. (P.) neogagates lasioides* var. *vetula* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:400, 540. ☿

Records: Ames, Rice Lake State Park, Strawberry Point, Decorah, Inwood.

This ant seems to be the commonest form of *neogagates* in Iowa. It lives in small colonies in woodlands.

27. *Formica (Proformica) neogagates vinculans* Wheeler

1913 *F. (P.) neogagates* var. *vinculans* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:400, 539. ☿ ♀

Records: Ames, Inwood.

This ant is rather common in lawns in Ames, a situation where the typical *neogagates* does not occur. The nests are rather small but more populous than the nests of typical *neogagates* seen. The ants will swarm out to defend their nests if provoked.

28. *Formica (Proformica) neogagates morbida* Wheeler

1913 *F. (P.) neogagates* var. *morbida* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:400, 538. ☿ ♀

Type locality: Lennox (P. J. Schmitt).

The writer does not possess specimens of this form but has seen the types in the Museum of Comparative Zoology at Cambridge, Mass.

29. *Formica (Neoformica) pallidefulva incerta* Emery

1893 *F. pallidefulva schaufussi* var. *incerta* Emery, Zool. Jahrb. Syst., 7:655. ☿ ♀ ♂
1913 *F. (N.) pallidefulva schaufussi* var. *incerta* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:401, 554. ☿ ♀ ♂

Records: Ames, Clinton, Tama, Holy Cross, Rice Lake State Park, Inwood.

A common form in Iowa. There is considerable variation in color in the Iowa specimens. Some are as light as *pallidefulva schaufussi* Mayr, others as dark as *pallidefulva nitidiventris*. Nevertheless, the Iowa specimens almost always have the erect hairs lacking on the gula, and so all have been referred to *incerta*. The writer is convinced that *nitidiventris* can always be distinguished from incerta by its lack of both gular and petiolar hairs, and by its shorter, blunter gastric hairs, in spite of the frequent convergence in color.

30. *Formica (Neoformica) pallidefulva dolosa* Wheeler

1904 *F. pallidefulva schaufussi* var. *meridionalis* Wheeler, Bull. Amer. Mus. Nat. Hist., 20:370. ☿ (nom. praeocc.)
1912 *F. pallidefulva schaufussi* var. *dolosa* Wheeler, Psyche, 19:90. (nom. nov.)
1913 *F. (N.) pallidefulva schaufussi* var. *dolosa* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:401, 554. ☿ ♀

Record: Glenwood.

This is a southern variant which apparently has managed to creep its way northward into Iowa only along the Missouri River bluffs.

F. pallidefulva dolosa is the only *Formica* which was found living on these bluffs. This is what one would expect if the Missouri River bluffs really have a southern fauna as has been contended. The genus *Formica* is poorly represented in the South.

31. *Formica (Neoformica) pallidefulva nitidiventris* Emery

1893 *F. pallidefulva nitidiventris* Emery, Zool. Jahrb. Syst., 7:656. ☿ ♀ ♂
1913 *F. (N.) pallidefulva nitidiventris* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:401, 555. ☿ ♀ ♂

Records: Ames, Sabula, Oak Grove State Park, Princeton.
A common woodland form.

32. *Formica (Neoformica) pallidefulva fuscata* Emery

1893 *F. pallidefulva* var. *fuscata* Emery, Zool. Jahrb. Syst., 7:656. ☿ ♂
1913 *F. (N.) pallidefulva nitidiventris* var. *fuscata* Wheeler, Bull. Mus. Comp. Zool. Cambridge, 53:401, 557. ☿ ♀

Records: Ames, Clinton, Sabula, Holy Cross.
This form may have no validity other than as a mere color variety of *nitidiventris*. The females can scarcely be separated.

7. Polyergus

KEY TO SPECIES OF POLYERGUS

1. Gaster pubescent 2
   Gaster smooth and shining; pubescence very sparse ..... 1. *P. lucidus*
2. Gaster red like the head and thorax ..... 2. *P. rufescens breviceps*
   Gaster black ..... 3. *P. rufescens bicolor*

1. *Polyergus lucidus* Mayr

1870 *P. lucidus* Mayr, Verh. Zool.-bot. Ges. Wien, 20:952. ☿ ♀ ♂

Record: Backbone State Park.
This species probably has its western limit in Iowa. The slave of the colony found at Backbone State Park was *F. (Neoformica) pallidefulva incerta*. The ants listed as *lucidus* in the writer's preliminary list are *rufescens breviceps*.

2. *Polyergus rufescens breviceps* Emery

1893 *P. rufescens breviceps* Emery, Zool. Jahrb. Syst., 7:666. ☿

Records: Ames. Also Sioux City (C. N. Ainslie).
This ant is fairly common in lawns in Ames, and the writer has seen it also within Clinton, Des Moines, and Davenport. It does not seem to occur, or at least must be very rare, outside city limits. In this peculiar preference it parallels *Formica sanguinea subintegra*.

3. *Polyergus rufescens bicolor* Wasmann

1901 *P. rufescens bicolor* Wasmann, Allg. Zeitschr. f. Ent. Neudamm, 6(N):23. ☿ ♀ ♂

Record: Backbone State Park.
A single female with a swollen gaster was taken at Backbone State

Park. She had been adopted by a medium-sized nest of *Formica fusca subaenescens*. Colonies found by the writer at Akeley and Jenkins, Minnesota, also had the same species as the slave.

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