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Great deeds are done and great discoveries made."

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A FORTNIGHT IN THE HIGHLANDS.

By G. T. PORRITT, F.L.S., F.E.S., &c.

A long-hoped-for collecting expedition to that classic ground to entomologists—Rannoch—was realized in June last. Some time previously Mr. C. A. Briggs of Lynmouth, Mr. J. J. F. X. King of Glasgow, and myself had arranged to visit the locality, the chief inducement being that we might capture our own series of the two local and up to that time rare dragonflies, *Æschna borealis*, Zett. (*cærulea*, Ström.), and *Cordulia arctica*, Zett. Monday, June 6th, therefore saw me on my way to Glasgow, where, at the railway station, Mr. King met me; and during the evening I had the rich treat of looking over his collections of Neuroptera and Trichoptera. Next morning we were up betimes to take the early West Highland train to Rannoch, and soon had the satisfaction of being joined by Mr. Briggs, who had been travelling all night in order to meet us. A journey through lovely Highland lake scenery brought us in due time to Rannoch, from which place we had a ten miles' drive before us to Camghouran, a small hamlet close to the famous Black Wood, on the south side of Loch Rannoch, and almost midway between the two ends of the lake, the distance indeed being about ten miles from Loch Rannoch at the west end, and eight miles from Kinloch Rannoch at the east end. At Camghouran Mr. King had already engaged for us comfortable "quarters" at the farmhouse of Mrs. Cameron, and there we spent nearly a fortnight in the wildest and most romantic spot it was ever my lot to be located in. Some collecting was done on the loch-side on the day of our arrival, but next morning we "set-to" in earnest to try to find the grand *Æschna borealis*. Not a trace of it could we then discover, and as we knew we were on the right ground, we were forced to the conclusion that it was not yet out. This proved to be the explanation, and nearly a week elapsed before we were absolutely certain we had even seen it. One morning, however, Mr. Kenneth J. Morton, of Edinburgh, who had joined us for a few days, called out that one had passed him, and a few seconds later Mr. King had it in his net. From that time the species emerged rapidly, due no doubt to the much hotter weather, and by the middle of our second week had become fairly abundant. But, like most species of the genus *Æschna*, *borealis* was most wary, and excessively difficult to catch. It does not, like *Æschna grandis* and *Æ. cyanea*, hawk for its prey in a forward and backward movement over the same ground, and so, unlike them, cannot be "waited for" until it comes within reach of the net. It flies at a terrific rate, but fortunately has a habit of settling on the ground, on tree-trunks, and perhaps oftenest of all on the dead trunks of felled trees. In such a situation we

often saw two, and now and then even three close together, but very fortunate indeed were we if we managed to secure one out of the lot! Up to the time of my leaving, on June 20th, about sixty had been secured among us—many more, no doubt, than had hitherto been taken in Britain altogether; but still we must have *seen* at least two hundred more specimens than we captured. We could not at all satisfy ourselves as to where the species bred; they occurred all over the Black Wood and the immediate district, and seemed indeed equally plentiful on the high moorland above the wood, and in the lowest parts of the wood, sometimes even getting into the main road at the bottom. We never saw one actually on the loch-side, nor did they seem at all to frequent the lochan Rusg-a-Bhiora, above the Black Wood; hence they apparently did not breed in the "big" waters. They were, too, equally absent from the small almost stagnant ponds so frequent in and near the wood, and where a number of *Libellula quadrimaculata* could almost always be found busy over domestic affairs. The Black Wood, although on a fairly steep hillside, is excessively damp, and the same may be said of the moorlands; and my own inclination is to believe that the species breeds in the wet mossy ground, and not in the ponds, although I admit it is difficult to conceive of so large a larva as *borealis* must have, being altogether comfortable in such situation.

Cordulia arctica has an altogether different flight to *Æ. borealis*, and is much easier to catch. Our difficulty with this species was to find specimens, and altogether we only managed to secure some sixteen examples among us out of perhaps twice that number seen. I do not think we saw a single specimen in the Black Wood, although all were taken on the higher and generally more open ground in the immediate vicinity. Still they were almost invariably seen near trees, and some certainly in the thick plantation of firs above the Black Wood. A common habit the species had was to ascend spirally to a considerable height, generally near a tall tree, and unless netted on its first rising from the ground was usually lost. The first day on which we saw the species, evidently when it was just beginning to emerge, Mr. King had the good fortune to secure six in a very short time; but no other similar fortune occurred to any of us, our captures afterwards being generally singly, and at long intervals. The other dragonflies taken were comparatively of less interest. The local *Leucorrhinia dubia* was common on the ponds, and about the heath near the lochan Rusg-a-Bhiora; and the pretty and variable *Libellula quadrimaculata* was abundant on both the high and low grounds. The fine *Cordulegaster annulatus* was common on the heaths, a beautiful object as it flew leisurely in the sun, its golden rings showing out conspicuously. A curious *Æschna juncea* was taken, so much like a *borealis* that it may be a hybrid, especially as no other *juncea*

occurred to any of us, and it was early for the species. The smaller species were represented by *Pyrrhosoma minium* and *Agrion cyathigerum* in fair quantity.

A trichopteron we were all anxious to take was the very rare *Limnophilus elegans*, but all our searching resulted in the capture of two specimens only, one by Mr. Morton, the other by Mr. King. As both were rather worn, probably we were a little late for it. Another interesting species in this group was *Apatania wallengreni*, which was found to be fairly common by beating trees on the side of Loch Rannoch, which as yet seems to be its only known British locality. The other Trichoptera included *Phryganea obsoleta*, several on Rusg-a-Bhiorna; *Neuronia ruficornis*, a few on the moors, &c.; *Colpotaulius incisus*, *Grammataulius atomarius*, *Limnophilus flavicornis*, *L. griseus*, *L. sparvus*, *L. centralis* and *L. luridus*, *Stenophylax lateralis*, *Philopotamus montanus*, *Plectrocnemia conspersa*, and *Rhyacophila dorsalis*.

Among the Perlidæ, we had one day probably a "record take" of *Isogenus nubecula*, which we found in great profusion by turning over stones close to the water on the loch-side; often six or seven specimens were found under a single small stone. The fine *Perla maxima* was found in a similar way under stones at the side of a broad burn which flowed close by the farm at which we were stopping; and beating trees along the burn-side produced *Chloroperla grammatica*, *Isopteryx torrentium*, *I. tripunctata*, *Teniopteryx risi*, *Leuctra fusciventris*, *Nemoura variegata*, *N. cinerea*, and others, including a *Hemerobius* which I have been unable to determine.

Mr. Briggs was the only one of us who paid any attention to the Ephemeriidæ, and he had his reward in the fortunate discovery of two species which have since been determined as quite new to Britain. One of them (*Leptophlebia meyeri*) attracted the notice of all of us, from its abundance near the lochan Rusg-a-Bhiorna; but of the other species (*Ameletus inopinatus*) Mr. Briggs seems to have taken only one specimen, on the shore of Loch Rannoch (see Ent. Mo. Mag. March, 1899, p. 69). *Tettix bipunctatus* occurred on the moors, but was the only orthopteron of which note was taken.

Lepidoptera were regarded as of only very secondary importance in the daytime, and practically only such species as came in our way when working at the other orders were taken, except, indeed, on several occasions when Mr. William Reid, of Pitcaple, joined us. Of butterflies, *Argynnis euphrosyne* and *Thecla rubi* forced attention by their abundance, the latter always among bilberry, on which, at Rannoch, its larva feeds. The Bombyces were represented by plenty of both larvæ and imagines of *Bombyx callunæ*, and I netted a beautiful male *Saturnia carpini* so late as the third week in June; a large batch

of eggs of the species were hatching on ling just about the same time, so it had probably been on the wing for a considerable period. Larvæ and cocoons of *Orgyia fascelina* were also not uncommon on ling, and a few larvæ of *Trichiura crategi* occurred. A fair number of Geometræ were picked up. *Eupithecia satyrata* var. *callunaria* was abundant, and *E. nanata* and *E. pumilata* fairly common, many of the latter being very highly coloured. *Melanippe tristata* was common, but, from its brown colour, not nearly so conspicuous as our blacker Yorkshire form; *M. hastata*, *Macaria liturata*, *Fidonia carbonaria* worn and apparently nearly over; *Scodionia belgiaria*, much paler and quite a different looking species to our Yorkshire moth; lovely forms of *Thera variata*, *Emmelesia blandiata*, and many others. Larvæ in this group included a very curious *Crocallis elinguarina*, in pattern and colouring a perfect imitation of the lichen-covered rail on which I found it resting, though no doubt it had come from an overhanging, also lichen-covered, tree; it produced a very pretty variety of the moth, unlike any other I have seen. *Ellopia fasciaria* and *Thera firmata* were beaten in plenty from pines, *Geometra papilionaria* on alder, *Thera juniperata* on juniper, and many others. We did not work at all for *Sesia scoliæformis* and *Pachnobia alpina*, but Mr. Reid was taking pupæ of the former and larvæ of the latter in some quantity at the time of our visit. Of Noctuæ observed in the daytime, *Anarta melanopa* occurred in abundance on one of the mountains, but, owing to the nature of the ground and the wild flight of the insect, not many were caught. A few *A. cordigera* were also about, but the species was evidently getting over; whilst *A. myrtilli* occurred sparingly on the moors. *Phytometra ænea*, fine and very highly coloured, was common; and from tree-trunks, &c., *Acronycta menyanthidis* and *A. glauca* were occasionally picked. Among the other genera, the pretty *Euchromia mygindana* was common among bilberry above the Black Wood; and *Pyrausta purpuralis*, *Botys fuscalis*, *Scoparia ambigualis*, *S. muralis*, *Sericoris daleana*, *Cnephasia musculana*, *Phoxopteryx biarcuana*, *P. myrtiliana*, *Pterophorus acanthodactylus*, and many others were observed. During our second week Mr. King and I sugared on most evenings, and it was on those occasions that our interest became really centred on Lepidoptera. Noctuæ were attracted in fair quantity, and especially interesting to myself, from the circumstance that I had never before seen them alive in a wild state, were *Hadena rectilinea* and *Acronycta myricæ*. Both species were in perfect condition, and the former was plentiful; a beautiful object it was on the sugared trees, though on some of the lichen-covered trunks they were so difficult to see that over and over again they would have been missed had it not been for a common habit they had of dropping to the ground when the light was turned on them. *Myricæ* only occurred during our last few days, and was

just getting well out. In point of numbers *Hadena adusta* took a good lead, and was in fine order, many of the specimens being very large and almost quite black. They were carefully looked over on the trees on the chance of *Crymodes exulis* being among them, but none of us were fortunate enough to get one. A plentiful and very interesting species too was *Rusina tenebrosa*, the specimens being generally smaller and much darker than any I had seen elsewhere; many of them were almost black with scarcely any marking, and quite a contrast even to our West Yorkshire examples. Very pretty forms of *Hadena pisi* and *H. dentina* occurred in moderate numbers, and a very welcome and not uncommon visitor was *H. contigua*. Only one *Acronycta leporina* was taken, perfectly fresh, and, to our surprise, of quite the pale southern type. The other visitors included *Cymatophora duplaris* and very dark *C. or.*, *Acronycta menyanthidis*, very pretty forms of *Xylophasia rurea*, *Agrotis porphyra*, *Gonoptera libatrix*, and a number of other ordinary species. *Platypteryx lacertula* or *P. falcula* (both, I think), *Ephyra pendularia*, and other common species were also taken at dusk. Mr. King and Mr. Reid had one evening's larva-hunting high up in the Black Wood, and found, mostly on bilberry, those of *Fidonia pinetaria* in plenty, a few of *Noctua sobrina* and *N. neglecta* (Mr. Reid), *Cloantha solidaginis* (?), *Cidaria populata*, and some, also on bilberry, which I think (and I had some feeding at home at the time) were *Oporabia filigrammaria*, though I am not aware that this species has been recorded from Rannoch. We were told that larvæ of *Aplecta occulta* had been common shortly before our arrival, but, judging it was then too late, we made no attempt to search for any. We ascertained too that a few imagines of *Petasia nubeculosa* had been taken in the spring, but that the species had been much scarcer than in some previous years.

The fact that *Hadena adusta* and *Rusina tenebrosa* were so much darker in the Highlands than in the West Riding of Yorkshire showed that, notwithstanding all that has been said and written during the past dozen or more years as to the probable cause of melanism in Lepidoptera, we know but little more than we did at the beginning. Both the species occur, the former commonly, in the same wood near my residence, in which are found almost absolutely black *Boarmia repandata*, *Amphidasys betularia*, *Hypsipetes elutata*, *Cidaria immanata*, *Miana strigilis* (only a very occasional specimen of this being other than var. *athlops*), and other species; and yet on the same ground *Hadena adusta* and *Rusina tenebrosa* are paler than at Rannoch, where the air is as nearly absolutely free from smoke or anything of that character as possible. On the other hand, I believe all the species I have mentioned as being so dark here are, excepting possibly *Miana strigilis*, of quite ordinary type at Rannoch. The much paler *Melanippe tristata*, too, gave the moth quite a different

appearance when on the wing to ours; and the specimen of *Acronycta leporina* was of the palest South of England form, whereas Yorkshire specimens are all of the dark variety *brady-porina*. The only *A. psi* taken was also an exceptionally pale one. In the Huddersfield wood alluded to, *Cidaria populata* occurs plentifully, and on the near moorlands is in the greatest profusion, but I have never yet seen one at all approaching the dark unicolorous Highland form.

Rannoch is a charming collecting district, but to those interested in Lepidoptera only I should recommend the last week in June and through July as likely to be much more productive than the time of our visit.

Crosland Hall, Huddersfield: March 3rd, 1899.

NOTE ON THE LIFE-HISTORY OF NEMEOBIUS LUCINA.

By REV. A. M. MOSS, M.A.

WHILE taking *Nemeobius lucina* last summer at Witherslack, I captured a pair "in cop.," the female of which I preserved alive in a glass-topped box, kept in the sunshine. After providing her with a couple of primrose leaves laid on soil, I was pleased to find that she fell in with my suggestion and laid me a score of eggs. They were deposited at intervals, about half a dozen at a time, spotted about the leaves, and all on the under side, the furry and uneven texture of the leaf being well adapted for this purpose, and affording an excellent shelter. From pale green they changed to pink; and in a fortnight or more, previous to emergence, the shells which had become semitransparent revealed little leaden-coloured larvæ curled up within.

Never had I less difficulty in breeding any insect; and I would strongly recommend any who are in want of a good series of *N. lucina*, to remember the story of the goose that laid the golden egg, next time a female turns up. Only one larva died in moulting, and one I preserved. I kept them in a flat biscuit tin on soil, very slightly moistened, and all I had to do was to supply them with a fresh primrose or cowslip leaf once a week. They pupated in due course, attached with the usual silken band, some to the leaves and some to the sides of the tin.

Having seen several records of the autumnal emergence of this species in captivity (*vide* Entom. xxviii. 338), I experimented with three or four pupæ during the last ten days of September, placing them beside a kitchen boiler. At the end of that period, no longer possessing any facility for forcing, I replaced them with my other pupæ in the more or less normal temperature of