

a wood clearing through which the path, such as it was, made its way, were a few specimens of *Argynnis aglaia* and *Brenthis euphrosyne*, and one or two *Melitaea athalia* and *M. dictynna*, and on coming out again into the fields *Erebia melampus*, *E. euryale*, *Aporia crataegi*, *Polyommatus hylas*, ♂s only, and *Cupido minimus* were not very uncommon. On reaching the steep cart-track that leads directly up to the Thalalp Pass a few other species appeared. *Parnassius mnemosyne* was by no means uncommon, though most of the specimens had seen better days; all those that I took showed indications of a row of white spots in the border, tending towards var. *nubilosa*, but not of the decided form of the Binnenthal. *Dryas paphia* was on the wing as well as *Argynnis aglaia*; *Pararge egeria*, the ♀s large and fresh, *Euchloë cardamines*, and *Leptosis sinapis* appeared a little lower down, and there were numerous specimens of *Pieris napi*, the ♀s, even at the highest level, showing no approach towards var. *bryoniae*. On recrossing Weesen marsh I saw a few *A. aglaia*, worn out at this level, and the first few *Agriades coridon* of the season, but there was no sign of *Lycaena euphemus* or *L. arcas*, or of any of the other marsh species which generally abound here.

(To be continued).

Myrmecophilous Notes for 1911.

By H. ST. J. K. DONISTHORPE, F.Z.S., F.E.S.

FORMICIDÆ.—Subfamily Ponerinæ.—*Ponera coarctata*, Latr.—A ♀ was found in the nest of *Lasius fuliginosus* at Darenth Wood on May 26th. A small colony was taken in moss at Box Hill, in May, which contained two ♀s and a few ♂s. They were placed in a small observation nest, but unfortunately the glass did not fit very well, and most of them escaped, so the nest was a failure.

Subfamily Myrmecinæ.—*Myrmecina graminicola*, Latr. (*latreillei*, Curtis).—One ♀ was found in a nest of *Lasius flavus* at Box Hill on May 7th, and three were found in a nest of *Formica fusca* in the same locality on April 13th. On April 14th I introduced one of these specimens into an observation nest of *F. fusca* obtained at Hartlepool in October, 1910. Next day I found it had been killed by the *fusca* ♂s. My nest of this species obtained last year is still in very good condition. I recorded¹ that on December 1st, 1910, a number of fair-sized larvæ were present. These larvæ passed the winter well, and on May 16th a number of pupæ were observed. On May 24th a new bunch of eggs had been laid. Some of the pupæ hatched in June and July, and proved to be ♂s, but on July 5th a ♂ was present. I find the ♂ feigns death when alarmed, in the same way as the ♀s and ♂s, by rolling up in a ball. On July 23rd a further batch of eggs had been laid, the previous ones being now small larvæ. By July 27th all the pupæ had hatched, the rest being ♂s. One of the ♀s has the antennæ deformed, being bent round and hooked. It is a pugnacious little ant, and attacks a brush if presented to it. It is generally to be found wandering about the nest away from the other ants, which all sit together in one corner. On September 10th larvæ of all sizes were present, and some pupæ. On November 20th the pupæ had hatched, and over 50 larvæ were observed, while the ♀ and all the ♂s were well, and no dead ants present.

¹ *Ent. Rec.*, 1911, p. 13.

Myrmica sulcinodis, Nyl.—A nest under a stone on the mountain above Loch Rannoch Hotel on June 14th was found to contain ♂, ♀, and ♂ pupæ, as did also another nest under a stone on the sandy bank of the Nethy, at Nethy Bridge, on June 21st. I took both nests home and reared the winged sexes in them. As I hope shortly to publish the distribution of our British ants as far as it is known I mention any localities where I may have found species which, as far as I know, have not been recorded before. Arnold, Ham, and I have all found this species in the New Forest. Besides nests under stones, I have several times taken deälated ♀s in sand-pits there.

Myrmica laevinodis, Nyl.—Colonies were found under stones on a small Island in Tobermorey Bay, off Mull, and on the Isle of Eigg in September. In two nests under stones at Rannoch, on the mountains, several nearly black ♀s were taken. On September 28th, at Flaxmere, Delamere, a few ♂s and a ♂ were found in sphagnum.

Myrmica scabrinodis, Nyl., was found on Mull in September.

Myrmica lobicornis, Nyl.—A ♀ was found in sphagnum on Mull. Two nests were dug up at Weybridge in July, both being beneath nests of *Formica sanguinea*: no ♀s could be found. I have taken this ant at Whitstable and on Wimbledon Common.

Leptothorax acervorum, F.—A ♂ was taken in a nest of *Formica exsecta*, and a deälated ♀ with *F. pratensis* at Rannoch on June 12th. This species is very common at Rannoch under bark. In one nest under the bark of a log, lying in the saw-pit, all the ants were observed to be covered with a fungus, but were quite active. I secured a number, but most unfortunately lost the tube. Wheeler² records the known cases of ants infested with *Laboulbeniaceae*, and he has himself found such ants. He says there are two known species, *Rickia wasmanni*, Cavora, and *Laboulbenia formicorum*, Thaxter, which occur on ants. It is impossible to say now if my ants presented a case in point. *L. acervorum* also occurs under stones on the mountains. I found two colonies under the same stone as *Myrmica laevinodis*. Both species had larvæ and pupæ, and appeared to be quite friendly. They did not attack each other when disturbed, and if they picked up each other's larvæ, or pupæ, when taking them into safety, they put them down again. The *acervorum* ♂s were very dark in colour, and Forel³ writes, "The alpine variety of this race is sometimes nearly entirely of a brown-black, and lives under stones." Cameron⁴ records an almost black variety of the ♂ at Kintail. I have found *L. acervorum* on the sandhills at Camber.

Leptothorax unifasciata Latr.—Crawley and I found a small colony in the cliff at St. Margaret's Bay on August 20th, we were unable to find ♂s, or ♀s. In 1907⁵ I found a larger colony there and secured a ♂ and deälated ♀.

Tetramorium caespitum, L.—In April Crawley and I visited St. Issey, in Cornwall, and we found many nests of this ant under stones on the cliffs. A number of *Cardamine* seeds were found in some of the nests on April 25th. I have before recorded⁶ taking the same seeds, which

². *Psyche*, xvii., 1910, pp. 83-86.

³. *Fourmis de la Suisse*, 1873, p. 84.

⁴. *Proc. Nat. Hist. Soc., Glasgow*, II., 1875, p. 293.

⁵. *Trans. Leicester, Lit., and Phil., Soc.*, 1908, p. 227.

⁶. *Ent. Record*, 1910, p. 17.

are probably either *C. flectuosa* or *C. hirsuta*, in many nests of this same ant at Whitsand Bay. They are not true Myrmecocorous seeds, as they do not possess food bodies. White⁷ records this ant "at Branscombe, S. Devon, manifesting harvesting instincts"! It would be very interesting if they were also *Cardamine* seeds be observed. *T. caespitum* is abundant at Whitsand Bay, and I always hope that *Anergates atratulus* and *Strongylognathus testaceus*, two parasitic ants, which live in the nests of *T. caespitum*, will be found there. We went down in July to try and find them and were joined by Keys. The very dry hot weather was unfavourable for us. The ground was baked up, and the stones over the nests were so hot during the heat of the day, that they burned our hands if held on them long. Only a few ants could be seen, and we had to dig up the nests to find anything. A number of ♂s and winged ♀s were secured, and a deälated ♀ found in one nest, in which were no winged sexes, was brought home with many of her ♂s as an observation nest. This ant chiefly occurs on or near the sea-coasts with us, but the following inland localities have been recorded, Hampstead Heath, Shirley, Chobham, Plumstead Wood, and Wellington College. It is not uncommon in the New Forest near Beaulieu Road Station, and I have found it at Tubney near Oxford.

Subfamily DOLIDOCERINÆ.—*Tapinoma erraticum*, Latr.—On May 18th, I took a small colony in the ground at Woking. It consisted of a deälated ♀ and about 25 ♂s. I fixed them up in a small plaster observation nest. The ♀ laid eggs but they were always eaten by the ♂s, in spite of their being supplied with plenty of food. In my former⁸ experiment with a queenless nest, the pupæ it contained and eggs laid by one of the ♂s were also devoured.

Subfamily CAMPONOTINÆ.—*Lasius fuliginosus*, Ltr.—On July 27th ♂s and winged ♀s were found swarming on the shoots and branches growing out of a tree stump, which contained a large nest of this ant. Copulation took place on the branches and no marriage flight was observed. Crawley and I have recently⁹ shown that ♀s of this species must have been fertilized by their brothers in the nest at Darenth Wood. It occurs in Harewood Forest, the only record I know for N. Hants. Morice has taken it at Hillmorton, in Northamptonshire. This is absolutely the only record I know for any ants from that county.

Lasius niger, L.—On August 9th I made the following notes on a marriage flight of this species, which took place on that day at Folkestone. A large colony occurred in one of the pillars of a gateway to a house in a street in the town. The ants entered the masonry by a hole in the mortar at the base of the pillar. At 5 o'clock in the afternoon the ♂s were much excited running all over the pavement, and up and down the pillar. A few winged ants were out, and going in and out of the entrance to the nest. At 6 o'clock thousands of ♂s and winged ♀s appeared. They emerged from the hole, swarming all over the pillar, and climbing to the top, and on the railings and shrubs in the garden. A very few couples were observed in copula; these flew away together. Most of the winged ants flew off separately; they rose

⁷ *Ants and Their Ways*, 1895, p. 242.

⁸ *Ent. Rec.*, 1909, p. 258.

⁹ *Paper read at the Meeting of the Ent. Soc. Lond.*, Nov. 15th, 1911.

straight into the air, going up so high that they were lost to sight. The ♂s helped some of them to start, tapping them with their antennæ, and pushing them to the edge of the top of the pillar. More ♀s than ♂s occurred. By 6.25 nearly every single winged ant had disappeared. Some few ♀s were already on the ground without wings. A marriage flight of this species was observed by two of my friends the same afternoon at Margate, and Seaview, in the Isle of Wight. On August 28th I noticed a marriage flight at Dover, and on my return to Folkestone the same afternoon another was seen there. Hubner writes¹⁰: "It is requisite that the temperature of the air should be at the 15° or 16° Reaumur (67° F.) to allow of our witnessing the departure of the males and females." It is evident that the ants are affected by some atmospheric influence, and it would be interesting to find out over how large an area they are affected at the same time.

Lasius niger, L., subsp. *alienus*, Först.—A nest was dug up at Weybridge on July 22nd. It contained plenty of ♂s and small cocoons, and some ♂s, but no winged ♀s. The ground was very hard and dry and no deälated ♀ could be found.

L. umbratus ♂s occurred with the *L. alienus*. It is possible that a deälated *L. umbratus* ♀ may have been present, as Crawley¹¹ has shown that *L. niger* will readily accept *L. umbratus* ♀s.

On August 20th Crawley and I found this subspecies abundant in the cliff at St. Margaret's Bay. In one colony many winged ♀s occurred, but no ♂s; in another very few winged ♀s, but more ♂s.

Lasius flavus, Fab.—On September 15th many nests occurred under stones on the small Island in Tobermorey Bay. Winged ♀s and ♂s were present, larvæ and cocoons. In one nest a deälated ♀ and eggs. Many of the ♂s were large and dark. Similar nests were found on the Isle of Eigg.

Formica fusca, L.—Many nests under stones occurred on the Tobermorey Island, and on Eigg a very small race was found. All the ♂s were exceedingly small, the nest was under a stone, but the ground underneath was too strong to dig it up properly, so no ♀ was found. I sent specimens to Forel, and he writes—" (Isle of Eigg), *Formica fusca*, L. Je possède des exemplaires aussi petits de la *F. fusca*. Ils sont fréquents dans les lieux froids. C'est l'effet de la dénutrition." A nest of *F. fusca* under the bark of a fallen tree at Helensburgh, on September 21st, contained winged ♀s and ♂s.

Formica fusca, L., var. *fusco-rufibarbis*, Forel, was found at Box Hill and Folkestone.

Formica rufa, L.—I have a little more evidence on the founding of colonies in *F. fusca* nests by ♀s of this species. On June 10th at Rannoch, in the Black Wood, I found a dead deälated *F. rufa* ♀ in a *F. fusca* nest under a stone. It had evidently entered the nest and had been killed by the *F. fusca* ♂s. On June 14th, high up on the mountain at Rannoch where no *F. rufa* nests occur, a deälated ♀ *F. rufa* was observed walking round a stone over a *F. fusca* nest. She eventually got under the stone and entered the nest. It was a small colony of *F. fusca*. I am unable to say if she was accepted, as I was unable to stay any longer.

On May 6th I introduced a deälated *F. rufa* ♀ from Wellington

¹⁰ *The Nat. Hist. of Ants*, Eng. trans., 1820, p. 99.

¹¹ *Ent. Mo. Mag.*, 1909, p. 94.

College into my *F. fusca* observation nest from Porlock. She as usual tried to conciliate the ♂s when attacked by them. On May 7th she was still somewhat attacked. On May 9th the same, and was held by the legs by some of the ♂s at times. She was not very aggressive, but killed one of the more persistent ♂s. By May 18th she was accepted and quite at home. She lived in the nest till July, when, unfortunately, she died. This nest contains two deälated *F. fusca* ♀s; the *F. rufa* ♀ used to sit with them, and I was anxious to see if she would have eventually killed them. In my mixed ¹²nest¹³ of *F. fusca* var. *fusco-rufibarbis* ♂s taken at Whitsand Bay, July 12th, 1909, and a *F. rufa* ♀ taken at Nethy Bridge, May 16th, 1909, the latter has brought up three families with the help of the ♂s. She laid eggs last on July 27th and September 7th, 1911. On August 16th over twenty cocoons were present, and by September 25th five small *F. rufa* callows had hatched, and over thirty cocoons were present. By November 1st, all the *F. rufa* cocoons had hatched, and they are all perfect, though small, and alive to-day, the *F. fusca-rufibarbis* ♂s being quite friendly with them. The ♀, unfortunately, died on October 5th, when I had had her for over two years, but this experiment has successfully proved this method of colony founding.

On June 15th I witnessed, at Aviemore, a marriage flight of *Formica rufa* for the first time. A number of ♂s and ♀s were seen flying about in a timber yard. They were running about on the large mound of sawdust in the hot sunshine, flying off and settling on it. The ♂s appeared to rise more easily than the ♀s, and to be hunting round for the latter. Copulation took place on the ground; I never saw a single pair together in the air. Sometimes a ♀ would rise and fly straight into the air, others ran about on the mound. A ♀ when found would sometimes refuse a ♂. I picked up one pair in copulation when the ♀ turned round and bit the ♂ and they separated. I found this ♀ afterwards refused any other ♂ that approached her.

An interesting observation was made on a branch nest of *F. rufa* in the Black Wood at Rannoch on June 12th. Two nests were found to be in connection 128 yards apart, one a large mound about 72 in. across by 54 in. in height a few yards below the path, and the other a small hillock about the same distance from the path on the other side of it. The ants were going backwards and forwards along the path to the two nests. Food was being carried to the large nest, but the ants were carrying their larvæ from the large nest to the smaller one. A deälated ♀ was trying to get to the smaller nest; though often stopped by the ♂s she persisted, and gradually won her way to it. Winged ♀s were upon the larger nest.

At Nethy Bridge nearly all the *rufa* nests examined contained pseudogynes. In one very large nest a number of pseudogyne callows were present, and naked pupæ, of which there were numbers, appeared all to be pseudogynes. There were very few myrmecophiles in the nests and it was evidently too late to find the *Atemeles*,¹⁴ the cause of all these pseudogynes.

Formica rufa, L. var. *alpina*, Santschi in litt.—On June 11th I found at Rannoch, on the edge of a moor, a small mound made of

¹² See *Ent. Rec.*, 1910, p. 82.

¹³ *Trans. Ent. Soc. Lond.*, 1911, p. 176.

¹⁴ *Ent. Rec.*, 1908, p. 281.

heather, etc. It was superficially very like a nest of *F. exsecta*. The ♂s running about on the mound, like *F. exsecta* does, were all small in size and very red, and might have easily been taken for *F. exsecta*. There were no tracks to and from the nest like *F. rufa* makes. On examining the ♂s I at once found that they were not *F. exsecta*. The nest was dug up and four deãlated ♀s were found. I concluded they were a form new to us, and when I had got them home I found the legs were more hairy and the scales had golden hairs, especially in the ♀s, in which characters they differ from *F. rufa*. I sent specimens to Forel and he says they are the var. *alpina*, Santschi in litt. He writes:—Your ants belong to a group of varieties which I once called *truncicolo-pratensis*. They are nearly the colour of the var. *dusmeti*, Emery, from Norway and Spain. Recently Santschi has discovered and distinguished it in our Alps under the name of *F. rufa* var. *alpina* in litt. I myself have received it from Norway and the Black Forest, etc., and have also found it in Switzerland. It is distinguished above all by the more narrow head, as Santschi has shown. It has some exserted hairs on the outer side of the tibiæ (hairs which fail in true *F. rufa*) and some spare hairs on the eyes. This variety is of course an addition to the British List; it is intermediate between the subspecies *pratensis* and *truncicola*. The latter we do not possess as British, but it is possible we may yet find it in the Highlands.

Formica rufa, L., subsp. *pratensis*, De G.—My chief reason for visiting Rannoch was to try and find this subspecies. On June 10th I found a small hillock of pine needles, etc., among the fir trees near the Loch inhabited by it. A number of ♂s were secured, and the nest was dug up, but no ♀s were found. On June 12th another nest was found close to the old one. It consisted of a large hillock of pine needles, etc., built over a pine stump. I dug it up, but with the help of a spade and an axe I could not get at the bottom, and no ♀s were found. Larvæ and cocoons were present. White¹⁵ writes: "This is the common wood ant at Bournemouth," and adds Loch Rannoch, Holnest, Porlock, and Exmouth (Dale). It is certainly not the common wood ant at Bournemouth now, and I am inclined to doubt the last three localities, Saunders¹⁶ says: "The race *pratensis* is rare in this country, but has been recorded from Bournemouth and Rannoch." I find I took a winged ♀ at Corbridge, in Northumberland, on June 3rd, 1906. The abdomen is dull and pubescent, and the scale has hairs, whereas in *F. rufa* the abdomen is smooth and very shining, and there are no hairs on the scale.

Formica sanguinea, Latr.—Dr. Sharp¹⁷ recorded the capture of *Microdon eggeri*, Mik., at Rannoch. Its known host is *F. sanguinea*, and I¹⁸ pointed out that it probably occurred at Rannoch, as I had discovered it at Aviemore and Nethy Bridge. I was consequently on the look-out all the time for nests of *F. sanguinea*, and on June 11th I found a very large colony under stones near a wall on the moor. Many *F. fusca* slaves were present. I took home some *F. sanguinea* ♂s in laurel to give away. Among them I found large ♂s of the var. *alpina* of *F. rufa*. As the *F. sanguinea* colony was quite near to where

¹⁵ *Ants and Their Ways*, 1895, p. 232.

¹⁶ *Hym. Acal.*, 1896, p. 2.

¹⁷ *Ent. M. Mag.*, 1910, p. 274.

¹⁸ *Ent. M. Mag.*, 1911, p. 43.

I found the *alpina* nest, it is obvious the former had executed a slave raid on the latter. I did not find any larvæ or pupa-cases of *Microdon* in the nest.

My observation nest of *F. sanguinea*, which I obtained at Woking on April 19th, 1910, is in splendid condition now. Their own ♀ died on May 1st, 1911. On May 5th I introduced a dealated ♀ *F. sanguinea* taken at Woking that day. In digging her up I had unfortunately cut off two of her legs and one antenna. She was at once accepted by my *F. sanguinea* ♂s and their *F. fusca* slaves, and by May 13th had laid several bunches of eggs. In spite of her crippled condition she is alive and well to-day (November 26th). The first callow hatched from her eggs on June 29th. On May 27th I introduced from Woking an *F. sanguinea* ♂, a slave *F. fusca* ♂, and another *F. sanguinea* ♀. The ♂ and slave were killed and the ♀ at first was attacked, but by May 28th she was also accepted, and laid eggs. By September 25th all the cocoons, from eggs laid by the two ♀s, had hatched, and to-day all are alive and well. One ♂ had the antennæ deformed in the same way as the one described above in the *Mymecina* nest and exhibited similar habits. It died on November 17th.

Formica exsecta, Nyl.—This species was also discovered at Rannoch, a new locality for it. On June 10th a small nest of the usual type was found by the side of a path in the Black Wood; on June 11th a large nest was observed near the Loch, and on June 12th two more large nests were found by another path in the Black Wood.

(To be continued.)

A Season's Collecting at Constantinople in 1911.

By P. P. GRAVES, F.E.S.

(Concluded from vol. xxiii., page 318.)

Of the Chrysophanids I found *Lowia dorilis* fairly frequent in its later broods. One or two ab. *purpureo-punctata* were taken. Most of my *Rumicia phlaeas* are of this form, and from June to the end of September all are more or less suffused, though I cannot say I came across any true g. a. *eleus*. I found *Chrysophanus thersamon* darker and on the whole larger than my Beirut specimens. The purple gloss on the submarginal area of the hindwings and apical area of the forewings (upperside) of the ♂ is often well marked. I found one or two ♀s with traces of bluish scales as in *R. phlaeas* ab. *purpureo-punctata*, and one ♀ which has the inner edges of 5 of the submarginal black spots on the upperside of the forewings covered with iridescent purplish scales. I have never seen any trace of these scales on the anterior wings of ♀s of *C. thersamon*. *L. alciphron* was uncommon and large, 47mm. to 49mm. Of my 2 ♀s one seems to be var. *meliboeus*, having the ground colour of the central area of the upperside of the anterior wings dull orange-red with no trace of purple reflections.

I need say nothing of the Theclids save that *Nordmannia ilicis*, and *Bithys quercus* were very large. Of the Lycænids, *sens. stricto*, *Cyaniris semiargus*, and *Aricia anteros* were the most interesting. The former seemed to belong to the var. *intermedia* (Tutt), being broadly dark margined, though I took no ♀s with more than the very faintest suggestion of blue scaling on the upperside. They varied in size, and I took among them a few large specimens that seemed very near var. *balcanica*, Tutt, save that the ♀s had the faintest trace of orange