

XX. *Revision of an Essay on the British Formicidæ, published in the Transactions of the Society. By*
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[Read 7th Dec. 1857.]

SINCE the publication of my first "Essay on the British Formicidæ," several additional species have been discovered, and much interesting information obtained; it therefore appeared to me to be desirable that a revised list should be laid before the Society. Two important works on the Ants of Europe have also appeared—first, "The Ants of Austria," by Dr. Mayr: and, subsequently, a "Synopsis of the Ants of France and Algeria," by Dr. Nylander; both these works are of the highest entomological excellence. I have adopted the divisions into which Dr. Mayr has divided the genus *Myrmica*, this will very greatly facilitate the discrimination of the species.

In my former paper I particularly alluded to the fact of various *Coleoptera* being found in the nests of Ants, and I enumerated several species of the genera *Myrmecodonia*, *Lomechusa* and *Claviger*; I also recorded the discovery of a specimen of *Batrisus*, which I at that time supposed to be the *Batrisus formicarius*, I have since ascertained that it is the *B. venustus*; since the publication of my observations on these Myrmecophilous Beetles a long list of rarities has appeared.

Mr. Janson has given a powerful stimulus to our researches by his observations and instructions published in the Entomologist's Annual for 1857; his researches however were confined to five species, and there are five times that number of ants in this country, therefore much has yet to be done. I would particularly direct attention to the nests of *F. sanguinea* and *F. cunicularia*: the former is not uncommon at Weybridge and in the neighbourhood of Blackwater, Hants. *F. cunicularia* is to be found on Hampstead Heath and in many places in the neighbourhood of London.

The connection between the Ant and the Beetle still remains a mystery, although I have lost no opportunity of endeavouring to penetrate and unravel the history for some years past, and have

particularly alluded to it in the former part of this Essay, in the hope of inducing others to attempt the solution. It is most probable that the ants imprison only the species of *Staphylinidæ*, and that all other beetles found there resort to the nests for the purpose of feeding upon a suitable nutriment which they contain, or for the purpose of undergoing their metamorphosis; many which are found in ants' nests during winter have undoubtedly sought that situation for the purpose of hibernation. From the various species of *Brachelytra* I think there can be little doubt the ants obtain an exudation similar in its nutritive qualities to that which they obtain from the *Aphides*; those species which we see the ants carrying into their nests, tending with such care, and which, on our disturbing their habitations, they eagerly seize and carry off with the same precipitation as their young brood, are undoubtedly conducive to an important phase of their economy. Species of *Coleoptera*, such as *Heterius sesquicornis*, various species of *Liodes*, *Cryptophagus*, *Corticaria*, *Latridius* and *Dromius*, all of which I have met with, cannot be supposed to be in any way capable of furnishing nutriment for the ants, but may still prove benefactors by feeding upon and removing substances which might otherwise render their habitations more or less foul and unhealthy.

Of all the families which compose the insect-world, there is none in my opinion, which presents such wonderful varieties—I may say eccentricities of form, as the *Formicidæ*; the organs of manducation in some species, as in *Drepanognathus* and *Eciton*, present an elongation equalling the length of the insects themselves; in *Atta*, and some other genera of that family, they are thickened and expanded to such a size as to be nearly equal to one half of the head itself; then again, as a reverse of this, in the males of some species of *Myrmecina*, the mandibles are rudimentary and in others obsolete. The antennæ partake of every variety of length and thickness, and the palpi of every number of joints between six and one; the variation in the number of the joints of the antennæ, forms perhaps one of the most remarkable deviations from what may be considered the normal number, namely, twelve in the female and worker of the social species, and thirteen in the males of the entire group of this class of insects. In the genus *Cryptocerus* and its allies, several remarkable deviations from the usual number of joints in the antennæ are met with: thus in *Orectognathus* the number is six in the worker ants, whilst in *Cryptocerus* they vary from nine to twelve in the workers. Remarkable as these deviations certainly are, they are not in my

opinion, to be compared to a deviation in excess of the normal number of joints in the antennæ of males ; indeed, so very rare is this the case, that only a single instance has been, to my knowledge, recorded ; this occurs in the genus *Pheidole* (*Æcopthora*, Heer), the male of which has seventeen-jointed antennæ. The above remarkable phenomena are quite sufficient to awaken our curiosity and beget a desire to investigate the structure of these wonderful creatures, but it forms a mere prelude to perhaps the most incomprehensible, or certainly at present impenetrable, mystery which is to be found in the entire range of the insect world ; I allude to the amazing variety in the size and situation of the eyes ; in some species these organs occupy the greater part of the head, in others they are reduced to so minute a scale that they are only perceptible under a considerable magnifying power, in many species they are entirely obliterated. If the presence or absence of the eyes proved to be an index to the habit of the species, the mystery which at present surrounds the subject would have no existence, but such is not the case : species whose habits are to a considerable extent subterranean, are furnished with these organs, whilst others, whose habit is to live and forage above ground, are without eyes. In the genus *Pseudomyrma* all the species have very large eyes, occupying in some instances the whole of the sides of the head ; in some ants the eyes are placed high on the head, in others, as in *Æcodoma*, they are situated low down near the base of the mandibles. The presence or absence of ocelli is equally remarkable : in the workers of the genus *Formica* they are usually present, but a few exceptions are to be met with ; whilst in the genus *Myrmica* and its allies the ocelli as a rule are obliterated, they are however present in the males and females of the entire family. The number of ocelli is usually three, but in many instances they are reduced to two, whilst in the genus *Atta* and *Æcodoma*, in some large-headed workers, the number is reduced to one, and this is not placed in the usual situation on the vertex, but on the face near the base of the clypeus.

These brief allusions to exotic forms, it is hoped will beget an interest in the minds of some members of the Entomological Society, and lead them to pursue the investigation of the *Formicidæ*, which, it will be seen, possesses an equal, if not superior interest to any other family of insects.

There is still another point of view in which we must briefly survey them ; the unceasing industry of these creatures has always been held up as a pattern to man for his guidance in that

respect, "Go to the ant, thou sluggard, consider her ways, and be wise; which having no guide, overseer, or ruler, provideth her meat in the summer and gathereth her food in the harvest;" this teaches us an invaluable lesson of prudence and forethought, and the sluggard is directed accordingly to "consider her ways and be wise." When, however, we glance at the habits of the entire group, we shall presently perceive, that although a lesson of prudence may be learnt from the ant, there is scarcely any of the most atrocious and fearful crimes which may not be inculcated when we investigate the habits of all the species; although numberless are the peaceful and industrious communities which we survey, we see others whose sole occupation appears to be to plunder the habitations of less warlike species, nor is their sole object confined to plunder; the species of the genus *Eciton* are the most savage and cruel of the tribe, they enter the nests of species of *Formica*, and ruthlessly drag out the peaceful inhabitants, after tearing them limb from limb, they carry off the mangled remains to their own dwellings. The system of slavery is the habit of numerous species, these plunder the nests of other communities and carry off pupa and perfect insects. Thus we see the necessity of considering the ways of those species alone to which the words of Solomon evidently direct our attention, "Go to the ant, which provideth her meat in the summer, and gathereth her food in the harvest."

The species of the genus *Formica*, discovered in this country since the publication of the Essay, are alone described here; whilst all those of *Myrmica* are enumerated under the respective subdivisions into which that group is now divided.

Genus 1. FORMICA, Linn.

Subdivision 1.—The anterior wings with the discoidal cells obsolete; the large workers frequently with the head greatly enlarged; the ocelli obsolete in the workers; the petiole with one node or scale, incrassate, wedge-shaped, or subglobose. None of the species of this subdivision have been discovered in this country.

Subdivision 2.—The anterior wings with one discoidal cell; the large workers only distinguished by size, not by any remarkable structural difference, the ocelli present in all the sexes, the scale of the peduncle vertical and compressed.

Formica congerens, Nylander.

Female.—Length 4—4½ lines. Very closely resembling the *F. rufa*, but distinguished by being covered with a shining cinereous pile; the eyes pubescent, and the abdomen sub-opaque; not shining as in *F. rufa*.

Worker.—This is distinguished from the worker of *F. rufa* by the same characteristics as the female; the pubescence on the eyes is not discernible without a high magnifying power; it is however a very marked distinction.

Male.—Black and covered with cinereous pile; the head and thorax covered with short black pubescence; the scale of the petiole sub-quadrate, slightly and widely emarginate above.

Nylander says, this insect constructs similar nests to the *F. rufa*, and, on being disturbed, emits the same strong odour of formic-acid.

The species was taken in Scotland by Mr. Foxcroft in 1846, at Loch Rannoch;—the male only has yet been captured. The species is so very like the *F. rufa* that it would not be recognized as a distinct species by any one but an Entomologist; the most striking difference being that it is thinly covered with hair, *F. rufa* being naked.

Formica brunnea, Latr., Nyland., Mayr, Schenck.

Worker.—Length 1¼—2¼ lines. Pale ferruginous, covered with a fine cinereous silky pile; the abdomen obscure fusco-testaceous; the head much wider than the thorax, with a distinctly impressed line passing upwards from the clypeus, and extending nearly to the vertex; the scape rather paler than the head, the flagellum faintly dusky above towards the apex; the head slightly emarginate behind.

Female.—Length 4½ lines. Dark fuscous, with a fine cinereous pile; the mandibles, antennæ and legs pale rufous; the flagellum and femora slightly obscure; the head as wide as the thorax; the scape of the antennæ and the tibiæ without pile or pubescence; the basal half of the wings more or less fuscous; an impressed line on the front terminating at the anterior ocellus.

Male.—Length 2 lines. Dark fuscous: the antennæ, scape and legs brown; the flagellum and the articulations of the legs pale testaceous; a line on the front deeply impressed; the eyes not pubescent; the scale of the peduncle emarginate; the basal half of the wings fuscous.

Although this species appeared in the list of British Ants some years ago, another species, the *F. umbrata* of Nylander, was mistaken for and represented it in the Stephensian Cabinet; it was not, to my knowledge, discovered until last year, when I met with it at Deal.

Sub-family MYRMICIDÆ.

The number of joints in the palpi differing in the species; eyes usually of moderate size, sometimes minute; males and females with ocelli, obsolete in the workers; the petiole of the abdomen with *two nodes*; the females and workers furnished with a sting; pupæ not enclosed in cocoons.

Genus 1. MYRMICA.

The maxillary palpi 6-jointed; the labial palpi 4-jointed; the anterior wings with the nervure at the apex of the first and second submarginal cells uniting and divided in the middle by a transverse nervure; the marginal and submarginal cells incomplete; the antennæ clavate.

- Sp. 1. *Myrmica ruginodis*, Nyl.
- Sp. 2. *Myrmica scabrinodis*, Nyl.
- Sp. 3. *Myrmica lævinodis*, Nyl.
- Sp. 4. *Myrmica sulcinodis*, Nyl.
- Sp. 5. *Myrmica lobicornis*, Nyl.
- *denticornis*, Curtis.

Subdivision 2. (TETRAMORIUM, Mayr.)

The maxillary palpi 4-jointed; the labial palpi 3-jointed; the anterior wings with one marginal, two submarginal and one discoidal cell; the clava of the antennæ 3-jointed.

Sp. 6. *Myrmica cæspitum*.

Myrmica cæspitum, Latr., Los., Nyland., Smith, Schenck, Fœrst.

Sp. 7. *Myrmica lippula*, Nyland.

Worker.—Length $1\frac{1}{2}$ lines. Ferruginous: the abdomen nigro-fuscous in the middle; the head and thorax finely rugose, the thorax more strongly sculptured than the head; the mouth, antennæ, legs, and abdomen beneath, pale ferruginous; the frontal area at the base of the clypeus very smooth and shining; the eyes

very small, placed rather forward on the sides of the head; the meso- and metathorax with a deep strangulation between them; the spines on the metathorax minute and acute; the petiole of the first node of the abdomen elongate, slender and rugose; the second node globose.

Female.—Length $2\frac{1}{2}$ lines. Closely resembles the worker in the form of the head, but has the eyes larger and the ocelli distinct on the vertex; thorax elongate-ovate, not so coarsely sculptured as in the worker; the wings hyaline, the nervures pale testaceous; abdomen rather more elongate, but with a similar long petiole to the first node as in the worker, in colour precisely similar.

This species is described in my Essay as the *M. graminicola* of Latrielle. The minute eyes and elongate petiole sufficiently distinguish it; it is rare, but I have occasionally taken specimens in and about London; the female is met with very late in the season: I took it at the end of October, and Mr. Wing once brought me a winged specimen he had just taken in his garden at Lambeth on the 9th of December; Mr. Reading of Plymouth also met with this species in Devonshire.

Subdivision 3. (LEPTOTHORAX, Mayr.)

The maxillary palpi 5-jointed; the labial palpi 3-jointed; the female and worker nearly of the same size; the anterior wings with one marginal, two submarginal, and one discoidal cell; the second submarginal sometimes semi-complete; the pubescence on the female and worker subclavate, or gradually tapering to the base of the hairs; the club of the flagellum 3-jointed.

Sp. 8. *Myrmica acervorum*, Fabr.

Myrmica acervorum, Zett., Nyland., Færst., Smith.

Myrmica graminicola, Latr. Hist. Nat. Fourm. (*var. worker*.)

Sp. 9. *Myrmica Nylander*, Færst.

Myrmica Nylander, Færst. Hym. Stud. Form. (1850.)

Myrmica cingulata, Schenck, Nass. Ameis. p. 104. (1852.)

Nyland, Form. Fr. et d'Algér. p. 93, 20.

Myrmica parvula, Schenck, Nass. Ameis., pp. 103, 140.

Leptothorax Nylander, Mayr, Form. Austr. p. 175, 11.

Leptothorax parvulus, Mayr, Form. Austr. p. 176, 12.

The species named "*unifasciata*" in British collections is not that which continental authors consider to be Latrielle's species, and in one respect it hardly agrees with his description—the abdomen is fuscous, with the base and apex pale; in the species which represent *unifascia* in the collections of Nylander, Mayr, &c., the abdomen has a narrow ring on the basal segment, and the club of the antennæ is fuscous; the latter species I have not yet seen captured in this country. It may, however, be in some collections mixed with *M. Nylanderii*.

Subdivision 4. (STENAMMA, Westw.)

Stenammas, Westw. Intro. Class. Ins. ii. p. 266. (1840.)

Formicoxenus, Mayr, Form. Austr. p. 141. (1855.)

The maxillary palpi 4-jointed; the labial palpi 3-jointed; mandibles dentate; the worker and female with the second node of the petiole spined in front beneath; the club of the antennæ 3-jointed; the anterior wings with the marginal cell open, incomplete; one complete submarginal cell, and one discoidal cell.

Sp. 10. *Myrmica Westwoodii*.

Stenammas Westwoodii (Steph.), Westw. Intro. Class. Ins. ii. p. 226, ♂.

Formicoxenus nitidulus, Mayr, Form. Austr. 146, 1.

Myrmica nitidula, Nyland.; *Myrmica læviuscula* and *debilis*, Fœrster.

Worker.—Pale rufous, smooth and shining, the head of a deeper colour, more or less, above; the antennæ 12-jointed, with the club rufo-fuscous, the tip paler; the metathorax with a smooth central depression on each side, furnished with a stout tooth directed horizontally backwards; abdomen nigro-piceous in the middle; the first node of the petiole with a cariniform process beneath; the second node with a stout spine at the base pointing forwards. Length $1\frac{1}{4}$ lines.

Female.—This sex differs only in having the ocelli distinct, the thorax more ovate, the wings hyaline, and the stigma fuscous. Length $2\frac{1}{4}$ lines.

Male.—Nigro-fuscous, the mandibles tridentate; the antennæ 13-jointed; the legs pale; the femora more or less fuscous; the metathorax with two short erect teeth; the wings of a milky whiteness; the nervures scarcely discernible; the entire insect thinly sprinkled with pubescence. Length 2 lines.

Nylander is of opinion that the male constitutes the *Stenammina Westwoodii*, this is probably the case; I have long suspected *Stenammina* to be a male of one of the small species of *Myrmica*. The female and worker were first discovered in this country by Mr. Waterhouse, in the nest of *Formica rufa*; Nylander says it also frequents the nest of *F. congerens*. The constant habit of this species appears to be to take up its abode in the nests of *Formicidæ*, whilst *Myrmica hirtula* is only to be found in company with *Myrmica muscorum*, and *Myrmica sublævis* in the nests of *Myrmica accrorum*; the two latter species have not yet been discovered in Britain.

Subdivision 5. (PHEIDOLE.)

Pheidole, Westw. Ann. & Mag. Nat. Hist. vi. p. 87. (1841.)

Myrmica, Nylander, Addit. alt. Form. Bor. p. 42.

Cecophthora, Heer, Ueber die Hausameise Madeiras's.

Labial palpi 2-jointed; maxillary palpi 2-jointed; antennæ with the club of the funiculus 3-jointed; the body slender; the legs sub-elongate; the (worker major) with the head very large, much wider than the abdomen.

Sp. 11. *Myrmica pallidula*.

Sp. 1. *Myrmica pallidula*, Nyland, Addit. alt. Mon. Form. Bar. p. 42.

Cecophthora pallidula, Mayr, Form. Austr. p. 183.

Cecophthora subdentata, Mayr, Einige neue Ameis.

Myrmica lævigata, Smith, Mon. Brit. Form.

Worker-minor.—Length 1 line. Described in the Monograph on the British *Formicidæ*.

Worker-major.—Differs in having the head very large, sub-square; the mandibles obscure; the abdomen fuscous in the middle; the head striated anteriorly, emarginate behind, and having an impressed line on the vertex; the insect slightly pubescent.

Female.—Length $3\frac{1}{4}$ lines. Rufous: head, thorax and abdomen above, slightly fuscous; the head delicately striated; the meta-thorax bituberculate and with a minute tooth on the tubercles; tibiæ pubescent; wings albo-hyaline.

Male.—Length $2\frac{1}{2}$ lines. Nigro-fuscous, shining; the antennæ 13-jointed; the sides of the thorax and the apex of the abdomen pale testaceous.

Since I described this species under the name of *Myrmica lævigata* I have had an opportunity of comparing it with specimens sent by Dr. Mayr, it proves to be the "*pallidula*" of his Monograph. I have also taken three more examples of the worker on a wall at Hampstead; Mr. Parfit of Exeter has sent it to me, he found it in a hothouse; I have a suspicion that it is introduced with plants or fruits, and will not prove to be indigenous.

Subdivision 6. (DIPHLORHOPTRUM, Mayr.)

The workers very minute; the labial palpi 2-jointed; the maxillary palpi 2-jointed; antennæ of the worker 10-jointed; the club 2-jointed; antennæ of the male 12-jointed; anterior wing with one marginal, one complete submarginal, and one discoidal cell.

Sp. 12. *Myrmica fugax*, Latr.

Myrmica fugax, Latr., St. Farg., Schenck, Smith, Mayr.

Myrmica flavidula, Nyland. Addit. Alt. p. 33.

Worker.—Length 1 line. Worker: Pale yellow, smooth, shining and slightly pubescent; the abdomen sometimes with a fuscous band in the middle; the mandibles 4-toothed; the eyes minute; head very delicately punctured; the thorax slightly constricted behind; the metathorax not spined.

Female.—Length 3 lines. Nigro-fuscous, smooth, shining and slightly pilose; the mandibles, antennæ and legs pale ferruginous; the head delicately punctured, with a deeply impressed channel running from the anterior stemma to the apex of the clypeus; the clypeus with a tooth on each side of its anterior margin. The first node of the petiole with a central depression above.

Male.—Length $2\frac{1}{4}$ lines. Black, shining and pilose; the antennæ and legs fuscous; the mandibles, articulations of the legs, the mandibles and tarsi testaceous.

This species is one of those which presents a great disparity in the size of the sexes, the workers being the smallest, if we except *M. molesta*, found in this country; the difference in colour is also remarkable, the male and female being nearly black and the worker of a pale yellow. I first discovered workers of this species at Southend, three years ago; this autumn I took the female at Deal on the Sandhills. The male has not been taken in this country to my knowledge.

Sp. 13. *Myrmica molesta*.*Myrmica molesta*, Say, Boston Journ., Nat. Hist. i. p. 293, 6. (1834.)*Myrmica domestica*, Shuck., Mag. Nat. Hist., p. 628. (1838.)

Daniells, Proc. Linn. Soc. ii. p. 172.

Smith, Cat. Brit. Hym. p. 119; and

Essay, Brit. Form. p. 131.

Nylander, Form. Fr. et d'Algér. p. 98, 26.

Hab. Britain, North America and Brazil.

This insect may now be regarded as cosmopolitan, I have examined numerous specimens from the above localities; Say was the first who described it, and who records its habit of intruding into houses. The Rev. Hamlet Clark brought it from Brazil, with this character:—"It is found everywhere and upon everything." Its native habitat, I think from this, must be Brazil, and that it has been imported elsewhere in merchandise.

Dr. Nylander has placed this insect in his eighth subdivision, which embraces the species belonging to the *Æcophthora* of Heer, but an examination of a winged individual shows that it has only one submarginal cell, and that the discoidal cell is obsolete in the male. Should this prove to be the case in the females also, a new subdivision or genus must be established for its reception.

Genus 2. MYRMECINA, Curtis.

Sp. 1. *Myrmecina Latreilli*, Curtis, Smith, M.*Myrmica striatula*, Nylander.*bidens*, Fœrst., Schenck.*graminicola*, Fœrst.*Latreilli*, Nyland.