

THE ANTS OF ISLE ROYALE, MICHIGAN.

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Subfamily *Myrmicinae*.

1. *Myrmica brevinodis* Emery var. *canadensis* Wheeler. Several workers from a single colony: 61 (I, 2) H. A. Gleason. "Found on the dry rock ridges under the mats of bearberry and also excavating nests in the crevices of rocks to a depth of some 8 cm." This is the common variety of the subspecies *brevinodis* at higher elevations in Canada and the Eastern States.

2. *Leptothorax acervorum canadensis* Provancher. Workers from three colonies: 63 (I, 2), (I, 1), 77 (I, 2), H. A. G. "Abundant in *Cladonia* clearings and on rock ridges, running about on the surface and through the thin deposits of soil. The specimens of No. 73 were from the rock pools on the shore just south of Tonkin Bay." This ant, like the preceding, extends its range into the Northern and Eastern States, but it is by no means common. It is abundant, however, at higher elevations (8000-9000 ft.) in the Rocky Mountains and at lower elevations in Nova Scotia.

Subfamily *Dolichoderinae*.

3. *Tapinoma sessile* Say. Workers from a single colony: 132 (V, 2) C. C. Adams, "under *Cladonia*." This is the only Dolichoderine ant which ascends to high latitudes and elevations. I have found it nesting under stones at altitudes of over 10,000 ft. near Cripple Creek, Colorado, and it is common in the Canadian zone throughout the Rocky Mountains. In the Northeastern States it descends to sea-level.

Subfamily *Camponotinae*.

4. *Lasius niger* L. var. *neoniger* Emery. Workers from five colonies: 20 (I, 5) C. C. A., and 75 (I, 1), 79 (I, 5), 82 (I, 5), 83 (I, 5), H. A. G., "Abundant on the rock ridges and jack pine ridges (I, 2, 5). The nest is always constructed beneath or at the side of a flat or angular stone, at a depth of one decimeter or more. A complicated system of roomy galleries is excavated with passages 1.5-2.5 cm. high by 2.5 cm. broad. This ant was seen to capture and kill a beetle. No. 75 H. A. G. is material from the rock pools." (Gleason).

There are in North America three distinct varieties of the circum-boreal *L. niger*, viz., var. *neoniger* Emery, *sitkaensis* Pergande and *americanus* Emery. The first and second have the legs and antennae of the workers and females covered with suberect hairs, and the hairs on the body are also conspicuously abundant. *L. neoniger* is small and black, *sitkaensis* much larger and of a lighter brown or yellowish color. *L.*

americanus is small, like *neoniger*, but brown and has few erect hairs on the body and none on the legs and scapes. It is closely related to the palearctic variety *alienus* Förster, and like this form inhabits warm and rather dry localities. It is the common form of *niger* throughout the Northern States. *L. sitkænsis* occurs in Alaska, Nova Scotia and in the damp alpine meadows of the Rocky Mountains at altitudes between 8000 and 9000 ft. *L. neoniger* occurs in dryer situations at somewhat lower elevations and is occasionally found even near sea-level in isolated colonies in our northern woods. Varieties (hybrids?) intermediate between *neoniger* and *americanus* also occur in these same localities.

5. *Formica sanguinea aserva* Forel. Workers from two colonies: 78 (I, 2), 72 (I, 2) H. A. G. "This is one of the commonest species on the rock ridges, but constructs its nest either in or under decaying wood. On the ridge north of the light house, a nest (72) was made under a rather small rotten stick, and the soil beneath was composed mainly of finely comminuted fragments of the wood. The second colony (78) had constructed a nest in the interior of a large decaying log." (Gleason). This subspecies has been taken hitherto only at Toronto (Forel), on the summit of Mt. Washington (Mrs. A. T. Slosson), among the Litchfield Hills of Connecticut (Wheeler) and in Casco Bay, Maine (Wheeler). It is a decidedly boreal form, approaching the typical palearctic *sanguinea* in size and coloration. There were no slaves accompanying the specimens from Isle Royale, a fact which tends to confirm the conclusions of Forel and myself that this subspecies usually lives in pure colonies.

6. *Formica adamsi* sp. nov. Worker. Length 3.5-5mm. Allied to *F. rufa* L. Head, including the mandibles, nearly as broad as long even in the smallest individuals, with straight posterior border, rounded posterior corners, and slightly but distinctly convex sides. Eyes large. Mandibles 7-8 toothed. Clypeus prominently carinate, with broadly rounded anterior border, not produced in the middle. Palpi of moderate length. Antennae slender, scapes nearly straight at the base, funicular joints all distinctly longer than broad, the basal somewhat more slender and longer than the apical joints. Pro- and mesonotum moderately rounded, convex, the latter elliptical and nearly twice as long as broad, the former a little broader than long. Epinotum with subequal base and declivity, the former slightly convex, the latter flattened or slightly concave; the two surfaces in profile passing into each other through a rounded angle. Petiole more than half as broad as the epinotum, in profile with convex anterior and flattened posterior surface and sharp upper border; seen from behind the border is rounded and but feebly or not at all produced upward in the middle. Gaster and legs of the usual shape.

Opaque throughout; only the mandibles, frontal area and sides of the clypeus faintly shining or glossy. Mandibles finely and densely striated. Surface of body densely and indistinctly shagreened.

Hairs and pubescens pale yellow; the latter covering the whole body and appendages, not conspicuous except on the gaster, but even on this region not sufficiently dense to conceal the surface sculpture. Hairs short, sparse and obtuse, in several rows on the gastric segments; on the thorax confined to the upper portions of the pro- and mesonotum, on the head to the clypeus, front and vertex. The hairs on the mandibles

are appressed and pointed, on the palpi short but numerous and conspicuous. Legs naked except for a series of pointed bristles on the flexor surfaces of the tibiae and tarsi and a few blunt hairs on the anterior surfaces of the fore coxae.

Sordid brownish red, the smaller specimens somewhat more yellowish red. Gaster dark brown, except a large spot on the base of the first segment and the anal region, which are reddish yellow. A large spot on the pronotum, one on the mesonotum, much of the posterior portion of the head, the distal halves of the antennal funiculi and in many specimens also the coxae and femora, dark brown or blackish. These dark markings are present in the largest as well as in the smallest workers. Teeth of mandibles black.

Described from numerous specimens taken from a single colony: 115 (1, 6) H. A. G. A dozen workers taken by myself on Pikes Peak, Colorado, near timber line, at an altitude of 10,500 to 11,000 ft. differ from the Isle Royale specimens only in having the frontal area smooth and shining, in having the middle of the petiolar border produced upward as a distinct, blunt point, and in the less extensive infuscation of the head, pro- and mesonotum. These specimens may be regarded as representing a distinct variety, *alpina* var. nov. Both this and the typical *adamsi* may be distinguished from our other North American forms of the *rufa* group by their small size, opaque surface and peculiar coloring and pilosity. The following collector's note on the Isle Royale specimens adds some ethological characters which are not seen in the other small forms of the *rufa* group known to me: "The nests of this ant are one of the most conspicuous features of the drier tamarack swamps. They are rounded-conical in shape, 3-6 dcm. high or even larger and with a diameter at the base about equalling the height. They are composed within of *Sphagnum*, but as would be expected with such material, without any definite system of galleries. The outer surface is thickly covered with leaves of *Cassandra*, probably to prevent loss of moisture by evaporation from the interior. They are frequently placed near or under a bush of the *Cassandra*, but the same covering is used if no *Cassandra* is near." (H. A. Gleason).

✓ 7. *Formica rufa obscuriventris* Mayr. Workers from six colonies: 46 (I, 1), 47 (I, 1), 63 (I, 2), 76 (I, 2), 114 (I, 6), 14 (112) H. A. G. "This subspecies occurs on the rock beaches (I, 1, 46, 47) where it forages about on the surface and in crevices but is more abundant on the jack pine ridges (I, 5, 63) and on the rock clearings (I, 2, 76)."

I recently described this subspecies as *F. dryas*, but an examination during the past summer of some of Mayr's types in Professor Forel's collection, shows that in so doing I created a synonym. Mayr's original description based on specimens from Connecticut is entirely inadequate, and the list of localities which he later cited for *obscuriventris* shows that he lumped together a number of different forms belonging to the *rufa* group. The name *obscuriventris*, therefore, should be restricted to the form having the characters of my *F. dryas*. This ant is rare in the Eastern and Northern States and evidently belongs to the boreal fauna.

8. *Formica fusca* L. var. *subsericea* Say. Workers from 11 colonies: 23 (I, 5), 102 (V, 2), 131 (V, 2), C. C. A., and 80 (I, 5), 81 (I, 5), 100 (I, 5), 102 (I, 5), 223 (V, 3), 224 (V, 3), 226 (V, 3), 227 (V, 3)

H. A. G. Also specimens from a single colony on Mackinac Island (3, H. A. G.). "A common ant on the jack pine ridges (I, 5, 80, 81, 100, 102). It constructs its nests under rocks in moist soil (100) and was observed to capture beetle larvae (103). The specimens collected in the rock-clearings at Siskowit Bay (V, 3, 223, 224, 226, 227), constructed circular, flat-topped craters 6 cm. in diameter, covered with debris of balsam and spruce needles and frequently with growing plants on them." This is the common form of the circumboreal *F. fusca* throughout Canada and the northern states. At higher altitudes on the Rocky Mountains it passes into the more silvery red-legged var. *argentata* Wheeler, a form which also occurs even near sea-level but very sporadically in the Atlantic States.

9. *Formica fusca* L. var. *neorufibarbis* Emery. A few workers from two colonies: 15 (I, 1) and 20 (I, 1) H. A. G. in vials with specimens of *Lasius neoniger* and *Camponotus whymperi*. Of the numerous varieties of *F. fusca* this is the most boreal, being known only from Alaska and British America as far east as Labrador and Nova Scotia, and from higher altitudes in the Rocky Mountains (9,000 to 12,500 feet). It forms rather small colonies under stones and logs in moist or shady places.

✓ 10. *Camponotus herculeanus* L. var. *whymperi* Forel. Workers from 10 colonies, with larvae and pupae: 15 (I, 1), 18 (I, 1), 22 (I, 1), 30 (I, 1), 62 (I, 2), 140 (I, 3) H. A. G. and 105 (V, 2), 126 (V, 11), 148 (III, '04), 149 (III, '04) C. C. A. "Although an abundant species on the rock and gravel beaches (15, 18, 22 H. A. G.) where it forages for dead insects, its actual home appears to be the ridges. On the dry ridges it occurs singly, usually in soil under stones (62, H. A. G.). It was also collected (140 H. A. G.) in the dense balsam fir woods, where it forages over the surface. This variation in habit leads to the conclusion that it belongs properly to the rock ridges." Like the preceding variety of *F. fusca*, *C. whymperi* is a truly boreal ant. It is our North American representative of the typical paleo-boreal *C. herculeanus* and in the United States is known to occur only at considerable elevations in the Rocky Mountains (above 8,000 feet) and on the summits of the Green Mountains of Vermont. The types of *whymperi* were taken in the mountains of Alberta, B. C., by the noted mountain climber, to whom the variety was dedicated. I have seen specimens from Nova Scotia (Russell) and Labrador (Henshaw).

The foregoing series of Formicidae, though represented by only ten different forms, is of considerable interest on account of its pronounced boreal character. Only two of the forms (*Formica subsericea* and *Tapinoma sessile*) are abundant at ordinary elevations in the northern states. *Myrmica canadensis*, *Leptothorax canadensis*, *Formica aserva*, *F. obscuriventris* and *Lasius neoniger* occur sparingly in the same region, but always in situations which indicate that they are not in their optimum environment or station, or where they seem to represent the laggards of a wave of post-glacial migrants to more northern latitudes or higher altitudes. *F. adamsi*, *F. neorufibarbis* and *Camponotus whymperi* are exquisitely boreal ants of circumscribed alpine distribution in the United States, but probably of extensive range in British America.