shows very little variation in color. The apical half of elytra is always darker than the basal half, in some specimens, however, the dark color becomes gradually paler towards apex. While in some specimens all the striæ are equally and distinctly impressed and geminate, in others the alternate striæ are more faint than the rest and the intervals are nearly equal. These latter must resemble the Central American *striatus* and *insolitus* which were described each from a single specimen.

9. **Læmophlœus denticornis Casey,** Trans. Am. Ent. Soc., Vol. XI, p. 94.

I am unable to find any difference between a specimen of this species from Texas in my collection and the description and figure of the Central American *L. addendus* Sharp.*

THE NORTH AMERICAN FORMS OF CAMPONOTUS FALLAX NYLANDER.†

BY WILLIAM MORTON WHEELER.

BOSTON, MASS.

Among the ants common to Eurasia and North America, *Camponotus fallax* Nyl. is as noteworthy for its ability to form local races and varieties as it is for the monotony of its habits. Unlike the much larger *C. herculeanus* L., which exhibits a similar though less pronounced variability, it shows little or no tendency to invade alpine or boreal regions, but seems to have a decided preference for the warmer or subtropical portions of the north temperate zone. In the Old World it is not uncommon in Japan, northern India, central and southern Europe; in America it occurs throughout the United States, but is most abundant on the Gulf coast. I have seen no specimens from the colder portions of British America or from higher elevations in the Rocky Mountains.

For many years *C. fallax* has been passing in the literature as *C. marginatus* Latreille, but Emery has recently shown that the species should bear the name originally given by Nylander to speci-

* Biol. Cent. Am. Col., Vol. II, pt. 1, p. 529, pl. XVI, fig. 24.

† Contributions from the Entomological Laboratory of the Bussey Institution, Harvard University, No. 31.

mens taken at Montpellier, in southern France, whereas the true *marginatus* of Latreille is a variety of *æthiops* Fabr. and belongs to the group of *maculatus* Fabr. The typical *fallax* has since been repeatedly described from France, Austria, Germany, Switzerland, southern Russia and various localities along the Mediterranean littoral. No less than six different forms of the species have been recorded from Asia. Three of these (var. *quadrinotatus* Forel, subsp. *vitiosus* F. Smith and subsp. *brunni* Forel) occur in Japan, a variety *himalayanus* Forel is recorded from an altitude of 2,160 m. in the Himalayas, another, *lameerei* Emery, from Tashkent, in Turkestan, and an undescribed variety is mentioned by Ern. André as occurring in the Amur region of Siberia. A small form, var. *ruzskyi,* closely resembling the North American var. *minutus,* has been described by Emery from Sarepta, in southern Russia, Ruzsky has described a var. *kamensis* from eastern Russia and a var. *hyalinipennis* Costa is known to occur in Sardinia. Although attention was called to the great variability of the species in North America by Forel as early as 1879 and by Mayr in 1886, Emery was the first to attempt a revision of our forms. In 1893 he enumerated and described two subspecies and six varieties from the United States. Among the many American specimens of *C. fallax* which have been accumulating in my collection during the past decade, I have been able to recognize all but two of these forms and have also found four others which are described below.

The following is a description of the typical European *fallax:*

Worker major.—Length 7–9 mm.

Head nearly as broad as long, subrectangular, a little broader behind than in front, with broadly and feebly excised posterior margin, convex dorsal and concave gular surface. Mandibles convex, 4–5-toothed. Clypeus with lateral borders slightly diverging anteriorly, somewhat convex but scarcely carinate in the middle; anterior border distinctly notched in the middle, slightly produced on each side as a blunt point. There is a deep dimple in the head near the middle of each lateral clypeal border. Frontal carinæ lyrate; frontal area and groove distinct. Eyes rather large, flattened. Antennal scapes slender at the base, gradually enlarged distally, reaching a little beyond the posterior corners of the head. Thorax narrower than the head, broader in front, laterally compressed behind, in profile evenly arched above; epinotum rounded above, declivity concave below. Petiole nearly as broad as the posterior end of the epinotum, but not as high, its anterior surface convex, its posterior surface flat, margin sharp and, seen from behind, rounded and entire or very faintly

sinuate in the middle above. Gaster elongate elliptical. Legs rather long, with stout femora.

Surface shining, finely and densely shagreened, more coarsely on the head and most superficially on the gaster, so that the head, especially in front, is subopaque. In addition to this sculpture the upper surface of the head is covered with small foveolæ, or coarse punctures, which are most abundant on the cheeks. Mandibles densely striatopunctate. Upper surface of pro- and mesonotum covered with small, indistinct punctures.

Hairs and pubescence pale, very sparse, the former long and erect, the latter visible only on the cheeks, mandibles, antennæ and gaster. Legs, except for a few hairs at the tips of the femora, naked.

Head, thorax and gaster black or piceous; mandibles, antennæ, borders of the thoracic sclerites and sometimes the whole thorax darker or paler chestnut brown. Legs brown or yellowish, sometimes variegated with fuscous. Thin posterior borders of gastric segments yellow.

Worker minor.—Length 4–6 mm.

Differing from the worker major in the smaller head, relatively longer antennæ and blunter petiolar border. The head is more shining and the foveolæ on the cheeks are indistinct. The clypeus is more convex and carinate or subcarinate in the middle.

Female.—Length 9.5–10.5 mm.

Resembling the worker major. Head broader than the thorax. Body black; mandibles, antennæ and legs reddish brown; wings rather strongly suffused with yellowish-brown; veins and stigma pale yellowish-brown.

Male.—Length 6.5–7.5 mm.

Head about as broad as long, with straight, subparallel cheeks and broader, rounded postocular region. Anterior border of clypeus nearly straight, without a median notch. Mandibles without large punctures. Body black, shining; antennal funiculi, mandibles, articulations of the thorax and legs reddish or brownish. Pubescence very dilute and inconspicuous; hairs long, sparse, almost absent on the head and thorax, most abundant on the gaster. Wings like those of the female.

C. fallax is readily distinguished from our other species of *Camponotus* by its smaller size and the distinct notch in the anterior border of the clypeus in the worker and female phases. In the southwestern states there are several other species (*sayi* Emery, *hyatti* Emery, *texanus* Wheeler and *schaefferi* Wheeler) which are very closely related to *fallax*, but differ in size or coloration or in the structure of the thorax. Emery also enumerates as belonging to the *fallax* group, *C. tepicanus* Pergande and *nitidus* Norton of Mexico; the Mediterranean species *sicheli* Mayr, *lateralis* Oliv., *gestroi* Emery, *universitatis* Forel and *interjectus* Mayr of Turkestan.

The habits of the European *fallax* are described by Forel in his "Fourmis de la Suisse" as follows:

"*C. marginatus* [*fallax* Nyl.] lives in small formicaries and is very timid. Roger, too, says that it is very timid and adds that it is found throughout Germany on old oaks. I have seen only four nests. The first was found near Zürich at the end of a dead oak branch about 10.5 m. above the ground. The tree had been recently felled so that I was able to study the nest at my leisure. The dead branch was scarcely 5–6 cm. in diameter and the dead wood had acquired a somewhat corky consistency. There was no hole at the broken end, but there were two oval openings on the side near the end of the branch. Two galleries, starting from these holes, united with each other at a depth of 4 cm., whence a sinuous central gallery ran back through the axis of the branch to a depth of about a decimeter and terminated in three ampullæ in the form of chambers, whose inner surface was not more than two square centimeters. During its course this gallery sent off scarcely more than three or four short lateral galleries, each of which also ended in a chamber. The chambers and galleries were somewhat flattened in the same plane, that is to say, their transverse section was generally elliptical. This was the entire nest of these ants, a nest containing about 150 workers and their larvæ. A second nest of the same size and very similar construction was found at Vaud wholly in the corky layer of the bark of a huge walnut, near the roots. A third nest was also found near Vaud in an old post. I believe that it had been established by the workers, which were still bringing to it their larvæ and companions. They were descending an old pear tree which had evidently been their former residence. I did not open this nest. The fourth and largest nest of *marginatus* which I was able to examine was in the garden of the insane asylum at Vienna in one of the larger dead branches of a *Paulownia*. This branch was two decimeters in diameter. The ants had three exits, first, a main opening which was made on the cut side of a secondary branch (dead also, of course), second a smaller opening in an abrasion in the bark of the main branch, distant about a meter from the first, and a third, very small opening corresponding to the central or pith cavity of a small, broken twig, which came off directly from the main branch between the two other orifices. As the tree was felled soon after I had discovered this nest, I broke up the branch and was able to examine both the nest and the colony. The latter, consisting of workers, females, males

and larvæ, may have comprised about a thousand individuals. The nest was composed first of the central, cylindrical cavity of the main branch, corresponding to the pith cavity, and second, of concentric stories corresponding to the layers of the wood. Each of these stories was very low but very extensive and formed a single great labyrinthine hall rather than a number of separate chambers. The stories communicated with one another and with the central cavity and outer openings only by means of narrow passages. Strange to relate, the nest was concentrated in the median layers of wood, the outer layers being perforated only by the galleries of exit, the principal one of which opened, moreover, through the central cavity on the cut surface of the secondary branch. All the wood which served the ants for protection was very hard." Several European authors mention the occurrence of *C. fallax* also in hard, woody oak galls.

In 1879 Forel broached the question as to whether the American forms of *fallax* have the same habits as the European type of the species. From many personal observations, especially on the forms *nearcticus, minutus, pardus, rasilis* and *discolor,* and from notes of correspondents on other forms, I am able to answer Forel's question in the affirmative. Our forms are all very timid ants, living in small communities in galleries and chambers which they excavate in dead wood and according to the same pattern as those described by the Swiss myrmecologist. Usually the wood of standing trees is preferred by the ants, probably because this is in the immediate vicinity of their food supply, which consists very largely of the excreta of aphids and coccids on the leaves and bark. The oak is a favorite tree in America just as it is in Europe, probably because in addition to nourishing a large number of *Kermes* and other phytophthorous Homoptera, its leaves and galls give off a sweet secretion in very small droplets that can be lapped up by the ants. The cavities of the hard galls of *Holcaspis,* which cling long to the oak twigs, are favorite nesting places, especially for incipient colonies of the forms *discolor* and *rasilis* which abound on the live oaks (*Quercus virginiana*) of Texas and the other Gulf States. In the northern states *nearcticus* is also fond of oaks and chestnuts, but in the warm pine barrens of southern New Jersey, it is quite common in dead branches of the pitch pine (*Pinus rigida*) or in its old cones that have fallen

to the ground. Even the stalks of the common elder (*Sambucus canadensis*) are sometimes tenanted, but the more woody bushes and trees are preferred. Near the roots of oaks I have found colonies of *rasilis* under stones, but these colonies may have been occupying merely temporary nests.

When kept in artificial nests, our forms of *fallax* are as stupid and monotonous in their behavior as the European form observed by Forel. The ants huddle together in one of the chambers and show little inclination to move about, even when the weather is warm. Besides feeding and caring for their young, they show little interest in their environment or in one another.

The North American forms of *fallax* may be arranged in two series, one of which has the cephalic sculpture and pilosity of the European type, *i. e.*, with the head and especially the cheeks of the workers and females covered with small, rather shallow foveolæ which bear very minute, inconspicuous and appressed hairs, whereas the other comprises forms in which the cheeks and clypeus have deeper and more elongate, comma-shaped foveolæ, each bearing an erect hair, or bristle, so that the anterior portion of the head is rough and hirsute. Each of these series presents a number of color variations grading from black forms to those in which the body, with the exception of the whole or a portion of the gaster, is yellow or red, and these color gradations seem to run parallel with each other in such a manner that a subspecies or variety with a particular type of coloration and with piligerous foveolæ corresponds with a form of similar coloration but without piligerous foveolæ. This is shown in the following table which begins with the darkest and ends with the palest forms:

With piligerous foveolæ:	Without piligerous foveolæ:
cnemidatus	*nearcticus*
paucipilis	*minutus*
clarithorax	*tanquaryi*
	pardus
	decipiens
subbarbatus	*rasilis*
discolor	*pavidus*

This table also roughly indicates the distribution of the various

forms. *C. nearcticus* is the most abundant and with *minutus* usually the only form to be found in the northern states and southern British America. Though recorded from Florida it is certainly rare and sporadic in that state. The pale *rasilis, pavidus* and *discolor* are, on the other hand, the prevailing and most abundant forms in the Gulf States. In the intermediate region, notably in the Mississippi Valley and central Atlantic states, we find *decipiens, subbarbatus, tanquaryi* and *pardus,* which have an intermediate coloration.

Since the various subspecies and varieties of *fallax* are based on the stature, sculpture, pilosity and coloration of the major worker and female, it is often difficult to identify single minor workers; and male specimens, unaccompanied by workers or females, cannot, with certainty, be referred to their respective subspecies and varieties. As an aid in identifying the major workers of the North American forms that have been recognized up to the present time I subjoin the following table:

1. Cheeks and clypeus with elongate, piligerous foveolæ.....8
   Cheeks and clypeus without such foveolæ.....2
2. Body black, thorax at most only partially red, average length 6.5 mm. var. *nearcticus* Emery.
   Of a different color 3
3. Both head and thorax reddish-brown or yellowish-red.....6
   The head largely dark brown or black.....4
4. Average length 5.5 mm. 5
   Average length 7 mm. .....var. *tanquaryi* var. nov.
5. Thorax dark red, head and gaster black.....var. *minutus* Emery.
   Thorax ivory yellow, spotted with brown, base of gaster often banded with yellow .....var. *pardus* var. nov.
6. Average length 6–6.5 mm. 7
   Average length 8 mm. .....subsp. *rasilis* subsp. nov.
7. Gaster yellow at the base.....var. *pavidus* var. nov.
   Gaster black throughout .....var. *decipiens* Emery.
8. Piligerous foveolæ few on the cheeks, usually absent on the clypeus.....9
   Both cheeks and clypeus with numerous piligerous foveolæ.....10
9. Yellowish-brown, gaster paler, with brown bands..subsp. *subbarbatus* Emery.
   Brownish-black .....var. *paucipilis* Emery.
10. Head blackish-brown 11
    Head and thorax yellowish-red.....subsp. *discolor* Emery.
11. Thorax blackish .....var. *cnemidatus* Emery.
    Thorax red .....var. *clarithorax* Emery.

1. Camponotus fallax fallax Nyl. var. nearcticus Emery.

C. marginatus Latr. var. *nearcticus* Emery, Zool Jahrb. Abth. f. Syst. VII,

1893, p. 675 ♀☿; Wheeler, Bull. Amer. Mus. Nat. Hist. XXI, 1905, p. 403; Occas. Papers Bost. Soc. Nat. Hist. VII, 7, 1906, p. 24.

Worker major.—Length 5.5–7.5 mm.

Very similar to the specific type from Western Europe but averaging smaller. Body shining; finely shagreened, more coarsely on the head and thorax, which therefore appear a little more opaque than the gaster. Clypeus subopaque, sometimes subcarinate in the middle. Front and sides of head with small and rather shallow, scattered foveolæ. Thorax evenly arched above, moderately broad in front, laterally compressed behind; pronotum flattened above, with a faint median impression; epinotum with feebly convex base and concave declivity, passing over into each other through a rounded angle. Petiole slightly narrower than the posterior end of the epinotum, compressed anteroposteriorly, with feebly convex anterior and posterior surfaces and rather sharp, entire upper and lateral border.

Pubescence scattered, indistinct except on the gaster. Hairs long, very sparse. Cheeks and clypeus without erect hairs. Scapes and legs naked.

Black; cheeks, mandibles, legs, antennæ, petiole, articulations of the thorax and petiole and sometimes also the pronotum deep reddish-brown. In some specimens the clypeus is also more or less reddish, the scapes, middle portions of the femora and tibiæ more or less blackish.

Worker minor.—Length 4–5.5 mm.

Differing from the worker major in the shape and smaller size of the head, the more pronounced clypeal carina, proportionally longer antennæ, less arcuate thorax and the absence or very feeble development of the foveolæ on the anterior portion of the head.

Female.—Length 8–9 mm.

Like the soldier except in the structure of the thorax. Wings tinged with yellowish or brown; veins and stigma yellowish.

Male.—Length 5.5–7 mm.

Clypeus carinate, with straight, entire anterior border; cheeks straight, subparallel, about as long as the eyes; head behind the eyes broad and rounded. Body shining; anterior portion of the head without foveolæ. Erect hairs sparse, absent except on the clypeus and gaster. Color black, appendages sometimes more or less reddish, with pale articulations. Wings like those of the female.

Emery mentions this form as occurring in New York, District of Columbia, Pennsylvania, Florida and California. I have examined a large number of specimens from the following localities:

New York: West Farms (J. Angus); Niagara Falls; Brooklyn, in maple tree; Staten Island (W. T. Davis); Ithaca and Albany (N. Y. State Coll.).

New Jersey: Lakehurst, in branches and dead cones of *Pinus rigida* (Wheeler); Clementon (J. C. Bradley); Cumbridge County and Boonton (H. Viereck).

Pennsylvania: St. Vincent (Jerome Schmitt); Harrisburg, Tinicum Island and Camhill (H. Viereck).

Connecticut: Colebrook (Wheeler).

Massachusetts: Chestnut Hill, Boston (Wheeler); Nahant (Möring); Cambridge (J. G. Jack); Essex County and Springfield (G. B. King); Warwick (Miss Edmonds).

Rhode Island: Providence (Davis).

Illinois: Rockford (Wheeler); Urbana (J. L. Pricer).

Wisconsin: White Fish Bay (C. E. Brown).

Nebraska: Crete (Wheeler).

Washington: Olympia (F. Kincaid).

Idaho: Market Lake (J. M. Aldrich).

Oregon: Corvallis (Amer. Mus. Nat. Hist.).

California: Shasta County.

Texas: Toronto, Brewster County (Wheeler).

Florida: Atlantic Beach (Mrs. A. T. Slosson).

British America: Toronto, Canada (R. J. Crew).

Examination of workers of the typical *fallax* from Austria, Bulgaria, France and the Crimea convinces me that Emery was right in regarding this variety as distinguishable from the European type only in the smaller average stature of the workers and female. The maximum size of the worker major of the typical *fallax* is given by Mayr and Forel as 9 mm.; the female is said by Emery to average 10 mm.

2. C. fallax fallax var. minutus Emery.

? Formica americana Buckley, Proc. Ent. Soc. Phila., VI, 1866, p. 154, ☿ ♀.

Camponotus marginatus var. *minutus* Emery, Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 676, ☿ ♀; Wheeler, Bull. Amer. Mus. Nat. Hist., XXI, 1905, p. 403; Occas. Papers Bost. Soc. Nat. Hist., VII, 7, 1906, p. 24.

Worker major.—Length 5.5–6 mm.

Differing from *nearcticus* in its smaller size and in having the thorax and petiole red or yellowish, sometimes darker behind. The legs and antennæ, too, are paler, the mandibles, sides and lower surface of the head red or brown. Petiole convex in front, flattened behind.

Worker minor.—Length 3.5–5 mm.

Very similar to the worker major in color and sculpture. Petiole with blunter margin.

Female.—Length 6.5–7.5 mm.

Like the worker major; thorax red, with the scutellum and a large antero-median blotch and two elongate parapsidal blotches on the mesonotum black. Pronotum clouded with fuscous or black. In some specimens the dark mark-

ings on the upper surface of the thorax are more or less confluent. First and second gastric segments each often with a broad, red or yellowish, transverse band above. Antennæ red, funiculi infuscated towards their tips. Legs red or yellowish.

Male.—Length 6–6.5 mm.

Indistinguishable from the male of *nearcticus* except, perhaps, by its slightly smaller average stature.

The types of this variety came from the District of Columbia, Maryland, Missouri and New Jersey. I have examined specimens from the following localities:

New Jersey: Great Notch and Cumbridge County (H. Viereck); Ramapo Mts. and Lakehurst (Wheeler and W. T. Davis).

New York: Jamaica, L. I. (N. Y. State Coll.).

Pennsylvania: St. Vincent (Jerome Schmitt).

Massachusetts: (Geo. B. King).

Illinois: Rockford (Wheeler).

British America: Canada (J. G. Jack); Vancouver (Mus. Comp. Zool.).

This variety, which is merely a paler and depauperate form of *nearcticus,* is extremely variable in color. A number of worker specimens in my collection from Bronxville, N. Y., have two dark spots on the pronotum and have the epinotum more or less infuscated above. They form a transition to the next variety. A series of forms taken by the Rev. Jerome Schmitt at St. Vincent, Pa., and comprising all four phases, have the larger stature of *nearcticus* with the coloration of *minutus.* Some of the females of this series have the thorax entirely black above, others have the characteristic maculation of *minutus.* The workers, too, are highly variable in color.

3. C. fallax fallax var. pardus, new variety.

C. marginatus subbarbatus Wheeler, Bull. Amer. Mus. Nat. Hist., XXI, 1905, p. 403.

This form has the small dimensions of *minutus* but the thorax, legs and antennæ of the worker major and minor are ivory yellow, the thoracic dorsum with dark brown spots, the legs and antennæ variegated with brown. The head has the anterior portion brownish, the cheeks, clypeus and mandibles ivory yellow. In some major workers the yellow runs back some distance in clouds between the eyes and the frontal carinæ. In many specimens the middle portions of the first and second gastric segments are more or less yellowish. The female measures 8 mm. and has the thorax, petiole and legs clay yellow; the thorax has the black markings of the *minutus* female, with

two yellow spots on the scutellum. The tarsi and ends of the tibiæ and femora are brown. The anterior portion of the head is red or yellow, the antennæ dark red. The male is indistinguishable from that of *minutus*.

Described from numerous specimens of all four phases from the following localities:

New York: Bronxville, Mosholu and White Plains, nesting in hollow stems of elder and dead oak branches (Wheeler); West Farms (J. Angus); Jamaica, L. I. (G. von Krockow).

New Jersey: Lakehurst (Wheeler); Riverton (E. Daecke); Westville (Jerome Schmitt).

The coloration of this variety is highly variable even in the same colony. Some of the major workers have the gaster entirely black, while others have the two basal segments largely yellow. The maculation of the thorax is also rather inconsistant. Workers from one colony taken at Lakehurst, N. J., have the spots very indistinct and the head brown or yellowish like the thorax, so that they seem to form a transition to the var. *decipiens*. The specimens from New York and New Jersey referred to *subbarbatus* in my "Annotated List of the Ants of New Jersey," p. 403, belong to the variety here described.

4. C. fallax fallax var. tanquaryi, new variety.

Worker major.—Length 7–7.5 mm.

Head and clypeus black; cheeks, antennæ and mandibles, except the teeth, deep red; apical half of antennal funiculi infuscated. Thorax varying from rich yellowish red to dark brown, legs paler. Gaster black, basal half of first segment and a narrow band across the base of the second segment yellow. Body shining; foveolæ on the cheeks and sides of the head numerous and distinct.

Worker minor.—Length 4.5–6 mm.

Differs from the major worker in having the mesothorax and epinotum black or infuscated. Petiole dark red or brown; yellow bands on gaster more restricted and less conspicuous or almost absent.

Female.—Length 7.5–8.5 mm.

Differing from the major worker in having the epinotum and upper surface of the thorax dark brown or black, the pleuræ more or less spotted with brown or brown throughout, the legs dark brown and the band on the second gastric segment faint or lacking. In some specimens the first segment is entirely black. Wings colorless, with yellowish veins and stigma.

Male.—Length 5–5.5 mm.

Differing from the males of the preceding varieties only in having the legs somewhat more reddish, except the middle portions of the femora and

tibiæ, which are black. Wings colorless, with dilute yellow veins and stigma. The head, thorax and petiole have a few long, erect hairs and those on the gaster are rather abundant.

Described from a number of specimens of all four phases belonging to a single colony captured by Mr. Maurice Tanquary in an old stump near Urbana, Ill. In coloration, though not in size, this variable form seems to represent a transition between *minutus* and *decipiens*.

5. C. fallax fallax var. decipiens Emery.

C. marginatus var. *decipiens* Emery (in part), Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 676, ☿ ♀.

Worker major.—Length 5.5–7 mm.

Head, thorax, petiole and appendages brownish-red; gaster black, with pale yellow margins to the segments. In some specimens the middle of the head and anterior border of the cheeks are dark brown. Sculpture and pilosity as in the preceding varieties.

Worker minor.—Length 4.5–5 mm.

Resembling the worker major in color but the posterior portion of the head is often deep red or brown and the petiole is more or less infuscated.

Female.—Length 8–9 mm.

Resembling the worker major. Scutellum, a large anteromedian and two elongate parapsidal blotches on the mesonotum, black or dark brown. Head sometimes infuscated in the middle behind. Wings yellowish, with yellow veins and stigma.

Male.—Length 6 mm.

Indistinguishable from the male of *nearcticus*.

I have seen specimens of this variety from the following localities:

Indiana: Cotype worker minor (Emery).

Kansas: Douglas, in bee-hive with bee-moths (E. S. Tucker and Miss Clara Klaumann).

Colorado: Colorado Springs, running on trunk of cotton-wood (Wheeler).

Utah: Mill Creek (R. V. Chamberlin).

Emery also includes Texas among the localities, but the specimens which he cites from this state really belong to a distinct and larger though very similar form, which is described below as subsp. *rasilis*. The type locality of *decipiens* is therefore Indiana. The specimens from Mill Creek, Utah form a transition to *rasilis*, because the females and workers are decidedly larger than those of the typical *decipiens*.

6. C. fallax rasilis, new subspecies.

C. marginatus var. *decipiens* Emery (in part), Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 676, ☿ ♀.

Worker major.—Length 7.5–9 mm.

Resembling the var. *decipiens* in color but decidedly larger. Head, thorax, petiole, antennæ and legs rich yellowish red; gaster black, extreme base of first segment and sometimes the venter deep red; mandibles sometimes red, teeth black, anterior margins of cheeks and clypeus somewhat infuscated. Antennal funiculi red throughout.

Worker minor.—Length 4–6 mm.

Colored like the worker major but the lighter portions are often more yellowish.

Female.—Length 9.5–10.5 mm.

Colored like the worker major; margin of the scutellum and sometimes also the metanotum blackish. Wings yellowish, with yellow veins and stigma.

Male.—Length 6.5–7 mm.

Closely resembling the males of the preceding varieties; gastric segments narrowly yellowish at the base; antennal funiculi brown; articulations of the legs yellowish; wings as in the female.

My series of specimens represents the following localities:

Texas: Austin, New Braunfels, Marble-Falls, and Granite Mt. in woody galls of *Holcaspis cinerosa* on *Quercus virginiana;* also in logs and branches of the same tree (Wheeler); Barksdale (Brown); Victoria, in twigs of willow (W. D. Hunter and J. D. Mitchell); Langtry (Wheeler); Kerrville (F. C. Pratt), Llano (J. C. Crawford), Tyler (R. C. Howell), Calvert (C. R. Jones).

Arizona: Tucson (Wheeler).

Louisiana: Keatchie (W. Newell).

Florida: Miami (Wheeler); Sanford (Jerome Schmitt).

I regard this form as a distinct subspecies on account of its large size and the constancy of its coloration. This constancy is the more noteworthy because it is one of the most abundant ants in portions of the Southern States.

7. C. fallax rasilis var. pavidus, new variety.

Worker major.—Length 6–7 mm.

Coloration of head, thorax, petiole and appendages as in *rasilis* but the base of the gaster clay yellow. In most specimens the first and second segments are of this color throughout but in others only the base of the first segment is yellow and the remainder of the gaster is black. Antennal funiculi scarcely infuscated towards their tips.

Worker minor.—Length 4–5 mm.

Colored like the major worker and exhibiting the same variations.

Female.—Length 8.5 mm.

Colored like the major worker; thorax yellowish-red throughout, only the border of the scutellum being somewhat infuscated. In one specimen the

posterior border of the second gastric segment is black; in another only the base of the second segment is yellow. Wings very faintly tinged with yellow, with dilute yellow veins and stigma.

Described from specimens taken in the following localities:

Texas: Victoria, in twig galls on burr oak (J. D. Mitchell); Dallas (Schwarz, Pratt and Hunter); Calvert (C. R. Jones); Liberty (E. S. Tucker); Austin, running on the bark of *Salix nigra* (Wheeler).

Louisiana: Logansport, on *Cratægus* (E. S. Tucker).

Florida: Jacksonville and Atlantic Beach (Mrs. A. T. Slosson).

While this variety is easily distinguished from *rasilis* by its smaller size and in having the base of the gaster yellow in the female and workers, there is nevertheless considerable variation in the latter character. The ergatotypes from Victoria, Texas, and the gynetype from Calvert, Texas, have the two first gastric segments entirely yellow. A series of workers from Austin has only the base of the first segment yellow. The specimen from Atlantic Beach, Fla., a female, is much larger than the type and measures 9.5 mm. It has a black margin to the first gastric segment and the second is reddish only at the base. This specimen may, therefore, be regarded as representing a transition to the true *rasilis*.

8. C. fallax subbarbatus Emery.

C. marginatus subsp. *subbarbatus* Emery, Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 676, ☿♀♂.

Worker major.—Length 6–6.5 mm.

Head and thorax finely and densely punctate and more opaque than in any of the preceding forms. Gaster superficially shagreened and shining. Cheeks with a few elongate foveolæ each bearing a short, stiff hair. Clypeus with few or no foveolæ. Head and thorax dirty, brownish yellow, pleuræ and posterior portions of head and thorax somewhat darker and more ferruginous. Gaster black or dark brown; first and second segments each with a very broad transverse broad band. In some specimens the first segment is yellowish or brownish throughout.

Worker minor.—Length 3.5–6 mm.

Coloration and sculpture as in the worker major. Piligerous foveolæ of the cheeks very few and indistinct.

Female.—Length 8–9 mm.

Head and thorax varying from reddish-brown to blackish. A large antero-median and two elongate parapsidal blotches on the mesonotum, the meso- and metapleuræ, scutellum and epinotum blackish. Petiole and gaster black or dark brown, the latter with the anterior and posterior margins of the three

basal segments yellow. Antennæ brown throughout; legs paler and more yellowish. Wings rather strongly suffused with yellow; veins and stigma brownish-yellow. Head and pleuræ subopaque, finely and densely punctate; elongate piligerous punctures on the cheeks and clypeus like those of the worker major. Thoracic dorsum and gaster shining.

Male.—Length 5–5.5 mm.

Head and thorax densely and finely punctate and less shining than in any of the preceding forms; cheeks and gula, as well as the gaster and upper surface of the head and thorax with rather long, scattered hairs. Black; antennal funiculi, tarsi and articulations of legs brown. Wings colored like those of the female.

The types are from the District of Columbia. I have seen specimens of all four phases from the following localities:

Virginia: (Emery).

New Jersey: Cumbridge County (H. Viereck); Lakehurst (Wheeler).

Illinois: Urbana (J. L. Pricer).

California: Los Angeles (Emery).

9. C. fallax subbarbatus var. paucipilis Emery.

C. marginatus subsp. *subbarbatus* var. *paucipilis* Emery, Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 677, ☿♂.

This variety, which I have failed to recognize among my specimens, is described by Emery as follows:

"A few workers from Washington, D. C. have the color and shining surface of *nearcticus*, but a very few bristle-bearing foveolæ on the cheeks. A male accompanying these workers resembles *nearcticus* more closely than *subbarbatus*.

"Mr. Pergande writes me that this form always occurs on living oaks, whereas the former occur only on dead trees."

10. C. fallax discolor Buckley.

Formica discolor Buckley, Proc. Ent. Soc. Phila., VI, 1866, p. 166, ☿☿.

Camponotus marginatus var. *discolor* Mayr, Verh. Zool. bot. Ges. Wien., XXXVI, 1886, p. 365; Dalla Torre, Catalog. Hymenopt., VII, 1893, p. 242.

C. marginatus subsp. *discolor* Emery, Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 277, ☿☿♂; Wheeler, Trans. Tex. Acad. Sci., IV, 2, 1902, p. 7.

Worker major.—Length 6.5–7.5 mm.

Color the same as in *rasilis*. Antennal funiculi often infuscated towards their tips. Surface shining, head more opaque in front, finely and densely punctate; mandibles, cheeks and clypeus with numerous elongate foveolæ bearing short, stubby hairs. Mesonotum convex, epinotal angle in profile much rounded. Petiole thick, strongly convex in front, flattened behind, upper border sometimes with a faint median impression.

Worker minor.—Length 3.5–5.5 mm.

Resembling the worker major in color and sculpture, but the head is more shining in front and the piligerous punctures on the cheeks and clypeus are less numerous and conspicuous.

Female.—Length 9.5–10 mm.

Like the worker major, but the mandibles, cheeks and clypeus seem to be even more densely covered with piligerous foveolæ. Metanotum and scutellum entirely black, or the latter is merely bordered with black. There is a small black spot at the insertion of each pair of wings. Tibiæ and tarsi sometimes brownish. Wings strongly suffused with yellow, with brownish-yellow veins and stigma.

Male.—Length 5.5–8 mm.

Resembling the male of *subbarbatus* but the thorax and head, except in front, are more shining, and the mandibles, cheeks and clypeus have longer and more numerous foveolæ and bear more numerous hairs. Body black; antennal funiculi and tarsi brown; wings whitish with pale yellow veins and stigma.

The types of this subspecies came from Texas. I have seen many specimens from the following localities:

Texas: Austin and Delvalle in woody galls of *Holcaspis cinerosa* on *Quercus virginiana* (Wheeler); Clebourne (O. P. Eastwood); Paris (Miss Augusta Rucker). Esperanza Ranch, Brownsville (C. Schaeffer), Llano (J. C. Crawford), Dallas (Jones & Hood); Corpus Christi (Jones & Pratt); San Antonio (F. C. Pratt).

Oklahoma: Ponca City (A. C. Burrill).

Missouri: Doniphan (Jerome Schmitt).

Illinois: Algonquin (W. A. Nason).

The habits of this form are the same as those of *rasilis*. It occurs in the same localities and sometimes on the same trees. It is constant in coloration and in possessing the elongate piligerous foveolæ on the cheeks and clypeus in all four phases.

11. C. fallax discolor var. clarithorax Emery.

C. marginatus subsp. *discolor* var. *clarithorax* Emery, Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 678, ☿♀♂.

Worker major.—Length 7–8 mm.

Head, mandibles, clypeus and antennæ uniformly chestnut brown or blackish; thorax yellowish-brown, sometimes darker behind; legs yellow; petiole dark brown; gaster black with yellowish margins to the segments. Head densely punctate or shagreened, subopaque, more shining behind; cheeks, clypeus and mandibles with distinct but more scattered elongate piligerous foveolæ than in *discolor*. Gula with numerous short hairs. Thorax somewhat more shining than the head but rather coarsely shagreened; gaster superficially

shagreened and therefore appearing more shining than any other portions of the body.

Worker minor.—Length 5–6 mm.

Closely resembling the worker major in color and sculpture, but the head is somewhat more shining in front and has fewer piligerous foveolæ on the cheeks and clypeus.

Female.—Length 8–8.5 mm.

Head black; antennal funiculi and mandibles, except their teeth, dark brown; thorax dark brown, pronotum, a large anteromedian and two elongate parapsidal blotches on the mesonotum, border of the scutellum, the petiole and the lower portions of the pleuræ, black. Legs yellow, tibiæ and tarsi brownish. Wings brownish, with pale yellowish brown veins and stigma. Sculpture and pilosity of the head as in the worker major.

Male.—Length 6–8 mm.

Resembling the male of *discolor*. Wings like those of the female.

This variety was first described from San Jacinto and Los Angeles, Cala. I have seen specimens from the following localities:

California: Los Angeles, worker minor cotype (Emery); Point Loma, San Diego, nesting in stems of manzanita (Percy Leonard); Whittier (A. H. Quayle); Felton, Santa Cruz Mts. and Three Rivers, (J. C. Bradley).

Illinois: Cherry Valley (Wheeler).

Pennsylvania: Beatty (Jerome Schmitt).

From the two latter states I have seen only a few major workers and these differ from the California forms in having the head more shining, but they are connected with the typical form by a soldier from Whittier, Cala., which has the head more shining than in the San Diego specimens, which are identical with the types.

12. C. fallax discolor var. cnemidatus Emery.

? Formica atra Buckley, Proc. Ent. Soc. Phila., VI, 1866, p. 160, ☿.

Camponotus marginatus subsp. *discolor* var. *cnemidatus* Emery, Zool. Jahrb. Abth. f. Syst., VII, 1893, p. 678, ☿.

This variety, which I have not seen, was based on worker specimens collected by Mr. Theo. Pergande at Washington, D. C. These resembled *clarithorax* in sculpture but were "piceous black throughout, with the mandibles, antennæ, tarsi, tibiæ and articulations of the legs reddish brown."