

NOTES ON A NEW GUEST-ANT, *LEPTOTHORAX*
GLACIALIS, AND THE VARIETIES OF
MYRMICA BREVINODIS EMERY.

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In two former papers* I described the habits of *Leptothorax emersoni*, a small yellowish Myrmicine ant, which lives in interesting symbiotic relations with *Myrmica rubra brevinodis*, a larger brown species of the same subfamily. The *Leptothorax* occupies small cavities, communicating by means of tenuous galleries with the more spacious chambers and galleries of the *Myrmica*, and, while freely and intimately consorting with its host, is very careful to keep its own brood isolated. This small ant feeds, as I have shown, partly on the oleaginous secretion covering the bodies of the *Myrmica* workers, whom it licks and sham-poos with comical assiduity, and partly on the liquid food which, after submitting to this treatment, these insects regurgitate.

L. emersoni was first discovered among the Litchfield Hills of Connecticut, at altitudes varying from 1,000 to 1,600 feet, but subsequently I found it also at similar elevations in the Berkshire Hills of Massachusetts. More recently, Mrs. Annie Trumbull Slosson took a single winged female on the summit of Mt. Washington. These facts indicate that the species belongs to the sub-boreal or alpine fauna, a conclusion which is confirmed by a study of the distribution of its host ant. As this host is extremely common in the Rocky Mountains and apparently also throughout British America, I fully expected to find the *Leptothorax* occurring over much of the same territory, but, although during the summer of 1903 I collected ants extensively in Colorado at alti-

*The Compound and Mixed Nests of American Ants. *Amer. Natural.* XXXV, 1901, pp. 431-415; and Ethological Observations on an American Ant (*Leptothorax Emersoni* Wheeler) *Arch. f. Psych. u. Neurol.* II, 1903, pp. 1-31, 1 Fig.

tudes varying from 5,000 to 10,000 feet, I never once saw a specimen. During the summer of 1906, however, while collecting in Florissant Cañon, at an elevation of 8,500 feet, I came upon a flourishing colony of *M. brevinodis* spread out under a group of five flat stones on the grassy bank of a stream and containing numerous workers, a few callow females and males, and many larvæ and pupæ of a *Leptothorax*, which, on account of its very dark color, I at first took to be an undescribed species. Closer examination, however, showed that it might be regarded more properly as a subspecies of the New England *emersoni*. The host, too, was found to differ in several minor characters from the eastern form of *M. brevinodis*. A portion of the Florissant colony was taken alive and kept for six weeks in an artificial nest for the purpose of observing the behavior of the ants. My notes on this colony will be recorded below, after a description of the new subspecies of *Leptothorax* and a revision of the varieties of *M. brevinodis*. It was necessary to make this revision in order to gain a clearer conception of the taxonomic affinities of the host ants to each other and to the other varieties of the subspecies.

***Leptothorax emersoni glacialis* subsp. nov.**

The worker measures 3-3.5 mm. in length and differs from the worker of the typical *emersoni* in the following characters: the mesonotum is distinctly less convex so that the thorax in profile is more like that of *L. acervorum*, and the hairs are less abundant and somewhat more reclinate on the antennæ and legs. As in the typical form, many of the hairs on the body and tibiæ are obtuse, but not clavate. The head and gaster are black, the thorax, upper portion of the petiole and postpetiole, and the extreme base of the gaster, dark brown; the legs, antennæ, clypeus and mandibles are yellowish brown, the clubs of the antennæ infuscated. The worker is less variable in size, and individuals with ocelli are much rarer than in the typical *emersoni*.

The female is no larger than the worker and of a very similar color, except that in mature specimens the thoracic dorsum is as dark as the head and gaster.

The male measures 3 mm. and is black throughout, except the tarsi and articulation of the legs, which are sordid yellow. The mandibles

are more pointed, and the thorax is more robust than in the male of the typical form. The pronotum and scutellum are much more opaque and heavily sculptured, the former being densely punctate and rugose, with three shining streaks, one down the middle and the others over the parapsidal furrows. The scutellum and epinotum are densely reticulate-punctate. In the typical *emersoni* the pronotum is shining, distinctly foveolate in front and rugose-punctate behind. The wings of *glacialis* are larger, broader and more whitish.

L. emersoni and its subspecies belong to a small group of the genus characterized by 11-jointed antennæ in the worker and female and a distinct though feeble constriction of the thorax at the mesoëpinotal suture. For this group, which comprises also the circumpolar *L. acervorum*, *muscorum* and *hirticornis*, and the neoboreal *provancheri*, Ruszsky* has recently erected a distinct subgenus, *Mychothorax*. *L. emersoni*, is evidently very closely related to *L. provancheri* Emery, but the latter is said to have clavate hairs on the tibiæ, whereas in the former the hairs both on the body and tibiæ, though often obtuse, are never clavate. As Emery described *provancheri* from a single specimen, this species, when more specimens are available, may prove to be conspecific with the one I have called *emersoni*.

Examination of several hundred specimens from a large number of colonies of *Myrmica rubra* from different parts of North America convinces me that Emery† was right in concluding that the true palearctic *M. rubra sulcinodis* Nyl. does not occur in this country, but is replaced by a distinct subspecies, *brevinodis*. Of this Emery distinguished two forms, the typical *brevinodis* and a variety which he called *sulcinodoides*, because it approaches the European subspecies somewhat more closely. More recently Forel

*The Ants of the Russian Empire. Kasan, 1905, p. 609 *et seq.* (in Russian).

†Beiträge zur Kenntniss der nordamerikanischen Ameisenfauna. Zool. Jahrb. Abth. f. Syst. VIII, 1894, pp. 312, 313.

‡Descriptions of Some Ants from the Rocky Mountains of Canada. Trans. Ent. Soc. Lond. 1902, pp. 699, 700.

has described a second variety, *frigida*, from British Columbia. The North American *brevinodis*, like the European *sulcinodis*, is restricted to the mountains, though in the Northern States one of its varieties occasionally, and in British America probably more generally, descends to much lower elevations. The worker and female of *M. brevinodis* differ from *sulcinodis* in the shape of the antennal scape, which even in the variety *sulcinodoides* is more uniformly and gracefully bent at the base. The males of all the forms of *brevinodis* I have seen, have the scape unusually short, never more than a third and often only a fifth or sixth as long as the funiculus, whereas the scape of the male *sulcinodis* is nearly half as long as the remainder of the antenna. The body of the male *brevinodis* is, moreover, always deep black, whereas it is more or less red or brown in the European subspecies. Although even in single colonies the size, sculpture and color of the individuals may vary considerably, I am able to distinguish the following varieties among the specimens in my collection:

1. *Myrmica rubra brevinodis* Emery, (typical).

This form was based on some workers from Salt Lake, Utah. Emery's description agrees very closely with a form which is not uncommon in Colorado, at altitudes below 7,000 feet, nesting in the sandy and gravelly banks of streams. The male described by Emery cannot belong to this, or indeed to any other form of *brevinodis*, on account of the great length of the antennal scape, which is recorded as "not quite as long as half of the funiculus." The following description is drawn from specimens belonging to a single colony:

Worker. Length 4—4.5 mm. Antennal scape evenly bent at the base, not angular and not compressed, gradually enlarged distally. Epinotum with well-developed, rather slender and curved spines, which are nearly as long as the base of the segment. Petiole short, less than twice as long as broad, in profile with gradual, concave, anterior slope, rather acute summit and angularly convex posterior slope. Sculpture of body moderately strong; rugæ on upper surface of head sharply longitudinal and reticulate, on the occiput and sides of head reticulate

only; the interrugal surfaces over the whole region finely and rather feebly punctate. Thorax with coarse, regular, longitudinal rugæ except on the sides of the pronotum where the surface, at least behind, is uniformly and densely punctate. Petiole and sides of postpetiole longitudinally rugose, node of latter smoother and densely punctate, finely striated or sometimes slightly glabrous. Hairs moderately abundant, slender and pointed. Body and appendages red; gaster with a broad dark brown or blackish band across the middle.

Female. Length 5—6 mm. Antennæ and sculpture of head like those of worker; thorax more sharply longitudinally striated above. Head, thorax, pedicel and appendages red; gaster black or dark brown; an anteromedian and two parapsidal blotches on the mesonotum, the metanotum, and posterior border of the scutellum, black. Nodes of petiole and postpetiole and in some specimens also the upper surface of the head dark brown. Wings dilute yellowish at the base, with pale brown veins and stigma.

Male. Length 4.5—4.8 mm. Scapes straight, rather stout, about $\frac{1}{3}$ as long as the funiculus, and as long as its five basal joints together; club 4-jointed. Hairs white, very slender, rather long and abundant, erect or suberect on both the body and appendages. Body black; tarsi, mandibles, genitalia and articulations of the legs yellowish; antennæ reddish brown. Wings white, very faintly yellowish at the base, with pale yellow veins and stigma.

Colorado: Colorado Springs, 5,990 feet (Wheeler); Boulder, 5,347 feet (T. D. A. Cockerell).

2. Var. *brevispinosa* var. nov.

Worker. Resembling the preceding in stature and color, but with very short spines which are not longer than half the basal surface of the epinotum and with more irregular, vermiculate thoracic rugæ.

Female. Somewhat paler than the typical form. The anteromedian blotch of the mesonotum is lacking and the gaster is red, with a broad brown band across its middle. The epinotal spines are hardly longer than broad at their bases. Wings colored like those of the typical form.

Male. Scapes somewhat curved and constricted at the base, about $\frac{1}{4}$ as long as the funiculus and as long as its four basal joints together.

Colorado: Cheyenne Cañon, 8,500 feet, and Colorado City, 6,064 feet (Wheeler); Cañon City, 5,329 feet (P. J. Schmitt).

New Mexico: Las Vegas, 6,398 feet, and Pecos, 6,366 feet (T. D. A. Cockerell).

The specimens from Pecos (two workers) have unusually short spines, which are hardly longer than broad at their bases.

3. Var. *decedens* var. nov.

Worker. Length 3.5—4 mm. Scapes evenly curved at the base as in the typical form. Spines short, straight and acute, somewhat more than half as long as the base of the epinotum. Sculpture of head as in the typical form, but the thorax above vermiculately and reticulately, instead of longitudinally rugose; sides of pronotum densely punctate, meso- and metapleuræ longitudinally rugose. Sculpture of petiole and postpetiole as in the typical form. Body and appendages yellowish brown; head dark brown or blackish above; gaster black.

Male. Length 4.5 mm. Scapes straight, nearly $\frac{1}{3}$ as long as the funiculi. Wings uniformly whitish hyaline, not suffused with yellow at the base; veins and stigma very pale brown.

Colorado: Buena Vista, 7,900 feet, and Florissant, 8,500 feet (Wheeler).

Colonies rather small, nesting under stones in grassy places on the banks of streams.

4. Var. *sulcinodoides* Emery.

Emery included more than one variety under this name, as shown by the localities which he cites (South Dakota, Utah, Maine). I would restrict the name to a distinct, large and dark-colored form, which is very common in the Rocky Mountains, at an altitude of 8,000 to 10,000 feet under stones and logs along the margins of subalpine streams and meadows. The larvæ and immature pupæ of this form have a peculiar greenish yellow color and oily luster, which I have not observed in any of the other varieties. Emery's statement that *sulcinodoides* approaches the European *sulcinodis*, is true of the worker but not of the male, which has extremely short antennal scapes.

Worker. Length 4.5—5.3 mm. Antennal scapes with a distinctly angular bend at the base, which is narrow and somewhat compressed. Spines as long as the base of the epinotum, slender, straight, acute and diverging. Sculpture strong; rugæ on the sides of the head

reticulate and not longitudinal, those on the thorax somewhat reticulate above, but longitudinal on the sides, even of the pronotum. Petiole and postpetiole sharply and longitudinally sulcate, the node of the latter sometimes more finely and irregularly rugose or more or less punctate. Hairs yellow, acute, rather short and moderately abundant. Head and gaster black; thorax, petiole and postpetiole deep red or, in some colonies, almost black; mandibles, antennæ and legs of a somewhat lighter red.

Female. Length 6—6.5 mm. Resembling the worker. Spines as long as the base of the epinotum, straight, rapidly tapering and blunt at their tips. In some specimens the thorax is entirely black, like the head and gaster, and there is a black spot on each node of the pedicel; in others the thorax is deep red, with the mesopleuræ, metanotum, posterior border of scutellum and the mesonotum, except for a pair of small red anterior and a larger posteromedian spot, black. Wings distinctly brown at the base, with light brown veins and stigma.

Male. Length 5.5—6 mm. Scapes very short and straight, only about $\frac{1}{6}$ as long as the funiculus and as long as its two basal joints. Club distinctly 5-jointed. Hairs yellow, long and abundant, especially on the legs. Body and appendages black; antennal clubs dark red, tarsi dark brown, articulations of legs yellowish. Wings like those of the female.

Utah: (Emery).

Colorado: Florissant, 8,000-9,000 feet; Cheyenne Cañon, 5,990 feet (Wheeler); Westcliffe, 7,849 feet, and Boulder, 5,347 feet (P. J. Schmitt); Ward, 9,000 feet, and Half-way House, Pike's Peak (T. D. A. Cockerell).

New Mexico: Top of Las Vegas Range, 11,000 feet; Harvey's Ranch, Las Vegas Range, 9,600 feet; Beulah, 8,000 feet; (T. D. A. Cockerell), Beatty's Cabin, Upper Pecos Valley (Mrs. W. P. Cockerell).

5. *Var. canadensis* var. nov.

Worker. Length 4—5 mm. Differs from the variety *sulcinodoides* in its somewhat smaller size and in the coloration, which is yellowish brown, with the upper surface of the head and the gaster, except at the base and tip, dark brown or blackish. The sculpture on the head is somewhat weaker, the hairs on the body slender and pointed.

Female. Length 5—5.5 mm. Resembling the worker. Thorax yellowish brown with the metanotum, posterior border of scutellum, an anteromedian, often double, blotch and two large parapsidal blotches on the mesonotum, black. Wings distinctly brown at the base, with brown veins and stigma.

Male. Length 5—5.7 mm. Closely resembling the male of the var. *sulcinodoides*, and with equally short antennal scapes. The wings, however, are of a deeper brown at their bases, the mesonotum is more densely and more extensively striated, and the hairs on the legs are shorter and stiffer.

Connecticut: Colebrook, Litchfield County, 1,000-1,600 feet.

Massachusetts: New Boston, Berkshire County, 1,400 feet.

Maine: (Pergande); Ogunquit (H. S. Platt).

Pennsylvania: Lehigh Gap.

Michigan: Marquette (M. Downing); Isle Royale (O. Gleason).

Wisconsin: Milwaukee (C. E. Brown).

Nova Scotia: Digby (J. Russell).

British Columbia: Golden (W. Wenman).

This is the only form of *brevinodis* which descends to lower levels in the Northern States. Transitional forms between it and the true *sulcinodoides* undoubtedly occur. Females from several of the Nova Scotia colonies have the thorax nearly black, and the workers of many colonies from the same region are almost yellow, with only the posterior portion of the head and a broad band across the gaster dark brown. The var. *canadensis* rarely reaches as great a size as the variety to which I have restricted the name *sulcinodoides*, and nests in cool bogs or meadows, under stones or logs. Its larvæ and young pupæ are pearly white and not greenish yellow.

6. Var. *subalpina* var. nov.

Worker. Length 4—5 mm. Resembling *canadensis* in color but differing both from it and *sulcinodoides* in having the hairs on the body obtuse, instead of pointed, and somewhat stouter than in the other varieties.

Female. Length 4.8—5 mm. Colored like the female of *canadensis*, but with the wings whitish hyaline throughout, with very pale brown

veins and stigma, and the upper surfaces of the petiole and postpetiole black.

Male. Length 4.3—4.8 mm. Closely resembling the male of *canadensis*, but with the wings colorless at the base as in the covarietal female.

Colorado: Florissant Cañon, occurring at a higher level (8,500) than *sulcinodoides* and replacing this variety along the margins of some of the streams and meadows.

7. Var. **frigida** Forel.

According to Forel, the worker of this variety has "the head longitudinally rugose, also at the sides, and nearly without transversal reticulations (in the typical *brevinodis*, the sides of the head are more reticulated). The abdomen highly polished, with only a few scattered erect hairs (more hairy and with slight scattered punctures in the typical *brevinodis*.) The whole body less hairy than in the typical *brevinodis*. Red; the abdomen and the upper side of the head brown. In all other parts like the typical form of the subspecies.

"Ice River Valley, British Columbia, 5,000 feet." [Edw. Whymper].

A single worker from Homer, Alaska, (A. Mehner) and a number of workers and males from the Bay of Islands, Newfoundland (L. P. Gratacap) in my collection agree very well with Forel's description. The color of the workers and the shape of the antennal scapes are the same as in the var. *sulcinodoides*. The sculpture is also very similar, except that the sides of the head are longitudinally rugose, and the petiole is coarsely longitudinally rugose in front and transversely rugose behind. In the male, the scapes are very short, not longer than the two succeeding joints together, or $\frac{1}{6}$ of the funiculus. The hairs on the body and legs are nearly white. Length of worker, 4.8—5.3 mm; of the male, 5.5—6 mm.

The host of the typical *Leptothorax emersoni* is the variety above described as *canadensis*, that of *L. glacialis* the var. *subalpina*. I have been unable to detect any differences in the habits or behavior of these two host ants. The nest of the Colo-

rado variety resembled in every way that of the Connecticut form, and the small nests of *L. glacialis* were arranged around the periphery under the edges of the stones in the same manner as those of the typical *emersoni* in the bogs of the Litchfield Hills. That the habits of the Western inquiline, however, are somewhat different from those of the Eastern type, is indicated by the following notes on the colony kept under observation in an artificial nest from July 17th to August 31st.

The artificial nest was of the design which I have described and figured in a former paper.* and consisted of two chambers of the same size, one of which was kept dry and illuminated, the other darkened and kept moist with a slice of sponge soaked in water. The installed colony consisted of the broods of both species, about a hundred *Leptothorax* workers, and a few males and females, and about seventy-five *Myrmica* workers. The queen of the latter species escaped while the ants were being collected. As soon as the ants and their broods, together with some of the earth in which they had been living, were placed in the lighted chamber, the *Myrmicas* hastened to transport their own larvæ and pupæ to the dark chamber. The *Leptothorax*, however, remained behind, and by the following day had hollowed out a small cavity in the earth and had brought into it all their young. This cavity was immediately beneath the glass roof-pane and fully exposed to the light. The *Myrmicas* kept visiting the *Leptothorax* continually, but the latter pulled the intruders' by the forelegs or antennæ, and in every way showed the same desire to be left alone in their own habitaculum, as I have observed, under similar circumstances, in the Eastern *emersoni*. The *Myrmicas* endured no end of tweaking and pulling, but nevertheless kept pushing their way into the *Leptothorax* cavity as if unable to forego the society of their little inquilines.

Although so jealously guarding their own habitaculum against

*On the Founding of Colonies by Queen Ants, with Special Reference to the Parasitic and Slave-Making Species. Bull. Am. Mus. Nat. Hist. XXII, 1906, p. 48, fig. 1.

the intruders, the *Leptothorax* workers did not hesitate to enter the chamber in which the *Myrmicas* had taken up their abode. There they ran about, accosting the *Myrmicas*, which had gorged themselves with the sugar water in the manger in one of the corners of the chamber. The *Leptothorax* mounted their backs, shampooed their bodies and then, turning to the ventral side, promptly placed their tongues in contact with those of their host and imbibed the regurgitated sweets. The shampooing, however, was of much briefer duration and much more perfunctory than in the colonies of the typical *emersoni*. Often the *glacialis* worker omitted these manipulations altogether and went at once to the mouth of its host. Sometimes as many as five or six of the little ants would remain standing on the floor of the nest and drink simultaneously from the tongue of a single *Myrmica*. If the host failed to proffer the droplet of food, the *Leptothorax* would usually pinch her fore leg or antenna, and this more emphatic and probably more painful appeal rarely failed to elicit the desired response. The *Leptothorax* undoubtedly obtained all of their food from their hosts, for during the entire six weeks they were under observation, I never found one of them eating from the manger, or even showing the slightest interest in its contents. In the privacy of their own quarters, however, they freely fed one another by regurgitation with the food they had obtained from the *Myrmicas*.

As by July 20th the *Leptothorax* had shown no disposition to move their brood into the dark chamber with the *Myrmicas*, I undertook to coerce them by exposing their quarters to the bright sunlight. Even this had no effect, till the glass roof-pane became heated, when they slowly and reluctantly took up their larvæ and pupæ and migrated into the dark chamber. Then the entrance between the two chambers was closed. I expected the *Leptothorax* to establish themselves in one of the larger cavities of the sponge, as had been done by some of my colonies of the typical *emersoni*, but they merely stacked their brood in three piles at the end of the sponge. Here they were, of course, fully exposed to the *Myrmica* workers and the latter began to visit them assiduously. The

presence of the brood, however, caused the *Leptothorax* to react by pulling and tweaking the fore legs and antennæ of their visitors. By the following day they had brought all their laræ and pupæ together in a single pile on the side of the sponge opposite that occupied by the *Myrmicas* and their brood.

July 23rd I left Florissant, and for several days traveled about in Colorado, carrying the nest in my luggage. The jarring of the railway train must have had a tendency to mingle the broods of the two species, for during the night of July 23rd to 24th, the *Leptothorax* built a wall of agglutinated sugar crystals about 4 cm. long, parallel with and about a cm. from the edge of the sponge. This wall they were apparently unable to carry up to the roof-pane, so that the long, narrow chamber which they had endeavored to construct, and in which they had placed their brood, was open above and at both ends. The visiting *Myrmicas* were in no wise restrained by the crystalline rampart, but in their uncontrollable craving to be near the little inquilines kept climbing over it or pushing their way into the openings at the ends.

No change was observed in the relations of the two species till I reached Colorado Springs, July 26th, when I found that the *Leptothorax* had abandoned their useless abode at the edge of the sponge and had moved their brood in under a delicate film of sugar, which they had built inside the food-cup. This film was fastened to the floor and to the vertical wall of the cup, so as to enclose a triangular cavity, which communicated with the outside by means of a single small opening. Structurally this little cell was, of course, an admirable contrivance for preventing the visits of the *Myrmicas*, but, unfortunately, by August 1st, its sugar wall had been partly dissolved by the moisture in the chamber, and partly eaten by the host ants, so that the little guests and their brood were again exposed on all sides. They now gave up all attempts at keeping their brood sequestered, and by August 3rd, when I arrived in New York, to my surprise, both species had collected and mingled their broods together in a single large cavity in the sponge. Henceforth, till all of the pupæ of both species had hatched, the workers of one species did not hesitate

to seize and carry the offspring of the other indiscriminately, although up to this time neither had shown the slightest interest in the brood of the other. By reversing the illumination of the chambers and keeping damp sponges in both of them, it was possible to make the ants move back and forth from one to the other, but, although this was repeated on several successive days, the ants always ended by keeping their brood intermingled, either at the edge of the sponge, or in one of its cavities. The original compound nest had, therefore, been converted into a mixed colony. This was quite unexpected, as I had found it extremely difficult to bring about such a result in my colonies of the typical *L. emersoni* and *M. canadensis*. The rapidity of this conversion may have been connected with the condition of the inquiline and host broods, for at the time of its occurrence all the larvæ had become pupæ, and many of these were pigmented and ready to hatch. The presence of eggs or larvæ among the *Leptothorax* brood would probably have rendered such a fusion of the two colonies impossible.

Early in August a few males and females of the *Leptothorax* and seven males of the *Myrmica* made their appearance. The behavior of the inquilines towards the latter was the same as towards the workers. The little ants shampooed these black, winged creatures and licked their mouth-parts, but I was unable to ascertain whether any food was regurgitated. The *Leptothorax* were always on hand whenever a *Myrmica* male was being fed by a worker of its own species. Sometimes the guests would congregate in numbers and lap up portions of the food as it was passing from the tongue of the worker to that of the male.

August 10th I isolated twenty of the *Leptothorax* workers and a few of their pupæ in a nest provided with honey and a few dismembered house-flies. The ants lived for a few days in a cavity of the sponge till their pupæ had hatched and then wandered aimlessly about the nest. They were never seen to approach the food in the manger and gradually died one by one before the end of the month. This result was very different from that obtained with isolated colonies of the typical *L. emersoni*, for these soon

learned to eat from the manger and lived several months as a pure colony.

During August the gaster of one of the larger *Myrmica* workers in the original nest became unusually distended, and as small packets of eggs were continually appearing and being as rapidly devoured by the workers, I concluded that this unusual individual had become gynaeccoid and was trying to function as the queen of the colony. At the end of the month, after all the brood of both species had hatched and the ants had become demoralized, as usually happens when there are no young on which to concentrate their attention, I discontinued my observations. The gynaeccoid worker was dissected and found to contain a number of mature eggs.

The above observations indicate that the habits of *L. glacialis* are similar to those of the typical *emersoni*, although differing in two important respects: first, the Colorado form feeds less on the surface secretions of its host and more on regurgitated food; and, second, this ant seems to have lost the instinct to secure its food in any other way. If further observations should prove that these differences are common to all colonies of *L. glacialis*, and not an idiosyncrasy of the colony which I happened to have under observation, or due to the depressing and demoralizing effects of confinement in an artificial nest, we should be justified in concluding that this subspecies has reached a more advanced stage of inquilinism or parasitism than the typical form of the Eastern States.

American Museum of Natural History,
New York City, March 9th, 1907.