

WILLIAM L. BROWN

Reprinted from the ANNALS OF THE ENTOMOLOGICAL SOCIETY OF AMERICA
Vol. XXX, No. 3, September, 1937

**NEW ANTS FROM OHIO AND INDIANA, FORMICA
PROCILIATA, F. QUERQUETULANA, F. POSTOCULATA
AND F. LCONTEI, (FORMICIDAE: HYMENOPTERA)**

CLARENCE HAMILTON KENNEDY,
Ohio State University,
Columbus, Ohio

K + De 73A

AND

CLYDE A. DENNIS,
Tusculum College,
Greenville, Tenn.

The senior author with various graduate students has been actively interested in Ohio ants since 1929. The subject has presented two grave difficulties, the "variability" of the material and the use by myrmecologists of relative terms in practically all published descriptions. A phase of the latter is the apparent distaste of many students of ants for the laborious task of making illustrations. In the following pages we have attempted, where it appeared to be especially needed, a more exact statement of spacial relations, of pubescence, hairs, etc. Contours and outlines we have figured. Our last description is a comparison, but with the second commonest North American ant, available to all American students.

***Formica prociliata* n. sp.**

Holotype, nest queen, from nest No. 1436, Kennedy collection.

Total length 9 mm. (paratype queens 9-10 mm., pinned).

Head, width at eyes, 1.8 mm., at base of mandibles, 1.3 mm., length to tip of clypeus 1.8 mm.

With the general characters of the Rufa Group of *Formica* as given in Wheeler's key (pp. 387-388, 1913). Head square behind, sides converging below. No hairs on eyes. Frontal carinae less than twice the height of antennal socket; a shallow circular depression in frons on median line below middle ocellus; frontal area pubescent, shining, its upper side a right angle; clypeus without keel, lower edge evenly rounded, lower two-thirds of its convex surface vertically striate. Striate mandibles, 8-toothed. Maxillary palp as long as mandible, 6-segmented. Seen from above, antennal scape sinuate on both anterior and posterior contours; basal segments of funiculus almost as wide as seg. 9, the widest.

Contour of thorax shown in Fig. 1, of petiole in Fig. 9, the latter with acute edge above, squared top and angles (semioctagonal); face and clypeal hairs shown in Fig. 3.

All surfaces smooth and shining except mandibles, clypeus and antennae. All surfaces hairy, the hairs brownish yellow and varying

from a scattered appressed pubescence through intermediate lengths to long shaggy hairs with curled and hooked tips; the shortest of the pubescent type, in length, three times width of an ocellus of the compound eye, the long hairs equalling more than half the height of the petiole.

Hairs distributed as follows: mandibles hairy except on outer basal surface (not drawn in Figs. 3 and 4); antennae densely covered with short appressed hairs; clypeus with many very long hairs along its lower edge and over middle third of its surface some with curly tips equalling clypeus in length. Frontal area with 8-10 minute pubescent hairs. Remaining surfaces of head with pubescent-like hairs the interspaces greater than length of hairs (sparse), much longer and oblique on frons below median ocellus.

Thorax with the longest type of curled hairs on all prothoracic surfaces, metanotum, crest and slope of epinotum, outer and dorsal edges of petiole. Scattered long hairs on inner coxal surfaces and lower mesopleurum. Mesopleurum otherwise with delicate appressed hairs $\frac{1}{8}$ - $\frac{1}{10}$ as long and spaced their length apart. Sides of metathorax more densely haired with longer appressed hairs. A tuft of long hairs below insertion of hind wing. Coxae shaggy with long appressed hairs besides the few very long hairs mentioned above. Legs hairy with oblique appressed hairs. Gaster with inconspicuous (at 30x) pubescent-like appressed hairs as on head, but more widely scattered on dorsal surface and more dense (insertions spaced less than length of hairs) on lateral surface of tergites. Sternites densely covered with the long hairs with curly tips.

Color and appearance. Thorax light tan with metanotum seal brown. Head slightly more reddish than thorax, with vertex distinctly red. Abdomen pale reddish brown (darker than head or thorax) with dark brown rings distinct in living queen with distended gaster. Antennae with scape reddish, funicle dark grayish brown. Legs tan as in thorax. (Wings in paratype virgins grayish smoky.) To the unaided eye the queen is a large, reddish brown ant, with shining head and abdomen.

In Wheeler's key to queens of the Rufa Group (p. 392, 1913) the queen keys out to *ciliata* Mayr, but differs in having no long hairs on gular region, few on sides of thorax and coxae and none on dorsum and sides of gaster. She is also larger than *ciliata*.

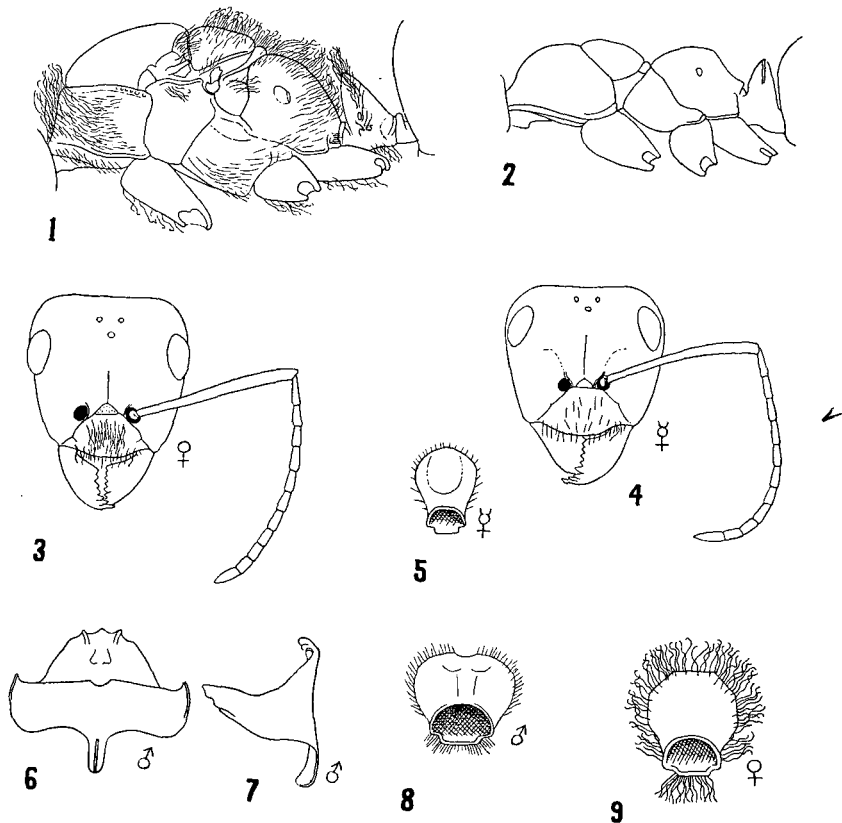
Paratype, major worker, from nest No. 1436, Kennedy collection.

Total length, 8 mm., head, width at eyes, 1.8 mm., at base of mandibles 1.5 mm., length to tip of clypeus 1.9 mm.

Mandibles 8-toothed, clypeus strongly carinate over its middle half, its lower edge slightly angulate. Occiput slightly concave. Eyes without hairs. Frontal area an equilateral triangle, frontal carinae short, one and a half times as long as diameter of antennal foramen, diverging above. A delicate frontal carina reaching two-thirds the distance to median ocellus. Antennal scape from above very slightly sinuate, funicle expanding uniformly to base of its seg. 11. Maxillary palp 6-segmented, as long as mandible.

Contour of thorax shown in Fig. 2, of face and clypeal hairs in Fig. 4; petiole in Fig. 5.

Mandibles finely striate, feebly shining, hairy (hairs not included in Fig. 4). Clypeus shagreened but its lower two-thirds striate half way to each lateral angle. Remainder of body uniformly and finely shagreened giving the worker a very opaque appearance or, to the unaided eye, almost the appearance of a light pruinosity.



Figs. 1-9. *Formica prociliata*, n. sp. 1. Thorax of queen showing distribution of the long curly-tipped hairs. 2. Thorax of major worker, shape only shown. 3. Face of queen showing long hairs on clypeus. 4. Face of major showing clypeal hairs only. 5. Petiole of major. 6 and 7. Subgenital plate (sternite 9) of male. 8. Petiole of male. 9. Petiole of queen. (Figs. 5, 8 and 9 slightly more enlarged than other figures in this article.)

Except mandibles, the entire head, body and appendages covered with a pale yellowish pubescence the hairs of which vary in length from the width of 3 to that of 5 ocelli of the compound eye. On the head the distance between insertions about equals the length of the pubescent hairs. On the thorax they are spaced apart 113 their length, on the

crest of the epinotum and on the gaster they are more dense and overlap. This long and dense pubescence adds to the dullness of this ant's colors.

No long curling hairs as on the queen except an occasional one on tip of gaster. Hairs light brown, appressed on mandibles, numerous (50?); pointed and erect on clypeus (Fig. 4); over anterior surface of pronotum scattered uniformly at spaces equal to their height but dorsal surface of pronotum densely covered with erect hairs slightly inclined forward; a crest of a dozen at posterior edge of metanotum; hairs on crest and upper sides of epinotum at spaces equal to their height. Coxae and trochanters with a few curving hairs. Petiole (Fig. 5) with numerous erect hairs on crest, upper sides and underneath. Gaster with 20-30 long, erect hairs on each sternite and about 12 very long hairs in a circle around Seg. 6. Tibiae with 2 rows of hairs on apical half or apical third of flexor surface.

Color and appearance. Head, thorax and petiole pinkish red to the naked eye. Antennae more brownish, infuscated toward tip of funicle, Coxae and legs dark brown. Gaster dead black, appearing grayish because of the long, dense pubescence.

↙ *Paratype*, minor worker, nest No. 1436, Kennedy collection.

Structure in general as in major worker with the following differences. Clypeus with striations reduced to striately arranged areas of the shagreen. A low but *distinct* mid-frontal carina reaching half way to middle ocellus. Surface and vestiture as in major workers but the erect hairs perhaps slightly less numerous.

(Color of smallest minors usually dark brown.) Of the paratype, head, thorax, petiole and appendages dark brown, slightly lighter on sides of thorax, on the basal half of funicle and lower side of petiole. Gaster brownish black. Colors dull as in the majors.

Intermediate workers, nest No. 1436.

In the next size above the smallest minors, the thorax is lighter but still brown. In larger intermediates (6 mm.) the thorax is usually distinctly red, the head red but infuscated on dorsal surface. Color-change with increase in size is not always correlated with a particular size as some intermediates slightly larger than smallest minors may have distinctly red head and thorax and some slightly less in size than the largest majors may have dark brown head and red thorax.

Allotype, male, from nest No. 2091, Kennedy collection.

Total length 8.5 mm., pinned (fresh and alcoholic material 10-11 mm.). Head, width at eyes 1.6 mm., at insertion of mandibles 0.9 mm., length to tip of clypeus, 1.3 mm.

Head with occipital border straight, ocellar area slightly elevated; upper half of front concave below median ocellus ending below in a circular pit as in queen. Frontal carinae equal in length to diameter of antennal foramen; Clypeus with high narrow carina over its lower four fifths, squarely truncate below. Mandible with a terminal well developed pointed tooth and one or two poorly developed truncate inner teeth.

Petiolar scale shown in Fig. 8, subgenital plate in Figs. 6 and 7.

Thorax at wings with same width as that of head through the eyes. Petiole thick, blunt, its scale $\frac{2}{3}$ the height of epinotal slope, convex anteriorly, slightly less so posteriorly; its upper edge, viewed from behind with a narrow, shallow, median notch behind which the dorso-posterior surface slightly concave.

Mandibles coarsely puncto-striate. Clypeus with lower edge rough. Frontal area shining. All other surfaces opaque due to fine shagreen with dull ridges. As in queen the hairs tend to vary from a long pubescence to strong long hairs. On most surfaces, if one is present the other is absent but on the tip of the dorsum of gaster seg. 6 both are present as also on the sternites of the gaster. All surfaces except mandibles and frontal area covered with a long pubescence, individual hairs of which equal in width 4-8 ocelli of compound eye, very diversely distributed, on head short with interspaces equal to or greater than length of hairs, on gaster interspaces $\frac{1}{2}$ or less than the length of individual hairs. Legs and antennae densely pubescent. Long hairs on mandibles and clypeus half as long as clypeus. A ruff of curly-tipped hairs on upper part of front half of pronotum. Plain hairs on edges of propleurum, on lower front angle of mesopleurum, a few on coxae, on crest of mesonotum and crest of metanotum and median areas of epinotum. A dozen or so stiff erect bristles on crest of petiole and others on its ventral surface. Gaster with abundant hairs on ventral surface of each sternite. Posterior edge of tergite of seg. 6 with 14-16 stiff hairs. No hairs on eyes.

Color and appearance. Color dull black, genitalia dull brown, legs paler than body due largely to their dense pubescence. Wings pale brownish hyaline.

Type and paratype material all from a group of nests on the fruit farm of Will Rofkar, formerly of the Wooster (Ohio) Agr. Exp. Station staff, on Catawba "Island" which is also Catawba Point, eight miles east of Port Clinton, Ohio. The nests are in an open blue-grass-carpeted woods of oak, black walnut, etc., on a rocky limestone ridge one-fourth mile east of the Rofkar residence.

Bottle No. 1433 are workers collected on trails, No. 1434 a nest from which workers only were taken, both collected August 19, 1934, when the colonies were called to the writer's attention by Mr. Rofkar. August 21, 1934, nests No. 1435, 1436 and 1437, the second with one queen the last with two queens collected by Mark Shellhaas and Kennedy. On July 11, 1935, nest 2089 with 20 nest queens collected by Mary Talbot, Clyde Dennis and Kennedy as also nest 2091 with numerous males and winged queens.

The younger nests were in each case in the shade of a small sapling, later expanding beyond shade to 10 feet in diameter. Galleries under the slabs of loose limestone half buried in the blue grass sod. No craters or mounds. As the original nest

surface tends to become hard, new openings are made on the periphery with the eventual partial abandonment of the central area. Thus the largest nests are 10 feet or more in diameter surrounding a bare center 2-5 feet in diameter where there is little activity, with the newer and more flourishing galleries under the rocks in the surrounding blue grass sod. The outermost openings are completely hidden under the tall grass. Thus the nests die centrally while growing peripherally, a fairy-ring effect.

Poorly developed trails 50-200 feet long, of the major and intermediate workers, radiate from the nest areas. Apparently a ground ant as well as a tree ant. Trailing habits very similar to those of *exsectoides*.

As many as 12 queens collected from one nest area, frequently 2-4 queens in a single six inch chamber. Nests with fully developed virgin males and queens July 11 (1935).

This species resembles *Formica ciliata* Mayr (Wheeler, 1903) of Colorado in the very wooly hairs on the thorax but differs from that species in the absence of such hairs from sides and dorsum of the gaster. This species differs from *F. comata* Wheeler in that the workers are redder. The worker's gaster is wholly black which latter character separates the species from *F. criniventris* Wheeler. It differs from *F. oreas* Wheeler and from *F. oreas comptula* Wheeler in having the long hairs on the thorax of the queen. The only eastern species with which it might be confused is *F. ferocula* Wheeler of Illinois which nests in craters and is more yellow in color and has red at base of gaster. The name, *prociliata*, refers to the fact that the queen is less specialized than the queen of *ciliata* Mayr in having a lesser development of long curly hairs.

***Formica querquetulana* n. sp.**

Holotype, queen, from nest No. 2444, Kennedy collection.

Total length 5.5 mm. Head, width at eyes 1.2 mm., at base of mandibles 0.96 mm., length to tip of clypeus 1.3 mm.

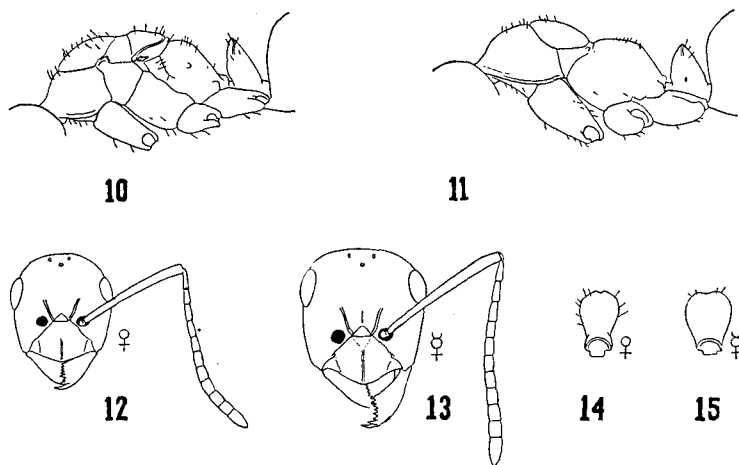
General characters of the Microgyna Group. Head evenly rounded behind, sides nearly straight; front and vertex smoothly convex. Clypeus evenly rounded below, carina a mere line in proper light. Antennal scape with apex twice the diameter of its base, funicle widening to seg. 6 then uniform to tip.

Contour of thorax shown in Fig. 10; face in Fig. 12; petiole shown in Fig. 14.

Head, thorax, legs, petiole and gaster uniformly and delicately shagreened, barely defined at 30 magnifications. Overlying the shagreen

a pubescence of silvery white hairs tightly applied to the surface, length of individual hairs of pubescence 1.5-2 times diameter of oculus of compound eye; pubescence dense the usual length of a pubescent hair 4 times the distance between insertions of same.

Spiny hairs brownish yellow, linear lanceolate (an occasional hair with truncate tip). Mandibles striate with long pointed hairs on their tips. The following areas with hairs as indicated; clypeus 11, one strong hair in middle of lower edge; frons, 5; ocellar area, 4; one half-sized hair on rear contour of head equidistant from eye and ocellus of its side. No large hairs on gula, antennal scapes or on eyes; propleurum, 6-8 weak hairs; pronotum with 10 along posterior dorsal edge, 1-2 below in front; mesonotum, 20; mesopleurum 12 small hairs; metanotum 12+; epinotal surface 20-25; petiole, 4-5 on either side of crest, lateral edge 4-6. Coxae hairy on anterior and posterior surfaces, each trochanter



Figs. 10-15. *Formica querquetulana*, n. sp. 10. Thorax of the microgynous queen. 11. Thorax of a major worker. 12. Face of queen. 13. Face of major worker. 14. Petiole of queen. 15. Petiole of major. (All figures to same scale. Hairs omitted in Figs. 12, and 13.)

with 1-3 and usually one at base of femur. Flexor surface of tibia with 2 rows of 4-5. Gaster bare on anterior surface of seg. 1 and on lower sides of tergites. Segments of gaster with hairs as follows: dorsal surfaces seg. 1, 35-40, seg. 2, 30+, seg. 3, 25-28, seg. 4, 16+, seg. 5, 10+, those on seg. 5 one and a half times as long as other hairs on gaster. Sternites sparsely haired, hairs variable in length some one and a half times as long as others. The length of average hair on dorsum of gaster is $\frac{1}{5}$ of width along middorsal line of pubescent area of gaster seg. 2.

Color and appearance, (30X), thorax and legs a yellowish brown, head slightly darker, mandibles and funicle of antenna dark brown. Wings opaque, a dull smoky brown. Gaster black. Colors dull due to shagreen overlaid with dense very fine pubescence, silvery on gaster less so on

head and thorax. In the field this species was spoken of as the "dirty Formica" because of the dull colors especially in early spring colonies before the more vigorous and more brightly colored workers appeared.

Paratype, major worker, nest No. 2444.

Total length 5.5 mm., head, width at eyes 1.4 mm., at base of mandibles 1.14 mm., length to tip of clypeus, 1.5 mm.

General characters as in the *Microgyna* Group. Head evenly rounded, sides nearly straight, front and vertex smoothly convex. Clypeus evenly rounded below with a well developed carina its entire length. Funicle of antenna widening uniformly to its seg. 10.

Contour of thorax shown in Fig. 11; face in Fig. 13; petiole in Fig. 15.

Head, except mandibles, thorax, legs, petiole and gaster uniformly and delicately shagreened, barely defined at 30 magnifications. Overlying the shagreen a delicate pubescence of silvery hairs tightly applied to surface: length of a pubescent hair equals diameter of an ocellus of compound eye and 3-4 times as long as distance between insertions of contiguous hairs.

Spiny hairs brownish yellow usually flat, linear, with roundly truncated tips. More sparse than in queen, perhaps due to loss through more active occupation. Mandible striatopunctate with long pointed hairs on apex. The following areas with hairs as indicated: clypeus, 13 (one in middle of lower edge); frons, 4; ocellar area 4 (6 in other paratypes); no hairs on eyes, on rear of head, sides, gular region or on scapes of antennae. Thorax: pronotum 8 on crest, 1-2 on anterior surface; propleurum, 1-2 on anterior surface; mesonotum 3 (6 in other paratypes); epinotal crest 12-18 very short hairs and 4-6 on side above metasternal gland. Procoxa with 2 on anterior and posterior surface each. Middle and hind legs free of hairs on coxae, trochanters and femora. Each leg with 2 rows of hairs on flexor surface of tibia.

Gaster with anterior surface of seg. 1 bare; dorsal surface of seg. 1, 25 (probably 10 lost); seg. 2, 20; seg. 3, 25; seg. 4, 20; seg. 5, 10 twice as long as those on segs. 1-4. Sternites with 5-7 hairs each. Length of hair on dorsum of gaster one-sixth of width, on middorsal line, of pubescent area on seg. 2.

Color and appearance, (dried alcoholic material, 30X). Reddish brown, except dull black gaster, dusky tips of antennal funicle and a slight infuscation of pronotum, of mesonotum and of apex of petiolar scale. Legs and mandibles brown. Colors dull (opaque) due to the dense, tight pubescence overlying the dense, delicate shagreen.

The major workers in the field and in the bottle are distinctly red on head and thorax, more so than even the more mature queens. Dried and to the unaided eye the gaster is a slate gray due to dense pubescence over the shagreen. The majors have no luster or shine except on mandibles.

Paratype, minor worker, nest No. 2444.

Total length 4 mm., head, width at eyes 1.1 mm., at base of mandibles 0.83 mm., length to tip of clypeus 0.9 mm.

Minor worker generally similar to major worker in structure.

Erect hairs as in major except they are shorter in proportion to width and as abundant. Pubescence on gaster similar but on head and thorax more sparse and shorter giving these surfaces a more shining appearance under 30 magnifications.

Color and appearance. General color brown at 30 magnifications but with a slight suggestion of red to naked eye. The head from below the eyes to rear is distinctly infuscated with darker brown. Pro- and mesonotum with dark brown above as also the tip of petiolar scale. Legs dark brown, the hind pair darkest.

Male unknown.

Relationships: This ant is without question in the Group *Microgyna* of *Formica* as the queens are no larger than the major workers. It runs in Wheeler's (1913) key (pp. 394-395) to couplet 5 but fits neither division of couplet 5. In this species the petiole is blunt as in division one but the color is a sordid reddish yellow as in division two. The species *nepticula morsei*, *impexa* and typical *microgyna* are eliminated by couplets 1-4. Of the other species (and varieties) only *recidiva*, typical *rasilis*, *spicata*, typical *difficilis* and *consocians* have such dense pubescence on the gaster. *Recidiva* is more hairy on the legs, *rasilis* (typical) has the posterior border of head feebly concave, *spicata* with more dark brown, typical *difficilis* has base of gaster red as has *consocians*. We have been unable to check this species more closely into the Group *Microgyna*. The name *querquetulana* means pertaining to an oak forest. The nests of this species are usually in dry or well drained soil characterized by various species of oaks.

Described on holotype queen, major worker and minor worker from nest No. 2444 in Kennedy collection. The types in the pinned series of the collection.

The paratype material consists of:

No. 2444 (9 bottles) Kennedy Collection and from the same type colony No. 7-29 (4 bottles) Talbot Collection collected July 11, 1937, by Talbot and Kennedy on second sand ridge north of Angola Road and east of King Road, one mile north of Holland, Ohio. No. 2428 (4 bottles) Kennedy Collection collected by the latter on same ridge 500 feet distant, July 4, 1937. No. 2482 (5 bottles) Kennedy Collection and No. 7-52 Talbot Collection. This nest located by Talbot August 8, 1937, in same area but on sand ridge east of King Road and one-eighth of a mile south of Nebraska Road.

The following nests collected by Kennedy in the high hills of southern Ohio (Adams Co.) in Kennedy Collection No. 156, Poker Hollow on Route 7 east of Peebles, April 19, 1931, No. 328 (3 bottles, nest queens) on top of hill, pasture, above school house east of bridge on Route 41, Peebles to West Union, May 23, 1931, No. 330 second nest on same hill, May 23, 1931, No. 805, same best as No. 328 recollected June 12, 1932. No. 789, Cedar Mill pasture south of West Union, May 24, 1932, No. 2097, (strays) and No. 2099 (outlier nest no queen or brood) Cedar Mill pasture, July 14, 1935.

The type nest, No. 2444, was in pure sand under the edge of a discarded piece of carpet. Immediately under the carpet were irregular shallow brood chambers, below these to a depth of ten inches a dozen or more nearly spherical chambers, one to two inches in diameter widely spaced from each other. Various of the chambers were packed with workers, callows, winged queens and brood.

Nest 2428 was similar but under a withered branch of oak leaves. Nests 328 and 2099 were under the edge of rocks the openings covered with loose trash as with *Formica truncicola*.

The nests west of Holland, Ohio, were in a sandy area, "The Oak Openings" of ecologists, with black oak and many prairie plants. The Cedar Mill nests were in an old pasture at bottom of a deep valley in mixed mesophytic forest. Nest No. 328 was in a dry pasture on the top of a high rocky hill with mixed mesophytic forest in the ravines. Apparently the nests are shallow and have no connection with a water table below.

***Formica postoculata* n. sp.**

Holotype, major worker, from nest No. 215, Kennedy collection.

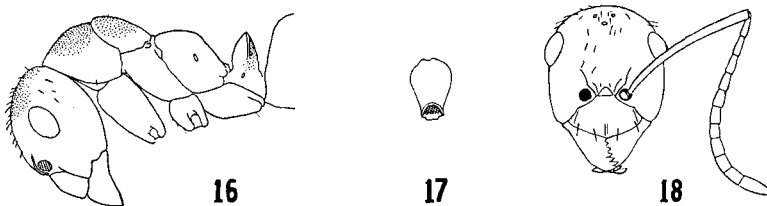
Total length 4 mm. (other paratypes 4.75 mm.). Head, width at eyes 1.4 mm., at base of mandibles 1 mm., length to tip of clypeus 1.6 mm.

Characters of the *Fulva* and *Microgyna* Groups, from small size and pubescence probably *Microgyna*. Head as wide as length to base of mandibles, sides parallel with widely rounded angles above and below, posterior border convex. Clypeal border evenly rounded, clypeal keel incomplete on upper fourth of clypeus, delicate but distinct. From above, front contour of antennal scape nearly straight, posterior contour sinuate, apex twice the width of base, funicle widened uniformly to seg. 7, 8-11 of uniform diameter.

Contour of thorax shown in Fig. 16; of face in Fig. 18; petiole shown in Fig. 17.

Head, body and appendages shagreened, that on head lightly impressed leaving the head surfaces glossy, on thorax more deeply impressed giving a dull surface, on gaster (30 X) shagreen as on thorax but surface more irregular (slightly roughened). Pubescence on head white, pubescent hairs with length 1-2 times diameter of ocellus of compound eye and equal to space between adjacent hairs. Pubescence on thorax the same except three times as long on inner sides of coxae. Pubescence on dorsal surface of gaster three times as long as on head, thinning on sides of gaster to where interspaces are equal to or greater than length of the hairs.

Spiny hairs on head and thorax linear, on gaster with slightly widened lower third, apices sharp or dull or occasionally truncate, color pale brownish. Mandibles striate with long hairs on their tips. The following areas with hairs as indicated: clypeus 4 on lower half (12-14 on some paratype workers); frons, 8 (14 hairs on paratypes); ocellar area with 6; angle of head back of eye 4-6; gular area above middle 4-6; pronotum 6 above; mesonotum 2 above, mesopleurum with 3-4 on lower



Figs. 16-18. *Formica postoculata*, n. sp. 16. Head and thorax of major worker showing the postocular hairs and infuscation. Thoracic hairs omitted. 17. Petiole of major. 18. Face of major.

end (0-1 in paratypes). Epinotum with 3 minute stubs above (0-6 in paratypes). Petiole bare above (occasional worker with 1-2 on or near upper edge. A double row on inner surface of tibiae. Vertical anterior surface of gaster bare, other areas with hairs as follows: dorsal surface, seg. 1, 40-50; seg. 2, 60 plus; seg. 3, 40-50 hairs; seg. 4, 25; seg. 5, 20; those on seg. 5 twice the length of other hairs on gaster. Each sternite with about 10 hairs.

Color and appearance, (30 X) head slightly shining because of lightly impressed shagreen and thin pubescence. Color light reddish brown (30 X) more reddish to unaided eye, lightly infuscated on ocellar area, less so on rear of head. Thorax (30 X) dull pale brown widely infuscated on dorsum of pronotum, and dorsum and sides of mesothorax, the anterior edge of mesonotum edged with pale brown. Antennal scapes, coxae, legs, petiole dull, slightly paler than head, but darker brown than thorax. Antennal funicle lighter than scape, its tip not noticeably infuscated. Infuscation on petiole is heavier on its posterior surface. Gaster a dull, dark brown, seg. 1 suffused with slightly lighter brown on each side of articulation of petiole. To the unaided eye the brown parts are slightly more reddish; in the field, to the collector, the masses of ants appear to be of dull black and red ants.

Paratype, minor worker, nest No. 215.

Total length 4 mm. (other paratypes 3.5 mm.).

General structure as in the major. Dorsal surface of epinotum less arched. Apex of scale of petiole lower than top of epinotum. Shagreen and pubescence as in major but hairs fewer. Those on hind angles of head short, 2 in number and difficult to locate (30 X). Head dark brown above and in front down to between frontal carinae. Antennae, lower face and legs, paler brown. Thorax and petiole dark brown even to absence of pale stripe around anterior edge of mesonotum. Gaster as in major, a brown so dark it appears at first as black.

Male and queen unknown.

Described from one nest, No. 215, Kennedy Collection, taken by C. H. Kennedy and Arthur C. Cole, Jr., in grassy pasture on shoulder of high hill facing the Ohio River on the road between Aurora and Rising Sun, Ohio Co., Indiana, May 2, 1931. The nest was in a V-shaped crevice between two large boulders and was covered with trash.

This species keys out to *adamsi* Wheeler (1913, p. 394) but differs from that species in having hairs on the posterior angles of head and a few hairs on the gular surface, also in having little infuscation, if any, of the antennal funiculi. The name, *postoculata*, refers to the location of the group of hairs back of the compound eyes.

Formica lecontei, n. sp.

Holotype. Virgin queen, No. 704, Kennedy collection.

Total length 11 mm. Head, width at eye 2 mm., at base of mandibles 1.6 mm., length to tip of clypeus 2.2 mm.

The queen of this species very nearly identical in gross structure with the queen of *F. subaenescens* Emery and with the queen of *F. subsericea* Say, the most abundant North American *Formica*, but differing from both in having on head, thorax and gaster a slightly shorter and much more dense, white or silvery pubescence giving it a frosted or delicate pruinescent appearance. The dense pubescence on the head composed of hairs whose length is $1\frac{1}{2}$ times the diameter of an ocellus of the compound eye. The interspaces between insertions of hairs slightly less than the length of a hair. The pubescent hairs slightly longer on cheeks and clypeus. No hairs on eyes. On the thorax pubescent hairs considerably longer, 4-5 times as long as the diameter of an ocellus of the compound eye. On the gaster more densely spaced than on head or thorax, on the dorsal surface the spacing $\frac{1}{2}$ - $\frac{2}{3}$ the length of individual hairs which are short, equal to twice the diameter of an ocellus, except the fringe of longer pubescence at posterior edge of each segmental band.

Erect hairs on head confined to mandibles and clypeus. On the latter pubescence covers its entire surface above which extend 10-12 long erect hairs among the bases of which on each lateral third and along lower front edge are numerous intermediate more appressed hairs..

Four or five scattered hairs on mesonotum and as many on metanotum. Long hairs on gaster as in *subsericea*.

Color of head and thorax black, of gaster black to the unaided eye, lustrous dark brown at 30 magnifications, with the delicate white frosting of the prunescence.

Paratype, worker major, No. 704, Kennedy collection.

Total length 7 mm.; head, width at eyes 1.6 mm., at insertion of mandibles 1.3 mm., length to tip of clypeus 2.0 mm.

Pubescence as in queen. Color of head, thorax and gaster black with the delicate frosting of the silvery pubescence. (Gaster more brownish in less mature workers.) Mandibles, antennae and legs dark brown.

Paratype, worker minor, No. 704, as in major worker.

Allotype, male. From nest No. 704.

Total length 11 mm. (other paratype males 12 mm.). Head and thorax black, petiole and gaster dark brown, lighter on segs. 5 to 7. Wings brown. Legs bright lemon yellow. Antennae with both scape and funicle medium brown, no infuscation of antennal tips. Entire body pubescent but pubescence less conspicuous than in queen and workers and on gaster yellowish.

Nesting habits. All nests found have been on stony, sunny slopes in short grass. Nests are apparently started under stones and then may spread to as much as three feet in diameter. Those examined more carefully appear to have a wide shallow layer of brood galleries just under the warm surface. The deeper galleries were not dug out. Nest queens were found in the smaller nests at a depth of 8 inches. This ant was common at Indian Gap.

Material described. One queen and 7 males (pinned collection) taken in Jug Run, Smithfield, Ohio, August 4, 1927. Nos. 696, 700, 702, 703, 704 taken along roadside and in mountain meadow at Indian Gap, 5,000 feet elevation, in fir zone on an outlier ridge of Mount Leconte, on the ridge along the crest of which is the Tennessee-North Carolina boundary. This spot is on the road built along the crest of the ridge from New Found Gap to Clingman's Dome since the collection was made. Collected by Kennedy, September 13, 1931. Nest No. 704 is the type nest from which the described individuals were collected.

We have hesitated to describe this species as it is probably included by Wheeler (pp. 504-505, 1913) as a large form of *Formica subaenescens* Emery. It agrees with *subaenescens* in distribution at high, cool elevations though it was also taken in warmer eastern Ohio at approximately 1,000 feet elevation. It

agrees in type of nest as it is not known to make mounds but spreads a large shallow nest out around a flat stone. It agrees in size with the large sized ants included in *subaenescens* by Wheeler, in the brown wings of queens and males and in the bright yellow legs of the males.

It differs from *subaenescens* in the greater fineness and greater density of the pubescence in *lecontei*, in the pure jet black of head and thorax of all castes and the nearly jet black of the gaster of very mature workers. The male differs in having all parts of the antennae a medium brown (in pinned and alcoholic material). In *subaenescens* the scape of the male antenna is described by Wheeler as being lemon yellow as are the legs.

LITERATURE

- Wheeler, W. M. 1903. Extraordinary Females in Three Species of *Formica*, with Remarks on Mutation in the Formicidae. Bull. Amer. Mus. Nat. Hist. 19 (28): 639-651, 3 figs. (*F. ciliata* and relatives.)
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