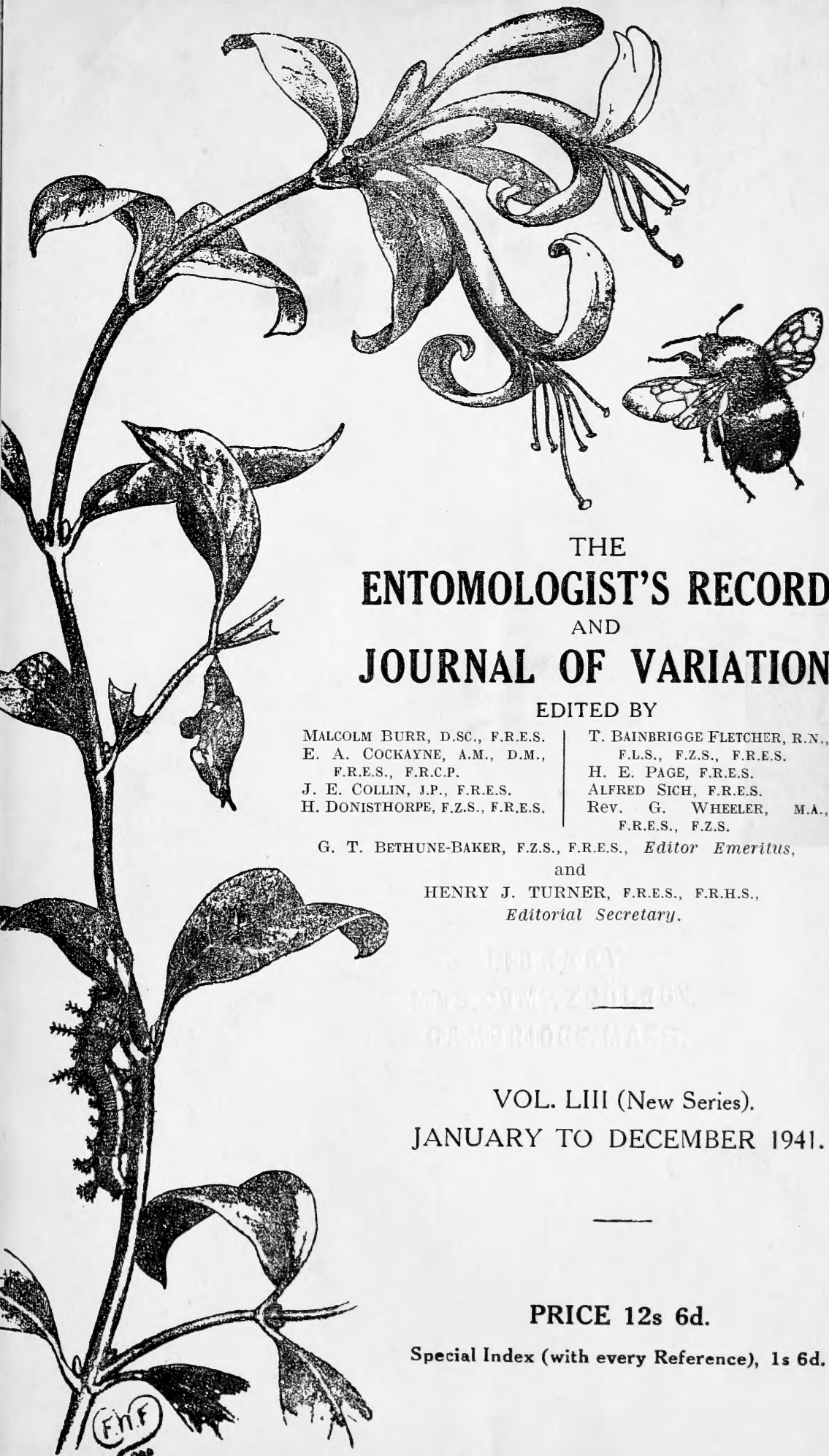

THE ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

EDITED BY

VOL. LIII (New Series).
JANUARY TO DECEMBER 1941.

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SPECIAL INDEX.

By Hy. J. TURNER, F.R.E.S., F.R.H.S.

VOL. LIII. (New Series), 1941.

The Entomologist's Rccord and Journal of Variation.

Coleoptera arranged in order of Genera. The other Orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.

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DIPTERA.

HEMIPTERA.

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Vol. LIII.

No. 1

JANUARY 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Journal of Variation.

VOL. LIII. 15th JANUARY 1941. No. 1.

A MATTER OF LIGHT.

By An Old Moth-Hunter.

He who breeds larvae for the sole purpose of observing and studying their habits is debarred from " sleeving " them, and some species are exceedingly difficult to rear in a wooden cage no matter how large the cage may be. But you will sometimes find that such species can easily be brought to maturity in a cage of the round celluloid type. *Pterostoma palpina*, L., the Pale Prominent, is a case in point. For some years I had reared larvae of this species in wooden cages and I found that a percentage of them always left the foodplant and climbed to the roof of the cage, where they remained till they died. Then I tried rearing them in round celluloid cages placed in the open, and at once reared practically every larva that was not ichneumoned. Unfortunately, I was content with the result achieved and did not trouble about the why and the wherefore. I had long since found that *palpina* appreciates being sprayed with tepid rainwater; but as the larvae in wooden cages left the foodplant whether they were sprayed or not, it could not be a matter of dew. Nor was it a matter of fresh air, for my larva cages are always placed where the wind blows through them day and night. So I put it down to the natural cussedness of the beast.

Then, quite by chance, I stumbled upon the reason why *palpina* so often refuses to remain upon his foodplant when confined in a wooden cage. It happened like this.

One day (it was 20th July) I found on *Salix cinerea*, L., a *palpina* larva in its prepupal instar. All my celluloid cages were in use, so I put the larva on *Salix cinerea* (gathered from a bush in my garden) in a wooden cage, hoping that as he was so near pupating time he would put up with the inconvenience for a day or so and complete his stadium like a respectable caterpillar. Half-an-hour later I saw that he was on the roof of the cage. With camel hair brush and dessert spoon I removed him and replaced him on the sallow. Thirty minutes later he was on the roof again. Once more I put him where he ought to be. When I visited him half-an-hour later he was slowly perambulating the ceiling.

There was only one thing to be done: I should have to remove some larvae from a celluloid cage and deposit him therein. So I pushed him into the spoon once more and carried him a few yards to a trim bush of *Salix cinerea* which had been planted near my larvarium with entomological design, intending to transfer the larvae in the celluloid cage straight into the wooden one. He could crawl slowly about the bush while I effected the transfer.

I held the spoon against a leaf at the top of a shoot. He crawled on to the leaf and looked it over carefully. It was no good to him. He marched, via the leaf-stalk, to the main stem and turned down this. At the first leaf-stalk he came to he stopped, then marched along it to the leaf. To and fro he swung his head, crawled half on to the leaf, then turned round and walked back to the stem. He did this with four consecutive leaves, and I was completely mystified. There was nothing wrong with the leaves; they were, in fact, identical with all the other leaves on the bush. I pulled out my pocket lens and scrutinised these rejected leaves; they were good healthy leaves, exactly like the leaf upon which I had found him feeding only a couple of hours before. What was his game?

When he had prospected six leaves and rejected them all he turned round and marched up the stem again. "Silly ass," I murmured; "you've already looked at those."

At that moment someone called me and I turned away. I was absent little more than two minutes, but when I returned *P. palpina* had disappeared. There was the twig and there were the rejected leaves, and no larva. One of those accursed sparrows that inhabit the maytree by my larvarium must have seen me stooping over the bush and have tumbled to it that I was watching a caterpillar, thought I; the moment my back was turned the wretched bird must have hopped down and eaten my *palpina*. I walked round the bush to go indoors.

As I did so I caught sight of *P. palpina*. Not only that, but in a flash discernment came to me. I saw it all. I saw the reason why he had rejected toothsome leaves, the reason why he dies so often in wooden cages. It is a matter of *light*.

P. palpina is hypersensitive to light, and for this reason. His vesture is so arranged that when the light falls upon his back he is the most conspicuous caterpillar in the universe. Walking along a stem of sallow (or aspen or willow) with his back to the light he could be seen a mile off. Any bird within half-a-dozen yards would have him. Therefore he is particularly careful never, never, never to walk anywhere with his back to the light.

Why, then, you may ask, has Dame Nature garbed him with such a suicidal suit of clothes? The answer is that, so far from being suicidal, the colour of his back, so conspicuous against a dark background, is the exact tint of the underside of a leaf of *Salix cinerea* (or aspen or willow). In fact, if you skinned him and stretched his skin on the underside of a leaf of his foodplant I don't believe you could tell where skin ended and leaf began if you were standing six feet away.

Now comes the interesting part. The waistcoat of *P. palpina* is a dull green, the ground colour being a pale green which is reticulated with a rich green exactly the colour of the *upper* surface of a leaf. Here and there among the reticulations are minute black spots—such as you will often find on the leaf-stalks of *Salix* bushes and trees. But there is more in it than that. The powdery white of his back is sharply cut off from the green of his underside by a cunning spiracular line, which is pale yellow edged above with black and below with pink. This not only prevents any merging of the colours on back and belly but creates an illusion of light and shade. It is camouflage at its very best.

His underside exactly matches the upper surface of the petioles or

leaf-stalks of *Salix cinerea*. So that when he is in his customary position, half on the lower surface of the leaf-stalk and half on the lower side of the leaf, with his tummy to the light, viewed necessarily against the green background of the bush, he just disappears from sight. It doesn't matter a bit if the wind blows the leaf about; he will be viewed, as to his anterior segments, against the underside of the leaf (which his back exactly matches), and as to his posterior segments against the leaf-stalk or stem, always against the gradations of green which compose the background, namely, the bush.

That was why he rejected leaf after leaf, yet returned towards the top of the stem. It wasn't the leaves that were wrong but their *position*. The setting sun was on one side of the bush, the dark wall of a barn on the other. He wanted a leaf that pointed in such a direction that, when he had taken up his position upon it, he would be head-and-tail to the sun, which would then be shining upon his feet. As soon as he found the right leaf he took up his position upon it and vanished into the blue.

Next day I confirmed all this—as I hope you will; for it is really most interesting to watch—and I twisted the leaf-stalk upon which he reclined so that the sun irradiated his side. You would have chuckled as I did when he at once moved sideways and brought his camouflage into play.

So remember that if you have difficulty in rearing certain species in a wooden cage, try a round celluloid one. It may be that these particular larvae leave the foodplant because Nature has bidden them orient themselves in a certain way to the light and in your cage they are unable to do so. In the meantime you can speculate on the *physiological* mechanism that actuates *P. palpina* in finding, and taking up the correct position on, the correct leaf.

THE REPUTED HYBRID NYSSIA ZONARIA, SCHIFF. ♂ × APOCHEIMA HISPIDARIA, SCHIFF. ♀.

By E. A. Cockayne, D.M., F.R.C.P., F.R.E.S.

In the *Proceedings of the South London Ent. and N.H. Society*, 1914-1915, p. 90, Mr A. A. W. Buckstone reported that he had bred one crippled male and four females of the hybrid *Nyssia zonaria* ♂ × *Apocheima hispidaria* ♀. He has kindly sent me the male and three of the females. I have examined them microscopically, though without dissecting the genitalia, and they differ in no way from normal *hispidaria*. The curious spines on the dorsal surface of the abdomen of the female are in size and number like those of normal *hispidaria*. I showed them to Mr L. B. Prout and he agreed that to the naked eye they had no trace of any of the characters of *zonaria*. I then wrote to Mr Buckstone to ask him if there had been any possibility of the female having paired previously with a male of its own species, and he replied giving the following history of the specimens: "May 11, 1912.—Larvae of *hispidaria* taken at Wimbledon. January 5, 1913.—Moths began to emerge and apparently all had emerged by the end of the month. February 4, 1913.—Imagines of *zonaria* began to emerge in another pot. February 5.—I was surprised to find that a female *hispidaria* had

emerged in the pot containing pupae of *zonaria*. The larva must have been placed there by mistake. This female was ovipositing between the flower pot and the leno cover. There had been *zonaria* males in the pot with the female *hispidaria*, but I am quite sure there had been no male *hispidaria*, for all of them had been killed before the end of January. No pairing between a male *zonaria* and the female *hispidaria* was seen."

From this account there can be little doubt that the reputed hybrids are parthenogenetic specimens of *Apocheima hispidaria* and it is not unlikely that a pairing with a male *zonaria* did take place and that the foreign sperm stimulated the development of the eggs. On the other hand it may be a simple case of parthenogenesis, though it is a rare phenomenon in the *Geometridae* and no example of it occurring in this species is given by Tutt.

THE SUMMER FLIGHT, IN COLD CLIMATES, OF VERNAL AND AUTUMNAL LEPIDOPTERA.

By E. P. Wiltshire, F.R.E.S.

My previous paper, "Notes on the winter flight, in mild climates, of vernal and autumnal moths" (*Ent. Rec.*, 15.xi.1938), drew attention to the convergence and overlapping of the time of flight, in Syria and Palestine, of certain moths whose time of flight in more strenuous climes was separated by winter. The converse phenomenon, that is, the convergence of the time of flight, in northerly latitudes or at high elevations further south in the Palaearctic zone, of species whose time of flight elsewhere is separated by high summer, can also be remarked, though the overlapping is in most of these cases less complete. Early August is the "separating season" for this second phenomenon, just as late January is the "separating" time of the species mentioned in the first article, where they do not overlap. Phenological tables, drawn up on the analogy of the previous table, illustrate this tendency.

I here regard as vernal not only the very vernal species, which both aestivate and hibernate in the pupal stage (e.g., *C. verbasci*, *D. areola*, *S. dentinosa*), but also the numerous early summer insects whose larvae hibernate; and as autumnal, not only those that pass the winter in the egg stage, but also the late summer species whose larvae hibernate. I do so because the high summer's heat, in warm climates, may be as important an obstacle in the life-cycle as winter's cold in other climates; the fact that a species prefers to fly well before or well after early August puts it in quite a different class from those that appear, in spite of the heat, exactly at the hottest part of the summer (a small class) or those which appear in successive broods throughout the summer (a more numerous class). These two classes alone really deserve the name "summer insects," and most single-brooded insects can without difficulty be divided into vernal or autumnal from a knowledge of their time of flight throughout their range. The species discussed in this and the previous article are all single-brooded.

The species considered in the tables are:—*Aporia crataegi*, L., *Malacosoma castrensis*, L. (Europe) and *castrensis-kirghisica*, Stgr. (Iran), *Lacydes semiramis*, Stgr., *Volgarctia spectabilis*, Tausch, *Thaumetopoea*

pityocampa, Schiff. and *wilkinsoni*, Tams, *Simyra dentinosa*, Frr., *Agrotis forficula*, Ev. and *elbursica*, Drdt., *Rhyacia nyctymerina*, Stgr. (ssp. *roseoflava*, Cti. in Syria, ssp. *rehnensis*, Wagn., in Iran), *Cucullia verbasci*, L., *Phragmitiphila typhae*, Thnbg., *Phragmatoecia castaneae*, and *Phragmatoecia territa*, Stgr.

In the tables, closely-related species or subspecies of the same species are, for the sake of brevity and also to illuminate the comparison, included under one name.

PHENOLOGICAL TABLES, illustrating article on The Summer Flight, in Cold Climates, of Vernal and Autumnal Lepidoptera.

HOT.

	Mesopotamia, below 3000 ft. (Lat. 31-37 N.).	Lebanon, below 4000 ft. (Lat. 34 N.).	Farsistan, 5000-7000 ft. (Lat. 30 N.).
crataegi	—	—	IV-V
castrensis	—	—	V
semiramis	—	—	28.IV-V
spectabilis	—	—	IX-X
Thaumetopoea	—	X	—
dentinosa	—	IV	IV
forficula	V	V-VI	IV-V
elbursica	—	—	V-VI
nyctymerina	—	—	V ?
verbasci	—	III*	?
typhae	VI	VI-VII	VII
castaneae	IV	—	?
territa	—	—	IX

COLD

	Lebanon Mts. (6000-7000 ft.) (Lat. 34 N.).	Kurdish Mts. (4000-6000 ft.) (Lat. 37 N.).	Mt. Alvand (8000-10,000 ft.) (Lat. 35 N.).	Barfkhaneh (10,000-12,000 ft.) (Lat. 32 N.).	Elburz Range (7000-12,000 ft.) (Lat. 36 N.).	Europe (Lat. 50-55 N.).
crataegi	V-VI	V	VI	?	V-VII	VI
castrensis	—	?	?	?	VII	VII-VIII
semiramis	—	?	VI-VII	VI	VI-VII	—
spectabilis	—	IX	?	?	VIII-IX	—
Thaumetopoea	4.VIII	—	—	—	—	VII-VIII
dentinosa	V	?	—	V-VI	?	—
forficula	VI-VII	VI-VII	VI-VII	VI	V-VII	—
elbursica	—	?	?	?	VII-VIII	—
nyctymerina	VII-VIII	?	VI-VII	VI	V-VII	—
verbasci	IV-V*	?	?	?	V*	IV-V
typhae	?	?	—	—	?	VIII-IX
castaneae	—	—	—	—	?	VI-VII
territa	—	?	VII	?	VII	—

*Times of wild emergence calculated from wild larva's size.

Under the heading " Mesopotamia " are included records both from the plains and the lower Zagros hills. Mt. Alvand and the Barfkhaneh (near Yezd) are both high Persian peaks; the latter has only received one visit, in early June, while the former has only been worked in June and July. The other localities in the tables have been the subject of longer attention.

Most of the biological facts in this article and most of the dates given in the tables are from my own records, but some are taken from stock reference books such as South and Blaschke, or from recently published works by other authors, such as Schwingenschuss's *Beitrag zur Lepidopterenfauna von Iran* (*Ent. Zeit.*, J., 52-53, Nos. 46 ff).

In the first table (the hotter localities) the respective times of flight of vernal and autumnal species are well separated; the tendency to overlap may be traced in the remaining columns, the colder localities.

In general, the first table clearly indicates whether a species is vernal or autumnal, the notable exception being *typhae*, which has a marked vernal tendency in hot climes. In briefly considering this case in my previous article I suggested that the oval hibernation, being unnecessary in a hot climate, suggested *typhae*'s having originated in a cold climate; I still consider this argument sound, and regard *typhae* as normally an autumnal species. The other autumnal species on our list do not occur at all in northern latitudes, and are far less stenoecous than *typhae*, which in hot climes is only to be found along perennial streams and springs. With *typhae* must be classed the other *Archanaras* which react in the same way to hot climates (*geminipuncta* and *sparganii*). *Castaneae*, on the other hand, is known to take two years to mature in cold climates, and is evidently not in the same class; it may be regarded as vernal, in contrast to its congener *territa*. (I should perhaps here mention, in view of Schwingenschuss's record of the presence of reeds at one of *territa*'s Elburz habitats, that this moth flies in profusion high up on mountains in Persia, where there is no sign of any *Phragmites*-growth).

Are there any other cases where speculation is profitable as to the possible place of origin of the species, or at least the sort of climate in which their specific characteristics crystallised? Does a study of the time of flight and life-history of other species beside *typhae* shed any light on such a hazardous question? In the previous article I suggested that the pupal or larval aestivation of autumnal species whose larvae hibernate, being unnecessary in colder climes, suggested a southern or warm climate origin, such species being the *Amathes*, *Aporophyla* and *Ocnogyna* species named in that article. To them we may now add *spectabilis* and (probably) *territa* (whose early stages are not yet known) and the pine-feeding *Thaumetopoea* group. In this last case, the fact that *pityocampa* sometimes in Europe fails to emerge from the pupa till the following year is surely an expression of the group's ingrained habit of pupal aestivation, such as occurs in a more normal way in *wilkinsoni*. The previous article also suggested a warm climate origin, on account of their pupal aestivation in England, for the vernal *anthemis*-feeding *Cucullia* group. As for *castaneae*, which, as already stated, takes two years to develop in N. Europe, we may conclude that it originated in a warmer climate if we regard the annual cycle as the norm in lepidoptera in cool climates. There is not room, however, here to discuss

the mullein-feeding *Cucullia* group or the case of *castrensis*, whose egg overwinters in Europe and also (presumably) in Persia; a confident inference of their origin seems impossible. There remain a number of species of more restricted range which, not occurring in very different climates, offer no chance of comparison in their reactions to local climate; for these, therefore, also no suggestion, based on the above criteria, is here offered as to their origin; we should, however, probably not go far wrong in postulating for *territa*, *semiramis*, *spectabilis*, *elbursica*, *forficula*, *nyctymerina*, and *dentinosa* an origin on the steppe mountains of Anatolia and Iran, beyond which their range does not extend very far. Such a postulation, however, will rest on zoogeographical grounds.

It is indeed interesting to compare the guesses made above on the basis of biological and phenological criteria with the zoogeographical classification of the same species. For instance, the vast range of *castaneae* puts it almost in the Geopolitan category; it seems to be a primitive species of great adaptability that originated in a tropical or semi-tropical climate.

LARVAL HABITATS OF APATURA IRIS.

By A. J. Wightman, F.R.E.S.

Having been officially requested, in common with the rest of the public, to keep off the roads on Easter Monday last, I abandoned a projected trip to Kent for pupae of *A. cinerea* and found myself at a dead end in my home locality, with a whole day in front of me.

I had for several years intended, when the time and mood should be upon me, to try and find just how widespread and plentiful *A. iris* was around this area. Occasionally, when beating for other things, I have found the larva of *iris* on the sheet, but always singly (and the idea being at the moment in mind, as a result of finding a small larva of the species among sallow catkins I had taken for larvae of *Xanthia fulvago*), I spent the day among the sallows in the woods. I used a car to get from one place to another and so covered a considerable area, sampling rather than searching each selected locality.

I had been advised to ignore sallows in open and dry situations and so spent most time in damp and narrow rides in rather heavily wooded country.

I worked only large-leaf sallows, not because all the " books " say this is the right thing to do, but because those of the small-leaf varieties, in common with all the foliage around, had been stripped by thousands, probably millions, of larvae of Geometers, Noctuae, and Micros. It was May, but most trees and shrubs were as bare as in midwinter. I have never seen such devastation before.

I first searched the selected bushes and then beat them and in this way had taken several half-fed *iris* larvae, widely separated from each other, when I chanced upon an old stone quarry, in which there was a large tree-like sallow, the branches of which were 20 feet from the ground and out of reach except at one spot, where a high mound of earth made it possible to clamber up and hook down a single fair-sized branch.

This I carefully searched and was about to release, when I noticed a half-grown larva of *iris* near the extremity of the branch I held in my hand, and when taking this found two more on the same shoot, on adjacent leaves. I was now satisfied that the insect is widely spread and by no means rare around this area, and so gave up active search and merely wandered around to see if there were any similar sallows in near-by areas. I found several very similar indeed, but no larvae, so I am still no wiser as to what the special requirements of this species are. Indeed, on the way out of the woods I beat a fallen sallow which was lying prone and took a larva from it. This fallen sallow was absolutely in the open.

These larvae were kept in a leno cage 24 by 18 by 12. I provided them with a fresh small branch of large-leaved sallow daily, and they changed from the old to the newer branch about every other day. This larva is hard to see. I knew there were eight larvae in the cage, but could seldom see more than five or six, even when I took the branches out and looked them over, until the second or third try. One larva was always on the underside of a leaf. All pupated the same week and all used a sallow leaf to pupate on. They pupated about sundown and I watched several of them go through this stage. The previously inactive larva would suddenly begin to sway from side to side violently and at the same time to expand itself from the normal larval shape to that of the pupa. This caused the larval skin to split at the bottom (head) and from this stage until the pupa was completely free averaged three minutes. The violent movement was continued after the pupa was free until the larval skin had actually fallen and even after, apparently to make sure that the skin was gone. I saw no sign that this pupa is especially liable to fall at this time; they all seemed well anchored, and to know it. The imagines all emerged before mid-day and there were 6 ♂s to 2 ♀s. The season was early, all out by July 20th, and all of large size. Being used to dealing with Noctuae, I was not equal to dealing with this species. Three emerged one day and while I was taking one out of the cage the other two, as quick as thought, were out and away through the outhouse door.

ON THE OCCURRENCE OF NORTHERN AND SOUTHERN SPECIES OF CARABIDAE IN A SECTION OF THE WEALD.

By R. A. Crowson, B.Sc.

For the last three years I have been engaged on a detailed study of the beetles of the district around Tunbridge Wells. The precise area covered by my investigations is as follows:—Northern boundary—the top of the escarpment of the North Downs between Westerham and the Medway gap; Southern boundary—the Forest Ridge of Sussex between West Hoathly and Mayfield; Western boundary—the road from Westerham to East Grinstead and West Hoathly; Eastern boundary—the River Medway between Halling and Yalding, the river Teise to Goudhurst and the road to Kilndown, Flimwell, and Mayfield. It will be seen that this defines a sector of the Weald with the outcrops of all the Geological

formations from the Chalk to the Ashdown sands. I have subdivided the area into the following Geological parts: the Chalk escarpment, the Gault valley (or Holmesdale), the Lower Greensand ridge, the wide low-lying marshy Weald Clay belt, and the diversified hilly Hastings beds country. The Chalk forms a steep scarp facing South and mostly covered with grass and scrub with some Beech-woods; the Gault is mainly covered by lush pastures with many Elm trees; the Lower Greensand supports woods and heaths, and to the South forms a bold scarp which is largely wooded; the Weald Clay belt is mostly pasture with stretches of damp Oak-wood and marshes, while the Hastings beds include small-scale examples of almost all types of scenery. As the latter group covers the largest area of my subdivisions, and I live in the middle of it, it has naturally provided much the largest number of the specimens collected. But even allowing for this, my records suggest that a greater number of species occur in the Hastings beds area than in any of the others. I had more than once noticed that species of beetle occurring on the Chalk downs and not elsewhere in our area were recorded by Joy as limited to S.E. England, while species frequenting the wet cold soils of the Weald Clay were recorded as ranging up to the North of Scotland. This prompted me to try to find out which species were, in our area, near the northern limit of their range (Southern species) and which were near their southern limit here (Northern species). Using the Calwers *Kaferbuch* (Stuttgart, 1893) on the European forms and Joy's Handbook for the British species, I listed those species which were recorded from Scotland and Scandinavia but not southern France or Italy, and those whose range included Italy, southern France, and South Germany but not Scotland or Scandinavia. The occurrence of the species of each group in our area was then analyzed. In the *Carabidae* the results may be summarized as follows:—Southern Species: Chalk, 4; Lower Greensand, 7; Hastings beds, 21; Weald Clay, 2. Northern Species: Chalk, 1; Lower Greensand, 1; Hastings beds, 18; Weald Clay, 11. The Gault Clay belt is omitted as I have almost no data from it. The results may be tabulated as follows:—

NORTHERN SPECIES.

Species.	C.	L.G.	H.B.	W.C.
Elaphrus riparius, L.	–	–	+	+
E. cupreus, Duft.	–	–	+	+
Loricera pilicornis, F.	–	–	+	+
Clivina fossor, L.	–	–	+	+
Ocys 5-striatus, Gyll.	–	–	+	–
Bembidion doris, Pz.	–	–	+	+
B. 4-guttatum, F.	–	–	+	–
B. 4-maculatum, L.	–	–	+	–
B. rupestre, L.	–	–	–	+
B. ustulatum, L.	–	–	+	+
Badister bipustulatus, F.	–	–	+	–
Patrobus excavatus, Pk.	–	–	+	–
Bradycellus similis, Dj.	–	–	+	–
Acupalpus meridianus, L.	–	–	+	+
Amara aenea, De G.	–	+	+	+
Pterostichus niger, Schall.	–	–	+	–
P. nigrita, F.	–	–	+	–
Europhilus gracilis, Gyll.	–	–	+	+
Dromius agilis, F.	–	–	+	–
Metabletus truncatellus, L.	+	–	+	–

SOUTHERN SPECIES.

Species.	C.	L.G.	H.B.	W.C.
Carabus monilis, F.	–	–	+	–
Leistus fulvibarbis, Dj.	–	–	+	+
Notiophilus aquaticus, L.	–	–	+	–
N. palustris, Dj.	+	+	+	–
N. 4-punctatus, Dj.	–	+	+	–
N. rufipes, Curtis	+	+	+	–
N. substriatus, Waterh.	–	–	+	–
Ocys harpaloides, Serv.	–	–	+	–
Bembidion guttula, F.	–	–	+	–
B. 4-pustulatum, Serv.	–	–	+	–
B. tibiale, Duft.	–	–	+	–
Badister dilatatus, Chand.	–	–	+	–
Bradycellus harpalinus, Serv.	–	–	+	–
B. verbasci, Duft.	–	–	+	–
Pterostichus madidus, F.	+	+	+	–
P. inaequalis, Marsh.	–	–	+	–
Calathus fuscipes, Goez.	–	+	+	–
C. piceus, Marsh.	+	–	+	–
Synuchus nivalis, Pz.	–	–	+	–
Metabletus obscuroguttatus, Duft.	–	+	+	–

In the above table + in the column C. means that the species has been found in the Chalk belt, L.G. the Lower Greensand belt, H.B. the Hastings beds area, and W.C. the Weald Clay. It will be observed that nearly all of both Northern and Southern species are recorded from the Hastings beds, and that the Lower Greensand, like the Chalk, has an unusually high percentage of Southern forms.

A similar analysis of the records of *Staphylinidae* did not show any notable difference in the proportions of Northern and Southern species on the Chalk and the Weald Clay. But it must be remarked that many of the *Staphylinidae* are not really terrestrial insects, and in any case their European distribution had not been so well studied as that of *Carabidae* at the time of Calwers' book.

If any readers of the *Entomologist's Record* can add anything to these results, I should be very pleased to hear from them.

COLLECTING NOTES.

Smodicum cucujiforme, Say. (Col. Cerambycidae) taken in England.—On 27th August 1934, Miss Irene Kirk took a specimen of this North American longicorn on the floor in a room in her sister's house in Oakhill Road, Putney. I had intended to record this capture at the time, but forgot to do so. As pointed out in *British Ants* [2nd Edtn., p. 385 (1927)], it seems advisable to enumerate all foreign species of insects captured in this county, as it shows how and where they were, or might have been introduced, should they obtain a footing here. When Irene found a specimen of the pretty little Clerid beetle, *Denops albofasciatus*, Charp., in the same house on 20th August 1933 [*Ent. Rec.*, 45, 164 (1933)], I pointed out there were many oak logs in the cellar from Windsor Forest; many sticks in the garden brought up from the same locality, and the fence one one side of the garden consisted of oak panelling from Windsor Great Park.—Horace Donisthorpe.

Staphylinus fulvipes, Scop., in Windsor Forest.—On 28th June 1940, when collecting in Windsor Forest, I noticed a beetle running across a pathway some distance ahead of me. On capturing the insect

I found it to be a specimen of the very rare and local, but somewhat widely distributed, "Staph," *Staphylinus fulvipes*, Scop.; a new record for Windsor Forest. I have only once taken the species before; at Pamber Forest, where I took one example which was running along the side of a ditch.—HORACE DONISTHORPE.

AGROTIS SAUCIA: AN ATTEMPT TO SURVIVE THE WINTER.—Last September I found a few fat Noctuid larvae feeding on tobacco plants in my garden in a sheltered spot facing south, between two bow windows. They soon burrowed, being then quite full fed. I didn't recognise them and just thought they might be *Triphaena pronuba* somewhat out of season. However, in October I got a ♀ *A. saucia* at ivy in the garden, and when her offspring grew up I recognised my mistake. I hastily dug up the pupae and forced them, *Agrotis saucia* appearing in a few weeks as an imago. The pupa is at first a pale brown object turning nearly black shortly before the moth hatches. On 15th December I thought I would try excavating under the tobacco plants. There I found one blackish pupa close up against the house: there was frost in the open early that morning. The moth, *A. saucia*, undersized, hatched indoors on the 17th December.—C. Q. PARSONS, Torquay.

VOLUCELLA INANIS, L., AT BEXLEY, KENT.—This large and conspicuous Syrphid is not uncommon in the south of England, but until this year I had never taken it in my immediate neighbourhood. On 20th July and 3rd August last I took one ♂ and two ♀♀ on the outskirts of Joydens Woods, Bexley. I also saw, but failed to capture, several other specimens. My only previous records for this species in N. Kent were two at Chattenden in August 1901, and one at Eynsford in August 1937. Incidentally I have never seen hornets in these parts, but Continental records refer to *V. inanis* as breeding in the nests of *Vespa vulgaris* as well as in those of *V. crabro*.—H. W. ANDREWS (F.R.E.S.).

NOTES ON VARIATION FROM THE WORTHING MUSEUM COLLECTION. I.—Mr Turner having written to ask me for notes, I replied that the above was the only subject on which I could supply them; but as it would be easy to write a whole book on the subject, he suggested taking the species that occur in Britain and comparing them with specimens from other countries. In doing this I am merely stating facts which could be gathered by any student of the collection, and shall rarely suggest inferences, as the scope of the collection and the number of specimens of any species are both too limited. In order to give any value to these notes it seems to me necessary to explain both these limitations. The scope of the collection is confined to Europe and the Mediterranean basin (including, however, Madeira and the Canaries when I can obtain specimens from either) and the numbers are limited to the contents of 156 drawers each holding about the same as the two sides of a large store-box. The bulk of the collection is from Switzerland (just over 4000), France (just under 4000), England (1775), and Italy (1365). After this is a big drop in numbers: Algeria with Morocco gives 354, closely followed by the Tyrol and Corsica, and about 100 less from Greece, Spain and Lapland; between 120 and 200 from Germany, Belgium, Syria (with Palestine), and Scotland; between 60 and 80 from Finland (exclusive of Finnish Lapland), Cyprus, Austria, Hungary and Bulgaria; rather less from Norway (exclusive of Lapland), Ireland, Russia, the

Channel Islands and Asia Minor, and a few specimens from eight other places, the whole amounting to 13,468 at the present date.

C. rubi.—The only considerable difference that I find among European specimens is that in a few, not very fresh, specimens that I took at Rognan in Norwegian Lapland the androconial patch is almost black. Specimens from north-western and central Italy are rather larger than English ones. The ab. *immaculata* may occur anywhere. Specimens are here from the N. Downs and the White-Horse Hill in England, from the French and Italian Riviera, and from the top of the Rochers de Naye in Switzerland.

The Algerian race *fervida* is small, much lighter on the up.s. and much duller on the un.s.; it is in appearance so different that one wonders whether it is not a separate species. It certainly differs far more in appearance from *C. rubi* than does *C. avis*. There is a short series of the latter, mostly from those bred by Dr Chapman from which the separate species was determined.

T. pruni.—All the English specimens are bred, and there are too few Swiss ones, taken wild, to make any comparison. The latter are rather larger and the orange not so bright, but the specimens are not fresh.

C. w-album.—One from the Swiss Jura, one from Italy, and two from the Tyrol are decidedly larger than the English (bred) specimens. There are two English and two Swiss specimens of the ab. *butlerowi*, without the white w.

B. quercus.—This is poorly represented in English specimens. There are two taken at Wolford, Warwickshire (one of them 50 years ago), and four which I took this year on the S. Downs, only one ♀ of which is very fresh; this has the most brilliant blue on the disc, without a trace of purple, that I have ever seen, though it is run close by the only ♀ from Italy. The French, Swiss and Italian specimens are all larger than the English except one small ♂ from Switzerland. The Algerian race, *iberica* (also found in Spain), has the under-side pale and only very slightly marked. There is a good series of this form.

Z. betulae.—None of the foreign ♂s, French or Swiss, have the least touch of orange inside the discal spot of the f.w. but all have a lighter shade in the same position. The Swiss specimens are generally larger, but here again the English ones are bred and the Swiss are taken wild. —Rev. G. Wheeler (M.A., F.R.E.S.).

CURRENT NOTES.

The Society for British Entomology.—Owing to enemy action, almost the whole of the archives of this Society and practically the whole of the stock of back numbers of transactions and journal have been completely destroyed, including the current list of the names and addresses of the members. Any members of the Society who happen to see this notice would facilitate matters very materially for the officials of the Society if they would be good enough to communicate their present addresses to:—W. Parkinson Curtis, 17 Christchurch Road, Bournemouth.

Will those who intended to exhibit at the cancelled Annual Exhibition of the S. London Entomological Society kindly forward their Notes on the Exhibits as mentioned in the December number, p. 140.

APPENDIX TO VOL. I, 1926-1940.

(To be followed by the Appendix to Vol. II, 1935-1940.)

P. (28) Add to the List of Forms of *A. diluta* after line 10 from the bottom the race *hartwiegi*, Reis.

P. (29) Add the Orig. Descrip. of race *hartwiegi* after line 11 from the bottom.

race *hartwiegi*, Reis., *Zt. Oestr. Ent. Ver.*, XII, 14, 24.

Fig.—*l.c.*, plt. 3, figs. 1-2 (1927).

Descrip.—Seitz, *Pal. Bomb. Supp.*, II, 192: "Has on the forewings a very prominent dark antemedian transverse band of about 2 mm. width and a narrower similar post-median band. Between these bands the pale ground colour contrasts very clearly. The north German form, whilst the typical *diluta* is the southern, especially Austrian form."

P. (16) Add to the List of Forms of *C. ocularis*, ab. *clausa*, Lempke, ab. *discolor*, Lempke, and ab. *confluens*, Lempke, after line 16 from the bottom.

P. (82) Add the Original Descrip. of the above three forms after line 13 from the bottom.

ab. *clausa*, Lempke, *Tijds.*, 81, 250 (1938).

Orig. Descrip.—"The transverse lines, which margin the central area, unite on the inner margin." Holland.

ab. *discolor*, Lempke, *Tijds.*, 81, 251 (1938).

Orig. Descrip.—"The transverse lines are feeble or absent." Holland.

ab. *confluens*, Lempke, *Tijds.*, 81, 251 (1938).

Orig. Descrip.—"The orbicular and reniform stigmata are united, so that they no longer form more than a single spot." Holland.

P. (20) Add to the List of Forms of *C. or*, ab. *interrupta*, Lempke, after line 15 from the top.

P. (82) Add the Orig. Descrip. of ab. *interrupta*, Lempke, at the bottom.

ab. *interrupta*, Lempke, *Tijds.*, 81, 249 (1938).

Orig. Descrip.—"The line, which borders the central area on the outside, is cut by the reniform, where the line borders this area on the inside is crossed by the orbicular." Holland.

P. (30) Add to the List of Forms of *P. flavicornis*, ab. *angustifasciata*, Heydm., ab. *lapponica*, Rang., and ab. *clausa*, Lempke, after line 10 from the bottom.

ab. *angustifasciata*, Heyd., *Ent. Zt.*, LII, 48 (1938).

Fig.—*l.c.*, plt. 1, f. 13 (this is not helpful).

Orig. Descrip.—" Of the double black lines, which normally enclosed the discal area, the outer are almost wholly obsolescent, and only the inner remains, but only black marked on the costa; this remaining portion is at an angle so that the enclosed discal area is much restricted, and the grey outline of the reniform is incomplete and only slightly evident on the inner margin." Holland.

ab. *clausa*, Lempke, *Tijds.*, 81, 253 (1938).

Orig. Descrip.—" The transverse lines, which border the central area, are united on the inner margin." Holland.

ab. *lapponica*, Rang., *Ent. Rund.*, LII, 223 (1935).

Fig.—*l.c.*, plt. 3, f. 28.

Orig. Descrip.—" Marking normal, colour generally similar to the light grey form (and near related to *finmarchica*, Schy.). The mid costal area beyond the somewhat greenish stigma slightly filled in, as well as the light apical spot." Lapland.

P. (35) Add to the List of Forms of *Metachrostis perla*, ab. *gazeli*, Luc.

P. (349) Add the Orig. Descrip. of ab. *gazeli*, Luc., after line 8 from the bottom.

ab. *gazeli*, Luc., *Bull. Soc. ent. Fr.* (95) (1931).

Orig. Descrip.—" Forewings above, white ground and not yellowish or greyish, as in the other races, with the markings distinctly set out in black. Hindwings above with the marginal band of a blackish grey." Corsica.

P. (37) Add to the List of Forms of *B. muralis*, var. *barbaria*, Schawd. at the foot of the page.

P. (350) Add the Orig. Descrip. of v. *barbaria* after line 3 from the top.

var. *barbaria*, Schaw., *Int. Ent. Zt.*, XXVIII, 415 (1934).

Fig.—*l.c.*, plt. 4, 5, ♂ and ♀.

Orig. Descrip.—" Ground colour creamy-white. This is a greenish *muralis*. The fine black toothed transverse lines are complete and not interrupted. The stigmata finely outlined. Three blackish spots on the costa, above the two stigmata and at the commencement of the fine transverse outer marginal band (lappenlinie). The latter partly absent in the ♂. The striking feature is the appearance of grey in the centre of the disc and on the inner margin, and in the ♀ also somewhat in the outer margin. In *barbaria* there is no black complex marking in the disc, nor in the outer marginal band. Between the grey disc and the base lies a cream coloured (gelappte) band reaching from the costa towards the inner margin, but which ends before it in spherical shape." Great Atlas.

P. (116) Add to the List of Forms of *L. impura*, ab. *nigrolinea*, Turn., after line 8 from the top.

P. (117) Add the Orig. Descrip. of ab. *nigrolinea* after line 10 from the top.

ab. *nigrolinea*, Turn., *Ent. Record*, L, 22 (1938).

Orig. Descrip.—" In which there is developed a jet black line along a fold of the wing below the apex extending about half-way along the wing to the hind margin." Torquay (Capt. Parsons).

P. (50) Add to the List of Forms of *A. ligustri*, race *gigantea*, Drdt.

P. (353) Add the Orig. Descrip. of race *gigantea* after line 7 from the top.

subsp. *gigantea*, Drdt., *Ent. Rund.*, LIV, 375 (1937).

Orig. Descrip.—" Agrees with the type in marking, but of outstanding size, the colour a deep black brown with slight coppery shimmer. Hindwing whiter with wide dark marginal band." N. Yunnan.

P. (53) Add to the List of Forms of *A. leporina*, L., f. *murella*, Rang., f. *grisescens*, Rang., f. *minor*, Rang., ab. *fasciata*, Lempke, ab. *sagittata*, Lempke, and ab. *continua*, Lempke.

P. (362) Add the Orig. Descrip. of the above six forms after line 15 from the bottom.

form *murella*, Rang., *Ent. Rund.*, LII, 223 (1935).

Fig.—*l.c.*, plt. 3, fig. 29a.

Orig. Descrip.—" Forewing silky mouse-grey, the outer marginal band obsolescent, central costal spot strong, a black basal spot and six indications of bands along the costal margin but completely markingless. Hindwing unspotted, body mouse-grey as the forewing." Lapland.

form *grisescens*, Rang., *Ent. Rund.*, LII, 223 (1935).

Fig.—*l.c.*, plt. 3, 29b.

Orig. Descrip.—" Forewing grey suffused on a white ground, three indications of bands on the costal margin, central spot and marginal dots quite black, but outside the four last dots of the outer band and the basal portion markingless. Body as the forewings."

form *minor*, Rang., *Ent. Rund.*, LII, 223 (1935).

Fig.—*l.c.*, plt. 3, 29c.

Orig. Descrip.—" Only 11 mm. expanse, brownish tone, almost markingless. Borders of all the wings with brown streaks, which do not reach the margin, between the veins." Lapland.

ab. *sagittata*, Lempke, *Tijds.*, (1939), 209.

Orig. Descrip.—" A row of large sagittate, black spots appears in the marginal area of the forewings." Hilversum.

ab. *fasciata*, Lempke, *Tijds.* (1939), 209.

Orig. Descrip.—" A somewhat large blackish median shade lies on the forewings." Holland.

ab. *continua*, Lempke, *Tijds.* (1939), 209.

Orig. Descrip.—" A subterminal line complete and strongly toothed extends from the costa to the inner margin of the forewings." Amsterdam, etc.

P. (58) Add to the List of Forms of *A. megacephala*, ab. *igdyrensis*, Teich., and ssp. *dungerni*, Rang., after line 7 from the top.

P. (351) Add the Orig. Descrip. of these two forms after line 18 from the bottom.

ab. *igdyrensis*, Teich., *Korres.-blatt. Riga.* (1901), p. 44.

Orig. Descrip. —Stz., *Pal. Noct. Supp.*, III, 238 (1936)—" Has the pale ground colour of *aceris* with faintly yellowish tone. Markings are as in type form, but only faintly indicated with the exception of the posterior transverse line, which is very distinct and has finely outlined black dentations. Hindwings white, barely darker at margin." Near Ararat.

ssp. *dungerni*, Rang.. *Ent. Rund.*, LII, 233 (1935).

Fig.—*l.c.*, plt. 3, 39.

Orig. Descrip.—" Great contrast in the black marking on the light grey ground. The whitish light spot between the margin and the central spot is often enclosed by the black cross lines. Hindwing grey instead of whitish shimmer." Lapland.

P. (62) Add to the List of Forms of *A. alni*, L., ab. *intensiva*. Drdt.

P. (86) Add the Orig. Descrip. of ab. *intensiva* after line 19 from the bottom.

ab. *intensiva*, Drdt., *Ent. Rund.*, LIV, 397 (1937).

Orig. Descrip.—" Larger than typical European; ground much darker grey, more purple brown. The black brown of the inner margin very deep and thick, the black markings distinct and clear becoming irregular and thinned out above. Hindwings very pure white not darkened at the margin." S. Shensi, China.

P. (63) Add to the List of Forms of *A. tridens*, Schiff., race *obscurior*, Lattin. at bottom of the page.

P. (353) Add the Orig. Descrip. of r. *obscurior* after line 19 from the top.

race *obscurior*, Lattin., *Zeit. Oestr. ent. Ver.*, XXIII, 27 (1938).

Fig.—*l.c.*, plt. 8, figs. 13-18.

Orig. Descrip.—" A relatively small race, distinctly divergent from other mid-European races, especially in the females. Forewings in both sexes generally brownish-grey. The black markings are sharp and well developed, the stigmata are clearly margined all round and above all have the dark longitudinal markings a definite expression. Both dagger marks are quite twice as strong and lengthened outwardly. The subapical streak also similarly increased in length and strength; in all female specimens there is a second costal streak which in a few cases extends to the reniform. Hindwings of male whitish, of the female clear brownish, in both sexes with a wide darkening of the border; the marginal dots are quite clear." Herzegovina.

P. (65) Add to the List of Forms of *A. psi*, L., r. *crassistriga*, Latt., and r. *solimana*, Drdt.

P. (362) Add the Orig. Descrip. of these two species after line 21 from the bottom.

SPECIAL INDEX.

By Hy. J. TURNER, F.R.E.S., F.R.H.S.

VOL. LII. (new series), 1940.

The Entomologist's Record & Journal of Variation.

Coleoptera arranged in order of Genera. The other Orders arranged by Species. Genera, Species, etc., new to Britain are marked with an asterisk, those new to Science with two asterisks.

COLEOPTERA.

DIPTERA.

HYMENOPTERA.

LEPIDOPTERA.

ODONATA.

ORTHOPTERA.

RHYNCOTA.

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New Address—Harold B. Williams, from Bramley, to 2 Mitre Court Buildings, Temple, E.C.4.

New Address—J. Antony Thompson, from Rhas School, to Roe Wen, near Conway.

MEETINGS OF SOCIETIES.

WAR-TIME ARRANGEMENTS.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON : 41 Queen's Gate, S.W.7. (Nearest stations : S. Kensington and Gloucester Road.) General Meetings at 3 p.m., on the first Wednesdays of the month, February-June; October-December. Annual Meeting, third Wednesday in January.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —Winter meetings, second Saturday of each month from 9th November to 8th March, 2 p.m. for 2.30 p.m., Chapter House Hall, St Thomas Street, S.E.1. *Hon. Sec., S. N. A. Jacobs*, Ditchling, Hayes Lane, Bromley, Kent.

THE LONDON NATURAL HISTORY SOCIETY, London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1.—Meetings on fourth Saturday in the month, at 2 p.m., in Forster Hall of the Chapter House, Southwark Cathedral, London Bridge, S.E.1. *Hon. Sec., A. B. Hornblower*, 91 Queen's Road, Buckhurst Hill, Essex.

ENTOMOLOGICAL SECTION, BIRMINGHAM NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.—Evening Meetings. On the third Monday of each month, 7 p.m., at 55 Newhall Street, Birmingham. Visitors welcomed. Those who would like to attend or exhibit please apply to *G. B. Manley*, 72 Tenbury Road, King's Heath, Birmingham.

SOCIETY FOR BRITISH ENTOMOLOGY.—All meetings suspended till further notice. *Hon. Sec., E. Rivenhall Goffe*, 102 High Street, Southampton.

Communications have been received from or have been promised by T. Bainbrigge Fletcher, A. J. Wightman, W. P. Curtis, H. Willoughby-Ellis, E. Ernest Green, H. Donisthorpe, P. B. M. Allan, Dr Malcolm Burr, Rev. G. Wheeler, (The late) Rev. C. N. Burrows, H. W. Andrews, S. G. Castle Russell, Dr E. A. Cockayne.

All communications should be addressed to the Acting Editor, HY. J. TURNER, "Latemar," 25 West Drive, Cheam.

Printed by T. Buncle & Co. Ltd., Arbroath.

ol. LIII.

No. 2

FEBRUARY 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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AN EARLY NOTICE OF BEDBUGS.

By Malcolm Burr, D.Sc., F.R.E.S., etc.

A year or two ago I had occasion to look up the early history of the pest of bedbugs in our country. The first allusion in our literature that I could find was in Moufet's *Theatrum Insectorum*, published in 1603, but written at least thirty years earlier, when Dr Penny, a Court Physician of Queen Elizabeth, who may be regarded as the first English entomologist, was called in to advise two Noble Ladies in the village of Mortlake about a curious stinging rash from which they were suffering. Dr Penny diagnosed the trouble without hesitation, and prescribed fumigation.

It is true that Dr Penny had travelled in the south of France, and in Switzerland, and so may have made the acquaintance of the little beasts on his travels. He certainly had a good knowledge of existing continental literature on Natural History, and personally knew Gesner. Anyhow, it is clear that he put his finger on the spot, and was probably the only man in England at the time who knew what the creatures were, and how to deal with them. Yet the fact that they were already swarming in what was then an obscure village shows that they had already become widely spread in the country.

A century later Pepys and his friends had their sleep spoilt by bugs in an inn on the road to Bath. They had a disturbed night, which made them right merry, as Pepys wrote. An odd reaction.

Recently I have come across another allusion to them, in the journals of Dr Covel, a distinguished Cambridge scholar, who went to Constantinople in 1670 in the suite of Sir John Finch, our Ambassador to the Porte. Covel spent six and a half years in the Turkish capital, and his diary is most interesting, but the mention of bugs does not occur in the Turkish part of his travels.

It was on the journey, at Malaga, that he met them. He writes:—"After supper and a little chat, we thought of our lodgings. All that lay on twills and bedsteads were sorely bitten with little bugs, which left hard knobs and pimples wherever they seised. I, with one or two more, had the fortune to put our twills for coolness into the middle of the floor, which was laid with brick, and we escaped all these pestilent companions. These insects, so well known in all hot countryes (but to us never seen before), are called *chismes* and *chinches*, and in Italian *cimici*, from the Latin *cimex*, in French *punaises*. They are shaped much like a spider, but far lesse, with six legs and a bottled breech, the back often being reddish. They are truly called by Pliny most nasty animals, *animalia foetidissima*, for besides their venomous bite they have . . . a most intolerable filthy smel. One of our comrades, catching one in the night as it were preying on him, and thinking it had been a flea (after a slovenly custom which he had got), *bit it with his teeth thinking so to kill it*; but the abominable stink set him vomiting in such a manner as he verily thought he had been poyson'd, which made me amazed how they came to be prescribed inwardly by the antients as a medicine against feavers . . ."

After discussing whether these, and similar vermin, have any sense of smell, the doctor decided in the affirmative, not only "because these never stir out of their holes and lurking-places till the steam and per-

spiration of your bodies invite them, but because all strong smels drive them away . . ." and he quotes a string of herbs, including Russia leather. He concludes, logically, that "it is manifest that the fierce *effluvium* of these things very grievously affect these vermin, and seeing they all have eyes why may they not as well have organs of smelling, or something *analogous* to it?"

All of which goes to show that Dr Covel was a good observer and of an enquiring turn of mind.

He was educated as a medical man, but on being elected to a Fellowship of Christ's College, Cambridge, took Holy Orders. He was widely known for his erudition, and his writings show a wide breadth of reading. He was certainly ahead of his time, and his comments on the bedbug, and on insects senses, are shrewd. He would have made a good entomologist.

The extract is from "Early Voyages and Travels in the Levant. II. Extracts from the Diaries of Dr John Covel, 1670-1679," edited by J. Theodore Bent. (Hakluyt Society, 1893.)

THE VARIATION OF SENTA MARITIMA, TAUSCH.

By A. J. Wightman, F.R.E.S.

The typical form of this species appears at first sight to have a rather indefinite pattern, but if it were fully examined with a lens it would be found to be far better marked than a superficial examination had led one to suppose.

The ground colour is always some shade of buff, very pale to brown, and the markings consist of a deeper shade than ground colour; longitudinal lines on costa; a slightly darker shade than the ground colour streams from the base through the orbicular and reniform stigma to the outer margin.

Below this hardly discernible streak the only darker markings are due to scattered dark scales along the inner margin. There is a row of crescentic or triangular dots along the outer margin, a dot on each of the nervures representing the outer line and two only to show the position of the inner line, while there is a dark mark at the base of wing; the stigmata are little darker than the background.

The costa is lined in white longitudinally, the nervures are heavily white suffused, the outer marginal spots have a white inner edge, and the stigmata have a partial white edging. It is the strength or weakness of these white lines which gives us the silvery buff and plain pale buff examples.

The well-known striking aberrations are all produced by the intensification of the darker markings of the typical form and the suppression of the white suffusion.

In ab. *bipunctata*, Haw., the white suffused lines are reduced to a minimum although present on the outlines of the black stigmata, and on the extreme outer area of the wing with a trace on the costa, but the more intense the black stigmata and black longitudinal lines just beyond the stigmata towards the outer margin, the less the white suffusion is apparent.

In ab. *nigrostriata*, Stdgr., the white lines on the costa and along the nervures are tinged with the ground colour and the dark lines on costa and below are black.

In ab. *combinata*, Edels., the black stigmata of *bipunctata* are present in what is otherwise a *nigrostriata* form, but these black stigmata are not so intense as in the first, or the lines so wide and black as in the second. Apparently there is not enough black pigment to meet the double demand.

In ab. *wismariensis*, Schmidt, the deeper than ground colour streak of the typical form becomes black, as also do the two stigmata, but the costa has now lost the deeper than ground colour lines and the wider and more intense black the streak is, the paler the costa and area below the streak become. There is in fact a sequence from the typically marked form to ab. *nigrostriata*, the dark markings becoming more intense, the pale markings less white, and it is hard to say where the typical forms ends and the aberration begins, but of course the extremes are very different. It might be said that in *nigrostriata* the black streak of *wismariensis* is present but broken up by pale longitudinal lines and the typical pale stigmata, and that *combinata* is a step nearer to the *wismariensis* form, but to produce the black streak, the black in the black lines on the costa is needed, and *wismariensis* never has any black lined costa. The less heavily marked examples of the *wismariensis* form are little more marked than the extreme *nigrocostata* forms, for the black streak is line-like for the greater part of its length and becomes a mere blackish suffusion towards the outer margin, while the two black stigmata stand out clearly. The width and intensity of this black line increases in various forms until in the most extreme forms the black streak really reaches from the base to the outer margin, where it is one-third the width of the wing, but the outer portion of the streak is broken up by the white on the nervures being strong, and although in these extreme examples the black stigmata are lost in the streak, their position is shown by the white outline being present in the black background.

ab. *nigrocostata* is an extreme form of ab. *nigrostriata* in which the black lines on the costa are wide and the pale ones narrow. While the black lines below the costa are less intense than in the bulk of examples of this form (*nigrostriata*), it is not really different from *nigrostriata*. The greyish-brown form is produced by an otherwise typically marked form being powdered with fine black atoms all over the anterior wings. Seitz, *Pal. Noct.*, plt. 48e, *ulvae*, is a good figure of this scarce form. I have never seen an example of any of the black marked abs. with this background, which again suggests lack of sufficient black pigment to do more than the typical markings and the powdering.

ab. *nigromaculata*, Schmidt, is the same as *bipunctata*, Haw., 1926.

ab. *spormanni* the same as *combinata*, Edels. 1910.

ab. *conjuncta*, Rangn, is a *bipunctata* with a bar between the black stigmata.

The ab. *grisea*, Wagnr., simply has more white suffusion.

There is a form which, being very much like the typical one at first glance, has not been described or named. I call it ab. **obsoleta**.

Unicolorous, the white and darker than ground colour lines of the typical form being absent there is a faint row of dots along the outer

margin and along the outer line and the two stigmata can just be discerned as slightly darker than ground colour, but only with a lens.

This species passes the winter as a nearly full fed larva, although I have had them in the Spring in the penultimate instar.

It hides by day in open ended or broached stems of *Phragmites* or the hollow open stems of nearby plants. The emergence holes of *Nonagria geminipuncta* seem to offer a great attraction and I have found it in the old pupal cavity of *N. sparganii* and *P. arundinis* on *Typha*.

On mild nights it parades and drinks freely, and in the spring certainly feeds at times but only intermittently.

In captivity the larvae will eat dead pupae if the moths are well formed within, also mutton fat, lard, butter, and such like, but food is less important than drink, without which it becomes cannibal.

They pupate in hollow stems, sealing up the opening through which they have entered before doing so.

As this larva is unable to open up reed segments to suit itself, it pays where the species is plentiful to open up reeds just at the water line in the reed beds in October and to examine these open reeds in April, when the water level will be much the same and the stems easily got at. In most years a good many will be tenanted by the larva of this species.

THE SEASON OF 1940 AT WOOD WALTON FEN DISTRICT.

By H. A. Leeds.

I have not been away this last season (1940) so had to confine collecting to about three miles. We are not actually quite lonely here. There are eight semi-detached houses in this corner of Wood Walton and not far away 24 other houses at " Green End." Then about a mile and a quarter away close to the fen is another hamlet, " Church End." Rothschild's Nature Preserve (with its " Large Copper ") is about two miles from this last, but its access is via a bridge over a large Navigation Drain near the Hamlet of " Ramsey Heights." Although the preserve is in Wood Walton parish, it is difficult to reach from here, as the road is so circuitous, viz., seven miles; so I do not visit it.

Monk's Wood is about twelve minutes walk by the Westward Road; *Strymon pruni* is still scarce there, but the wood is untouched. A noted *S. w-album* plantation of elms has been cleared recently and many other trees felled. The rough grass lands have mostly been ploughed, but two hillside *Satyrus galathea* fields remain, and I have worked them every day in the season for an hour or two. It was days after males had appeared fairly plentiful that I saw a female and they continued so scarce that, I think, not more than a dozen emerged. I took one male underside of washed out and faded appearance, quite fresh out.

The Great Northern section main line runs close to us on the huge " Walton " embankment, which extends gradually for over two miles from the fen. A short distance southerly from us there is a very wide and deep cutting for nearly two miles. I have a permit for collecting on or in them. There I found a few clumps of *Polyommatus icarus* in its first brood during evenings search and I obtained a few nice undersides of the female, including some of very greasy appearance; a bril-

liant all blue form (not ordinary lilac or lavender tinted blue); and a very thinly scaled lavender-blue specimen. One male was very pale on the upperside, *pallidula*; another on the underside was the *elongata* form, otherwise the undersides were practically typical. The second brood hardly put in an appearance, only an odd specimen here and there. I think they perished in the pupal stage as we had such a severe drought.

Throughout October I found *Heodes phlaeas* in swarms on Walton (railway) Bank; it was the third brood. It was then lovely sunny weather and compensated me for not getting away for *P. coridon*, and for the failure of second brood *P. icarus*. Although I got a few nice *Coenonympha pamphilus*, that species was not plentiful, and I had to walk many miles for them. I caught a good many aberrations of *H. phlaeas*, but did not see ab. *alba*, which I have never taken. Mostly the embankment extends to the boundary ditch and fence, but on its West side here it does not do so in one place where its side is ragged and irregular, thus leaving a flat portion for about 400 yards and varying in width from eight to twenty yards, which is on the level with the adjoining grazing fields. For the first two weeks on this flat part there were considerable patches of ragwort flowering at its best; often I took four or five *H. phlaeas* at one sweep and once I got eight on one flower head. There were three wasps nests on this area and they hunted *H. phlaeas* in the air, taking a piece out of the wing. I watched the sharp fluttering before *H. phlaeas* tore away. Many otherwise fresh specimens had three or four pieces out, hence some I wanted had to be released. One of these last was a fine ab. *auronitens*, with the upperside hindwings dark areas shot with golden, but shortly afterwards I took another, small and perfect, of this form. While here I moved about very quietly and the wasps left me alone, but in the meadow adjoining, the wasps from another nest attacked a shepherd and he got badly stung; he ran away, discarding his coat and flinging it into the air, which seemed to divert their attention.

In the first emergence of *H. phlaeas* there were, as usual, only a few, most occuring on a wide rough verge by the roadside; here there was a lot of dock and when the second brood was out I visited it most mornings for about two hours, and for a few days I examined, I should say, about 180 each day. They were a most ordinary lot, but one day in an isolated spot, I took a fine male of the ab. *eleus*. In this area hardly a specimen of the third brood appeared, except in a stockyard adjoining where a few comparatively shaded plants continued green, otherwise as in most areas the drought had dried up the docks during the larval stage. But on the West side of the embankment, where the docks were well green-leaved, even up to 2nd November, I saw the last fresh "copper."

Of *Maniola jurtina* there were very few aberrations, but its best fields had been ploughed, two of which in the past had yielded me more aberrations than I have seen anywhere else. My *M. jurtina* are in twelve store boxes and would at least fill twelve cabinet drawers.

M. tithonus was far from plentiful and in colour and spotting showed only slight variation; only a few had any additional spots, which were always small. I have seen none better than some in my collection, which I have taken in the Isle of Wight, S. Devon, Bucks and Herts, undersides of both males and females.

We were inundated with *Pieris rapae* and *P. brassicae*. Of the latter I took a male underside, with black peppering all over the hindwings. *P. napi* was also abundant. All "fritillaries," *Vanessa* and "hairstreaks" were scarce. I saw only one *Colias croceus*, and no *Hamearis lucina* appeared although I looked especially for them. I saw no *Eumenis semele* and not more than four *Pararge aegeria*. I did not trouble much for the "Skippers," but know that *Hesperia malvae* and *Erynnis tages* were scarce; the latter had a second appearance, of which I retained the first one seen, 3rd August, and I saw other worn ones in the same place three weeks later. On 12th October I noticed several *Pararge megera* high up on a railway bridge, but only one came down low enough to capture, a ♀; this was a third emergence, as I had taken a few aberrations of the first and second broods. I had almost overlooked reporting that *Aricia agestis* (*medon*) was hardly seen in either brood and these were quite ordinary. Their best spots were ploughed up.

AULONIUM TRISULCATUM, FOURC., EXTENDING ITS RANGE IN ENGLAND.

By H. Donisthorpe, F.Z.S., F.R.E.S.

In 1904 C. J. C. Pool discovered this beetle at Enfield in the burrows of *Scolytus destructor*, Ol., in an elm stump. He subsequently found it in elm trunks infested by *S. destructor*, Ol., and *S. multistriatus*, Marsh., at Edmonton, Waltham, Palmer's Green, and Winchmore Hill.

The beetle was not found elsewhere until 1926, when I took a single specimen in Windsor Forest in an elm log infested by *S. destructor* on 2nd August. I had been especially hunting for this beetle in the Windsor area, as many elm branches, logs, and stumps were frequently found to be attacked by this *Scolytus*. Just before I took the *Aulonium* I had told Miss Kirk, who was with me at the time, what I was looking for. It was not found again until 21st July 1931, when a second specimen was captured in Windsor Forest, and recorded.

In the Windsor list, 1939, I wrote:—"Very scarce in Windsor Forest until the last two years, when it has occurred in large numbers in elm logs and branches infested by *S. destructor*."

Miss Kirk found three or four specimens in burrows, and running on a *live* elm tree infested by *S. destructor* in Windsor Forest on 7th September 1933. This tree was probably diseased, as it was blown down a year or two afterwards.

The record of my second Windsor specimen produced a note from Mr R. C. Fisher, who recorded that he had bred *Aulonium* from elm, infested by the two species of *Scolytus*, from Richmond Park in 1922 and 1923.

This year Mr S. O. Taylor, of Leicester, wrote and told me that he had taken *Aulonium* out of a fallen elm at Pilton, Northamptonshire, on 13th July 1940.

I believe Mr Ashe has also taken this beetle in Devonshire.

It has been suggested that the elm disease may account for the increase in numbers, and the extension of its range, of *Aulonium trisul-*

catum; for it is known that diseased, and recently dead, elms attract, and cause the increase in numbers of, the host beetles of this parasite.

Mr Laidlaw, however, points out in connection with elm trees:—"A healthy, vigorous tree is the least liable to fungus, or beetle, attack, though attack by either is possible. A sickly or less vigorous tree is always liable to fungus or insect attack. Its loss of vigour may be due to drought, old age, root injury, acid fumes, artificial and heavy pruning, accidental damage, and many other chemical, physiological, and mechanical causes, and also, on occasion, to the presence either of fungi or of bark beetles."

"It is reasonable to assume that any primary inorganic cause of weakening by reducing the flow of sap will favour fungus or beetle attack; remembering that in addition either of the two latter may on occasion become a primary cause themselves. Which happens to be the first in any case is purely a matter of chance and thus of no consequence. A sickly or less vigorous tree is always open to many ailments, and the sequence of attack is not fixed and unalterable, but rather the reverse."

I am indebted to Mr F. Laing for kindly calling my attention to Mr Laidlaw's paper.

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COLLECTING NOTES.

Notes on British Moths:—*Malacosoma neustria.*—Larvae are fairly common about Camberley. I took a bunch of the caterpillars off a pear tree, in my garden, on 18th May. Larvae were feeding on Oak, 21st June. On a visit to Wood Walton Fen, in July 1919, I found that the place had been visited by a plague of "Lackey" caterpillars, which had completely defoliated the Birch and Sallow trees. Their cocoons were to be seen on all the surrounding bushes. The moths vary considerably both in colour and in the width of the median band. Males vary from pale fawn-colour to dull chocolate-brown; females range through deeper shades of the same colours to reddish-brown, with darker median bands. Moths have emerged, in my cages, during July and August.

Trichiura crataegi.—I have taken these larvae, in June, on *Crataegus*, *Betula* and *Salix*. Ova were hatching out, in my cages, on 17th April. Moths have emerged in August and September.

Poecilocampa populi.—I have seldom come across the larvae of this moth; but I used frequently to find the dark brown cocoons, in crevices at the base of Oak trees, when I was digging for pupae. I have taken both sexes in my moth-trap, at Camberley. A female, trapped on 25th November, deposited a number of ova.

Eriogaster lanestris.—I have received nests of these larvae, in June, from several localities, from which I have raised moths in the following year, in mid-February and early March. Two females emerged, in my breeding cage, on 8th November. These cocoons were constructed in the previous summer and should have produced moths in the following spring.

Lasiocampa quercus.—Larvae of this species do not appear to be common in Camberley. I have, on one occasion, beaten one out from a stunted Birch.

Macrothylacia rubi.—Larvae are abundant on heather-clad commons about Camberley. I have been able to bring them through the winter by including plants of heather and bramble in a bottomless crate, covered with wire-gauze. Moths emerged towards the end of May. Virgin females, exposed on the common, very quickly attracted numerous males.

Cosmotriche potatoria.—I have had larvae of the "Drinker" from many parts of the country; but the species is not common in the neighbourhood of Camberley. I have bred dark forms of both sexes.

Gastropacha quercifolia.—I have found the huge larvae of this species, on several occasions, on "Blackthorn." When disturbed, the caterpillar arches the front part of the body, displaying transverse bands of needle-like hairs, which—when touched—penetrate the skin and cause intense irritation. When constructing its cocoon, the larva distributes these special hairs—a veritable "chevaux-de-frise"—on the surface. On one occasion a caterpillar escaped from the cage in which it had been kept (in my bedroom) and selected the toe of one of my boots as a convenient site for making its cocoon. When, later, I introduced my foot, the result was extremely painful.

Saturnia pavonia.—Larvae have been taken on heather, bramble, *Potentilla*, Mountain-Ash, Birch and Aspen. The resulting moths have emerged in April. A virgin female, exposed in my garden on 9th May, attracted males within an hour. The warts on the full-grown larvae vary through lilacine to yellow and golden with a metallic lustre.—*(To be continued.)*—E. Ernest Green, F.R.E.S.

Volucella inanis, L., at Bexley, Kent.—This large and conspicuous Syrphid is not uncommon in the south of England, but until this year I had never taken it in my immediate neighbourhood. On 20th July and 3rd August last I took one ♂ and two ♀♀ on the outskirts of Joydens Woods, Bexley. I also saw, but failed to capture, several other specimens. My only previous records for this species in N. Kent were two at Chattenden in August 1901, and one at Eynsford in August 1937. Incidentally, I have never seen hornets in these parts, but Continental records refer to *V. inanis* as breeding in the nests of *Vespa vulgaris* as well as in those of *V. crabro*.—H. W. Andrews (F.R.E.S.).

LUPERINA NICKERLII, RACE INCERTA, TUTT, OR RACE GUENEEI, DOUBLEDAY.—In the revised edition of South's *Moths of the British Islands*, Vol. I, pages 334 and 335, we are told that the original specimens of *gueneei*, Doubleday, from near Rhyl in Wales, one of which was sent to Guenée and which he declared to be identical with his var. A of *testacea*, are in fact identical with the British race of *L. nickerlii* later taken in such profusion at St Anne's-on-Sea, Lancs., by Baxter and others.

This is not in accordance with the findings of H. J. Turner. See *Noctuae and Vars.*, Vol. I, pages 315 and 316, where the Rhyl specimens are treated as genuine pale abs. of *testacea* and in no way connected with *L. nickerlii*.

This point of difference in acceptance of the status of the Rhyl specimens is of greater importance than at first appears.

The late J. W. Tutt, *Brit. Noct.*, I, 137-140, refused to see that these Rhyl insects were anything more than *testacea* forms and he also considered the St Anne's insects simple *testacea* forms, but he considered them such different forms that he gave the name ab. *incerta*, Tutt, to the St Anne's insects.

If the Rhyl insects are indeed forms of *L. nickerlii* and not of *L. testacea*, then the name of the British race of *L. nickerlii* is *L. nickerlii*, race *gueneei*, Doubleday, but if the Rhyl insects are in fact *testacea* abs. then the British race of *L. nickerlii* is *L. nickerlii*, race *incerta*, Tutt, and *gueneei* is simply a pale form of *L. testacea*.

I feel personally that H. J. Turner must be right, because the races of *L. nickerlii* are extremely specialized, those of France being as different from ours as are those of Bohemia, from which the typical form comes. Yet if the Rhyl insects are, like the St Anne's ones, *L. nickerlii*, then Guenée had a continental specimen exactly like the British race.

Probably this can only be settled by an examination of the genitalia of the Rhyl examples; the genitalia of *nickerlii* and of *testacea* being very distinct, there could be no doubt about the verdict thus arrived at. —A. J. WIGHTMAN (F.R.E.S.).

"MYRMECINA GRAMINICOLA, FABR. (HYM. FORMICIDAE) AT HESTON."—On 7th July 1940 I discovered a few workers of this interesting little ant under a stone in the churchyard at Heston. This is another instance of how odd specimens of alien local species turn up in uninfected places. There are only two or three other records for Middlesex, but nearer to London. Hertford is at present the most northerly county known for *Myrmecina*.—HORACE DOONISTHORPE.

P.S.—Earlier in the year an oil bomb was dropped in Heston Churchyard; several tombs were destroyed, and that of the late Rev. Ashby was all plastered with mud and oil. Fortunately it fell too far away to desecrate dear Miss Kirk's last resting place.—H. J. D.

NOTES ON MONIMA (TAENIOCAMPA) GRACILIS.—Apropos of the remarks on page 134 of Vol. LII of the *Ent. Record*, I should like to record that at Rannoch three years ago I and other collectors had no difficulty in finding full-fed larvae of *M.* (*T.*) *gracilis* on Bog Myrtle by the lake-side, both by day and night, more of course at night, unprotected on the food-pland.—G. V. BULL (Dr.), Sandhurst, Kent.

CURRENT NOTES.

Our colleague, Dr Malcolm Burr, is in Istanbul, Turkey, and he would be pleased to hear from all his old friends, to whom he sends greetings for the New Year, 1941. Those who write him would do well to send their communication to the Foreign Office, Whitehall, the envelope being marked "Per favour of the Foreign Office Bag to Istanbul." Dr Burr is well known to many scientists in the near East and has already met many acquaintances he made while in Macedonia a quarter of a century ago. It was there in Salonica, near the end of 1918, that all his notes and collections picked up during the campaign were completely destroyed by fire. With his letter Dr Burr enclosed an article on a " beastie " one meets with too frequently in the countries of S.E. Europe, a pest to man.

Mr H. A. Leeds, to whose intensive observation and intensive study we owe so much of the matter in the volume on " The British Aberrations of the Chalk-hill Blue," by P. M. Bright and H. A. Leeds, is now engaged in working up the aberration and variation in the three common Satyrids, *Maniola tithonus*, *M. jurtina*, and *Coenonympha pamphilus*. He would be pleased to know of any items which would be of help to him in his fresh line of study. His address is H. A. Leeds, Wood Walton, Huntingdon.

The Royal Entomological Society (London) has just published the completion of its Annual issues for the year 1940. The *Transactions* for the whole period consist of 626 pages of 22 memoirs with numerous plates and many text figures. The *A. Proceedings* consist of 124 pages with plates and figures, the *B. Proceedings* (Taxonomy), 218 pp. with plates and many figures. There now remains only *C. Proceedings*, the record of the Annual Meeting in January. This recent issue contains among other memoirs " The British *Tachinidae* (Dip.), Second Supplement," by C. J. Wainwright. " The Life History of the African Lycaenid, *Lachnocnema bibulus*, Fab., in Kenya," one of those species whose remarkable association with ants has not previously been fully investigated; there is a coloured plate; by C. Cripps and T. H. E. Jackson. W. J. Kaye adds to his previous accounts of the Lepidoptera of Trinidad; G. Talbot contributes Revisional Notes on the genus *Ideopsis* (Lep.); H. E. Andrewes continues his information on the *Carabidae* (Col.). Other memoirs deal with *Coccidae*, *Orthoptera*, *Odonata*, *Diptera*, *Coleoptera*, *Aleyrodidae*, etc.

Volume XIII of *Eos*, the Spanish Review of Entomology, was published in June 1940, consisting of over 100 pages with 8 plates, of which 7 are diagrammatic, illustrating the main article on the non-Spanish Zygaenid genus *Procris*, by R. Agenjo. The species the author recognises are:—

Procris (*Theresimima*) *ampelophaga*, Bayle. Dalmatia, etc.
P. (*Rhagades*) *pruni*, Schiff. Austria, etc.
P. (*R.*) *cirtana*, Lucas. Mauritania.
P. (*R.*) *gigantea*, Nauf. (*cognata*, Luc.) (*maroccana*, Nauf.). Algeria.
P. (*R.*) *budensis*, Spey. Hungary.

P. (*Jordanita*) *chloros*, Hb. (*sepium*, Bdv.). Austria, Hungary.
P. (*J.*) *tenuicornis*, Zell. (*bellieri*, Rmb.) (*turatii*, Bart.). Sicily.
P. (*J.*) *syriaca*, Albt. Palestine.
P. (*J.*) *graeca*, Jord. Greece.
P. (*J.*) *algirica*, Roth. (*orana*, Jord.). Algeria.
P. (*J.*) *anatolica*, Nauf. (*levantina*, Jord.) (*pfeifferi*, Nauf.). Anatolia, Turkey.
Procris statices, L. (*drenowskii*, Albt.). Europe.
P. albanica, Nauf. Albania.
P. manni, Led. (*micans*, Rocci). Austria, Dalmatia.
P. mauretanica, Nauf. Spanish Morocco.
P. obscura, Zell. Turkey, Taurus.

The plates deal with the structures in detail and there is a Bibliography of about 8 pages. The article is a valuable summary of what has been done in the study of this small and difficult group of the Palaearctic *Zygaenidae* (sens. stric.)

We understand that the Entomological Club has suspended its social functions until circumstances are more propitious. One of our note books reminds us that the customary meetings were held a hundred years ago at the famous Birch Wood hostelry in N. Kent. The poet (sic) said somewhat unkindly of these gatherings—

Giving to small things mighty names
A very artful dodge I call,
Since rifles, skittles, quoits and victuals,
Are termed En-to-mo-log-i-cal.

Ent. Club, Birch Wood, 1850.

The South London Entomological and Natural History Society at their Annual Meeting, held on the 11th January, elected the following members as Officers and Council for the ensuing twelve months:—*President*, F. D. Coote, F.R.E.S.; *Vice-presidents*, E. A. Cockayne, A.M., D.M., F.R.C.P., F.R.E.S., and S. Wakely; *Treasurer*, T. R. Eagles; *Secretaries*, F. Stanley-Smith, F.R.E.S. (Corresponding), and H. G. Denvil (Minuting); *Curator*, S. R. Ashby, F.R.E.S.; *Librarian*, E. E. Syms, F.R.E.S.; *Editor of Proceedings*, Hy. J. Turner, F.R.E.S., F.R.H.S. Council—R. W. Attwood; A. Bliss; G. B. Bull, B.A., M.B.; R. J. Burton, L.D.S., R.C.S. (Eng.); F. J. Coulson; S. P. Doudney; W. J. Finnigan; C. N. Hawkins, F.R.E.S.; S. N. A. Jacobs; and Baron de Worms, M.A., Ph.D., F.R.E.S.

The Royal Entomological Society held its Annual Meeting 15th January. The following Fellows were elected as Officers and Council for the ensuing year:—*President*, K. G. Blair, D.Sc.; *Treasurer*, Brig. W. H. Evans, C.S.I., C.I.E., D.S.O.; *Secretary*, N. D. Riley, F.Z.S.; *Council*—Prof. P. A. Buxton, M.A.; Prof. H. G. Champion, M.A.; E. A. Cockayne, M.A., M.D., F.R.C.P.; A. S. Corbet, D.Sc., Ph.D., F.I.C.; G. Fox-Wilson, N.D.H.; Col. F. A. Labouchere; Hugh Main, B.Sc.; C. Potter, B.Sc., Ph.D.; O. W. Richards, A.M., D.Sc.; The Hon. Miriam Rothschild; W. H. T. Tams; and A. Welti.

In continuation of the Supplementary Notes on Vol. III of Tutt's "British Noctuae and their Varieties," the following species will be dealt with: *Orrhodia* (*Cerastis*) *erythrocephala*, *Dasycampa rubiginea*, *Scopelosoma satellitia*, *Hoporina croceago*, and the *Xanthia* sps., viz., *citrago*, *fulvago* (*cerago*), *flavago* (*silago*) (*lutea*), *aurago*, *gilvago*, and *ocellaris*. Particularly wanted is the variation of this last species.

It would be a great help if any one who has followed the Supplementary Notes on the Noctuae can give us other forms we may have omitted or which have not hitherto been described.

"There is a pleasure in the pathless woods,
There is a rapture on the lonely shore,
There is society, where none intrudes,
By the deep sea, and music in its roar;
I love not man the less, but Nature more."

Byron.

REVIEW.

To the *Proceedings A* of the Royal Entomological Society of London the Registrar, F. J. Griffin, A.L.A., has contributed an article of much interest to many of us. "The first entomological societies. An early chapter in entomological history in England." At the time of the celebration of the Centenary of the Society in 1933 Dr Neave and Mr F. J. Griffin wrote a short history of the Society and the present memoir is an expansion of the earlier portion of that account, to include not only the growth of the Society, but also the rise and growth of Entomological Science itself. The author gives details of "The [first] Aurelian Society [1742-1748], with which the notorious Benjamin Wilkes was connected." The [second] Aurelian Society [1762-1766], of which "Moses Harris" was for a time Secretary. The next Society is "the Society of Entomologists of London [1780-1782], of which Haworth was President and Secretary and Drury, Francillon, Jones and Bentley were fellow-members. Haworth was not only an entomologist but a botanist of considerable note (1767-1833), and it was he who attempted to form a Society in 1801. "The [third] Aurelian Society [1801-1805]." On the break up of this Society a new one was almost immediately formed and called "The [first] Entomological Society of London [1801-1822?]." The whole account is packed with personal details of all contemporary entomologists, who were in any way connected with these various societies, extracted from their letters, their writings, private minutes kept by individuals, the minutes whenever kept of the different Societies, financial statements and documents of various sorts, most of which are now kept in the Library of the present Royal Entomological Society of London. The memoir is a very fine selection of matters of note compiled by a masterly hand into a record of attempt after attempt, to be finally stabilized and welded into the present R.E.S. of London, now of wide fame in the world of Science.—Hy. J. T.

"THE BRITISH NOCTUAE AND THEIR VARIETIES" (J. W. TUTT).

SUPPLEMENTARY NOTES. III.

By Hy. J. Turner, F.R.E.S., F.R.H.S.

CLASS.—NOCTUAE, LINN.

Orrhodia, Hbn. (1821), Stdgr., Splr., South, Culot [*Glaea*, (Hb.), Steph. (1829), Wood: *Cerastis*, Hb. (1821), Frr., H.-S., Barr.: *Conistra*, Hb. (1821), Meyr., Hamp., (South), Warr.-Stz., Meyr., Drdt.-Stz.] *vaccinii*, L. (1761).

Glaea, Hb., was a *Tentamen* name, discarded wrongly as many of us think.

Tutt, *Brit. Noct.*, III, 1 (1892): Meyr., *Hand.*, 66 (1895): Barrett, *Lep. Br. Is.*, VI, 12, plt. 234 (1900): Stdgr., *Cat.*, IIIed., 209 (1901): Hamp., *Lep. Phal.*, VI, 454 (1906): Splr., *Schm. Eur.*, I, 255, plt. 46, f. 32 (1907): South, *M.B.I.*, II, 24, plt. 16, f. 2-6 (1907): Warr.-Stz., *Pal. Noct.*, III, 147, plt. 36 abc (1910): Culot, *N. et G.*, I (2), 12, plt. 39, f. 16-18; plt. 40, f. 1-8 (1913): Meyr., *Rev. Hand.*, 119 (1827-8): Drdt.-Stz., *Pal. Noct. Supp.*, III, 149, 258 (1934) (1937).

Schiff., *Verz.*, p. 85, R. 2 (1775), listed *vaccinii*, the Preusselbeer-Eule: *l.c.*, 85, R. 3, *polita*, the Dunkelbraune, glanzende Eule, the dark brown glossy Noctua: *l.c.*, 86, R. 4, *nitida*, the Ehrenpreis Eule: and also *l.c.*, R. 10, *glabra*, the Blass honigbraune, düsterstriemige Eule, the pale honey-brown dark-streaked Noctua.

Tutt, *Brit. Noct.*, III, 1 (1892): Meyr., *Hand.*, 66 (1895); Barr., *Lep. Brit. Is.*, VI, 12, plt. 234 (1900): Stdgr., *Cat.*, IIIed., 209 (1901): Hamp., *Lep. Phal.*, VI, 454 (1906): Splr., *Schm. Eur.*, I, 255, plt. 46, 32a (1907): South, *M.B.Is.*, II, 24, plt. 11, 2-6 (1907): Warr.-Stz., *Pal. Noct.*, III, 147, plt. 36 abc (1910): Culot, *N. et G.*, I (2), 12, plt. 39, f. 16-18; plt. 40, f. 1-8: Meyr., *Rev. Hand.*, 119 (1928).

Espr., *Abbild.*, IV, plts. 161 and 162 (1789?—), gave 12 figures which he labelled as varieties of *vaccinii*. Werneb., *Beitr.*, II, 48 (1864), accepts plt. 161, f. 1-6, as giving varieties of *vaccinii*; but plt. 162, 1-4, he called *erythrocephala* (3 and 4 var. *glabra*) and f. 5-6 named *canescens* by Esper he called *dolosa*. Plt. 161, f. 5, has been named *mixta* by Stdgr. It is the most variegated form on the plate. The figures are quite recognisable.

Ernst & Engram., *Pap. d'Eur.*, VII, 153-4, f. 514 ab, 515 ac, 516 b (1790), gave good figures which one can identify as v. *polita*, v. *spadicea*, and *vaccinii* f. respectively, teste Werneb., *Beitr.*, II, 122 (1864).

Bork., *Naturg.*, IV, 739 (1792), referred to the variation but named no forms. He treated the forms *nitida*, p. 744; *spadicea*, p. 748; *polita*, p. 743, of Schiff., as separate species.

Fab., *Ent. Sys. emend.*, III (2) (1794), treated p. 20, *polita*; p. 23, *vaccinii*; p. 31, *nitida*, as separate species.

Illiger, *Verz. Neu. Ausg.* (1801), pp. 297, 301, referred the above four to the first, viz., *vaccinii*, as varieties, citing Fab. and Bork. in each case except *glabra*; *nitida* was bred from *vaccinii* [?].

Hübner, *Samml. Noct.* (1800-3) gave figures 177, *vaccinii*; 178, *polita*; 179, *spadicea* (a form of *vaccinii*); 180, *nitida*. The ground colour of *spadicea* is very dark red almost black, that some authorities have taken it for *ligula*, but the latter has no red form. The figures are very good.

Haw., *Lep. Brit.*, 233 (1809), described *vaccinii*, No. 212, and *polita*, No. 213, with which he included *nitida* as a synonym. Of *polita* he said " praecedenti omnibus simillima."

Treit., *Schm.*, V (2), 401 (1825), included *polita*, Schiff., *spadicea*, Hb., Schiff., *ligula*, Esp., but not *glabra*, Schiff., nor *nitida*, Schiff. Esper's *ligula* was considered a *vaccinii* form.

Dup., *Hist. Nat.*, VI, 92 (1826), has given a good figure of the dark *spadicea*, Hb., form of *vaccinii* " because it is the commoner form with him." He treated *glabra* and *erythrocephala* as two forms of the same species. The figures of *glabra* and *erythrocephala* are too deep in ground colour. (The plate is very dark as a whole.)

Stephens, *Ill.*, II, 161 (1829), considered *vaccinii*, *spadicea*, *subnigra*, and *polita* a single species, but as previous authors had held them to be distinct species he described them separately although he had taken all four together when collecting, *subnigra* being the least plentiful. In *l.c.*, iv, 389 (1835), he corrected the above, " I have no doubt but that *subnigra* and the two following *Glaea* are referable to one very inconstant species."

Frr., *Neu. Beitr.*, I, 87, plt. 46, 1-2 (1833), gave two figures, both good, one *vaccinii* the other similar to f. *spadicea*, Hb. He placed the figures 177, 178, 179 of Hb. to this species. *Glabra* he would attach to *polita*, Hb., 178.

Wood, *Ind. Entom.*, p. 45, plt. 11, 209-212 (1834), gave four good figures illustrating Stephens species of *Glaea*, viz. *vaccinii*, *spadicea*, *subnigra* and *polita*.

H.-S., *Sys. Bearb.*, II, 322 (1850), considered the three figures of Hb. 177, 178, 179, all good. That of Frr., *Neu. Beitr.*, I, 46, as useless. His own fig. 459 is abnormally large = v. *brigensis* [?].

Gn., *Hist. Nat. Noct.*, V (1), 379 (1852), included only *polita* with his *vaccinii*, but described two other forms, a yellow one, which Tutt subsequently named *ochrea*, and a yellowish marbled form, which Tutt named *variegata*. The *spadicea*, Hb., is placed with *ligula*.

Stdgr., *Cat.*, IIIed., 209 (1901), gave ab. *signata* of Klem. as a synonym, named the *vaccinii* of Esp. 2 (3) as ab. *spadicea*, Hb., 179; the *vaccinii*, Esp. 5 as *mixta*, Stdgr., *Cat.*, IIed., 118; added ab. *sebdouensis*, Obthr.

Hamp., *Lep. Phal.*, IV, 454, considered the *spadicea*, Schiff., and *spadicea*, Hb., as the same form.

South, *Moth. B.I.*, II, 24, plt. 11, figs. 3-6 (1907), gave four very good figures. 3, typical; 6, *spadicea*; 4, *mixta*; 5, *suffusa*.

Splr., *Schm. Eur.*, I, 255, plt. 46, f. 32a, 32b (1907), gave ten aberrational forms of which *ocellata* was new. The figures are not good, much too dark and indistinct, somewhat larger than average British examples.

Warr.-Seitz, *Pal. Noct.*, III, 147, plt. 36 abc, gave thirteen figures, *vaccinii* ♂ and ♀, *mixta*, *glabroides* ♂ and ♀, *spadicea* 2 ♂ and 2 ♀, *signata* ♂ and ♀, *rufa*, and *suffusa*, all quite useful.

Culot, *N. et G.*, I (2), 11-13, plt. 39, 16-18; 40, 1-8 (1913), gave an excellent series of eleven figures after discussing the variation at length. His figure 16 of the typical form has fawn forewings with lighter lines and in parts darker; but all the lines are well expressed and quite definite. His first aberration is *grisescens*, Obthr., f. 17, of a uniform ferruginous red, with markings only very slightly expressed, the forewings are concolorous; plt. 39, f. 18, is *polita*, Schiff.; plt. 40, f. 1, is *robusta* (Engr.) Obertr.; f. 2 is *spadicea*, Hb.; f. 3 is *spadicea-grisea*, Obthr.; f. 4 is *mixta*, Stdgr. = *vaccinii*, Hb., 177 (Hb. 177 is not typical); f. 5 and f. 6 are two forms of *mixta*, with nervures lost in the ground and with finely expressed nervures respectively; f. 8 is the *polita*, Hb., renamed by Oberth. *hübneri* (nec *polita*, Schiff.); f. 7 is another form of *hübneri*, transitional (*mixta-hübneri*).

These results are somewhat confusing by the mixing up of the names as previously defined by the older authors.

Corti-Drdt.-Stz., *Pal. Noct. Supp.*, III, 149, 258, added ten additional aberrations on p. 149 (1934), and one more on p. 258 (1937).

Tutt, *Brit. Noct.*, III, 4, called attention to the three almost unicolorous forms of *vaccinii*, viz., (1) the dark reddish *vaccinii*, Linn.; (2) the bright reddish *rufa*, Tutt, and the blackish *unicolor*, Tutt.

Of the Variation Barrett wrote:—

Variable in the depth of the ground colour and in the degree of marbling, or rippling of purple-brown; often this darker colour suffuses the whole surface except the hind margin, and the forewings become of a very smooth uniform dark purple-brown, or the whole is of an equally smooth chestnut-red; or it is ornamented with short white lines upon the nervures. When this last character is added to the usual typical form the variety seems to be called var. *mixta*; when to the very dark form, var. *spadicea*; but these names are somewhat arbitrary, all the variations being inextricably intermingled.

He spoke of a "curious specimen of an unusually bright red-brown, shading off to drab." Bred.

Another "The darkest purple brown form with the hind-margin normal is usually a Western variety, from South Wales especially."

Spuler, in *Schm. Eur.*, I, p. 255 (1907), gave a good summary of the significance of the various aberrational names which were then in use—

"The sparsely marked form, which is uniformly rust-brown on the forewings, is Linné's type. The ground colour of the forewing can become rosy-red, and, according to Gn., become wholly ochre-yellow, ab. *ochrea*, Tutt, with rosy transverse and marginal marking; one finds the underside dark red-brown and red-brown, black. In the dark unicolorous forms the surround of the stigmata, and the veins become yellowish-white, and frequently well in evidence: ab. *canescens*, Esp. The ab. *obscura*, Tutt, is the extreme form, which I have never seen. In the form in which the forewing has lost its ochreous or reddish colour and has become greyish or greyish-black, the veins, the stigmata surround, etc., are usually very pale. From Basel Seiler reports a black

aberration—in which case one probably meets with a *ligula* form with a blunted apex. The waved line and a parallel streak inside the dark marginal dots (the so-called watered band), part of the marginal area and most of the discal area can often be lightened up yellowish: ab. *mixta*, Stdgr.; for the most part the veins are appreciably lighter also. The *mixta*-form with darker ground up to the sharply margined clay-yellow 'watered band' and with clear stigmata, costal and marginal marking is ab. *glabroides*, Fuchs. It becomes quite distinct when the watered band becomes merged with the dark veins into a row of reddish-yellow-ochre black centred eyes, the dark red-brown colour which extends to the base of the wing and its out-lying portion well emphasised by the rhomboidal blackish spots on the veins: ab. *ocellata*. In another form one finds inside the inner and outside the outer transverse line an intensely blackish transverse band of varying width, sometimes, but not always, blackish or blackish-grey spots, isolated or as a band outside the waved line, the ground is uniform: ab. *spadicea*, Hb. The ab. *signata*, Klem., has only the band of black spots before the margin according to Stdgr. The costa as well as two-thirds of the discal area are darkened grey or blackish evenly, and the transverse lines and the discal veining are distinctly paler in the ab. *suffusa*, Tutt, but in which also the black spots of the marginal band can be well developed. This form will show the *mixta* character when it has the pale markings near the black-grey cross band: ab. *mixta-spadicea*."

The List of Names and Forms to be considered:—

vaccinii, L., *Fn. S.*, 320 (1761).
f. *spadicea*, Hb., *Samml. Noct.*, 117, 179 (1800-3).
vaccinii, Esp., *Abbild.*, IV (1), 549, plt. 162 (1789-?).
ab. *mixta*, Stdgr., *Cat.*, IIed., 118 (1871).
r. *sebdouensis*, Aust., *La Nat.*, 221 (1880).
ab. *ochrea*, Tutt, *Brit. Noct.*, III, 3 (1892).
ab. *variegata*, Tutt, *l.c.*
ab. *rufa*, Tutt, *l.c.*
ab. *unicolor*, Tutt, *l.c.* 4.
ab. *suffusa*, Tutt, *l.c.*, 4.
ab. *obscura*, Tutt, *l.c.*, 4.
ab. *signata*, Klem., *Spraw. Kom. Fiz.*, XXXIII, 141.
ab. *conspadicea*, Fuchs, *Stett. e. Zt.*, XLII, 130 (1901).
ab. *glabroides*, Fuchs, *l.c.*, 131.
ab. *ocellata*, Splr., *Schm. Eur.*, I, 256 (1907).
ab. *mixta-spadicea*, Splr., *l.c.*
ab. nigra, D. Luc., *Ann. Soc. ent. Fr.*, 483 (1910).
ab. *flavofasciata*, D. Luc., *l.c.*
ab. *grisescens*, Obthr. (Culot), *N. et G.*, I (2), 12, plt. 39, f. 17 (1913).
ab. *robusta*, Ernst. & Engr. (Obthr.) Culot, *l.c.*, plt. 40, f. 1.
ab. *hübneri*, (Obthr.) Culot, *l.c.*, f. 7-8.
ab. *polita*, (W.V.) Culot, *l.c.*, plt. 39, f. 18 (nec Hb.).
ab. *obscuro-spadicea*, Heinr., *Deut. ent. Zt.*, 521 (1914).
ab. *caerulescens*, Preiss. et G., *Verh. Ges. Z.-b. Wein*, LXX (85) (1920).
ab. *fusca*, Lenz., *Osth. Schm. Sudbey.*, II (2), 320 (1927).
ab. *mixta-grisea*, Lenz., *l.c.*
ab. *elegans*, Horm., *Ent. Zts.*, L, 359 (1936).
ab. *albovenosa*, Schwing., *Ent. Rund.*, LV, 524 (1938).

Tutt dealt with (1) *vaccinii*, L., the dark reddish, almost unicolorous type of Linn. (2) *unicolor*, the blackish-red almost unicolorous form. (3) ab. *suffusa*, with base and central area blackish-grey. (4) *obscura*, whole area blackish-grey, with pale nervures. (5) *ochrea*, yellow-ochreous, reddish transverse lines. (6) *variegata*, yellow-ochreous, marbled with red, and pale nervures. (7) *rufa*, bright reddish or chestnut, almost unicolorous. (8) *spadicea*, reddish or with dark transverse lines. (9) *mixta*, reddish with paler subterminal area, and pale nervures.

ab. *mixta*, Stdgr., *Cat.*, Hed., 118 (1871).

Orig. Descrip.—" Al. ant. exterius (et in medio) dilutius fasciatis."

In ab. *mixta*, Stdgr., the two shades (chestnut-brown typical Hb. and ochreous light-brown *ochrea*, Tutt) become prominently mixed, hindwings paler, and a diffuse rufous outer band, and terminal area as well as fringe. cf. Warr.-Stz.

race *sebdouensis*, Aust., *Le Nat.*, 221 (1880).

Orig. Descrip.—" It is a little smaller than *rubiginea* and of quite a different appearance. Forewings narrow, of a hepatic brown, shining above with all the lines and spots obsolete. One notes, however, readily, some black dots grouped at the base and along the inner margin; a double row of black dots, one along the edge of the wing preceding the fringe, the other in place of the subterminal; another dot of the same colour at the lower portion of the space, which is occupied by the reniform if it were visible. Costa blackish in the middle with a white dot badly arrété at the origin of the elbowed line. Fringe mixed with brown. Lower wings of a uniform blackish with the fringe reddish. The underside of the forewings is deep grey on the disc with the costa and external margin reddish. The latter is marked by a line of brown dots which reproduce those of the above. The underside of the lower wings is of a somewhat clear flesh brown. One notes on it with much clearness a median row of dots and antemarginal lunules of a deep grey. The body is brown with the head a little yellowish." Algeria.

Hamp., *Cat. Lep. Ph.*, VI, 454 (1906), described it briefly, " Forewing with the lines hardly traceable, subterminal and terminal series of black points." Algeria.

ab. *conspadicea*, Fuchs, *Stett. e. Zeitg.*, XLII, 130 (1901).

Orig. Descrip.—" Forewings red-brown, darkened, with two black transverse lines, the second widened on the costa. The margin below the apex is somewhat cut in and then more strongly curved out than in *vaccinii*, and thus the apex appears a little produced. That of the hindwing is narrow and long. But *ligula* varies somewhat in this respect. I have Hungarian specimens in which the wing shape is not different from that of our *vaccinii*. Hence the determination is rendered more difficult. In both species the markings vary in the same direction, producing parallel forms, so that the correct determination often lies only in the somewhat more noticeable size of *ligula*, the breadth of the forewing and its usual denser colour, on which the black transverse lines are mostly less apparent. Usually the lower part of the reniform has a round black central spot."

This form was described by Fuchs as an ab. of *ligula*. Warr. determined it as belonging to *vaccinii* (*Pal. Noct.*, III, 147), a development

of *spadicea*, Hb., a red form with distinctly darker transverse lines, and which has the median and submarginal areas paler, the shade before the inner line generally more or less reaching the base and which beyond the outer line as well as the narrow terminal space become black-brown or black.

ab. *conspadicea*, Fuchs, is the form *spadicea*, Hb., where the ground colour is sometimes dark brown, or grey-brown, as well as light. (Hamps.)

ab. *signata*, Klem., *Spraw. Com. Fiz.*, XXXIII, 141 (Seitz, *l.c.*, 148).

FIG.—Seitz, III, plt. 36 bc.

DESCRIP.—" When the form *conspadicea*, Fuchs, has the black shading restricted to the outer band and stigmata only with ground colour pale or dark grey."

ab. *glabroides*, Fuchs, *Stett. ent. Zeit.*, XLII, 131 (1901).

ORIG. DESCRIP.—" Bright red-brown, with a bluish sheen, lighter on the costa, with light leather-yellow stigmata, and bright leather-yellow waved line before the margin. The distinction on which this aberration relies is signified in the name: it bears the characteristic of the well-known *erythrocephala* aberration *glabra*."

This form was described by Fuchs as an ab. of *ligula*. Warr.-Stz. determined it as belonging to *vaccinii* (*Pal. Noct.*, III, 147), a development of *mixta*, Stdgr., a form with the two shades prominently intermixed, light brown and darker shadings, and

ab. *glabroides*, Fuchs, is one development of *mixta*, Stdgr., where the whole of the forewing, except the pale band containing the subterminal spots, is suffused with dark rich brown, sometimes mixed with blackish.

ab. *ocellata*, Splr., *Schm. Eur.*, I, 256 (1907).

ORIG. DESCRIP.—" This form is quite distinctive; the waved band becomes broken up by the dark veins into a row of reddish ochre-yellow black-centered eyes, which stand out plainly on the veins, through the dark red-brown suffusion which reaches to the base of the wings, and their blackish, rhombic small spots lying on the outside."

ab. *mixta-spadicea*, Splr., *Schm. Eur.*, I, 256 (1907).

ORIG. DESCRIP.—" In ab. *suffusa*, Tutt, the costa as well as the outward two-thirds of the disc are evenly darkened grey or blackish, the cross lines and veins of the central area are lighter, but in this form the black band of marginal spots can be well developed. This form thus by the clear markings on it, shows by the black-grey transverse band the *mixta* character " = *mixta-spadicea*.

ab. *nigra*, D. Luc., *Ann. Soc. ent. Fr.*, 483 (1910).

ORIG. DESCRIP.—" Alis anticis supra fere totis nigris." Tarf, Algeria.

" Frequently the forewings are of a uniform black. The thorax and head the colour of the forewings. The antennae are slightly darker than in the reddish forms. There exists a whole series of transitional forms between *nigra* and *mixta*, passing from red to grey, then to brown, finally to black."

ab. *flavofasciata*, D. Luc., *Ann. Soc. ent. Fr.*, 483 (1910).

Orig. Descrip.—" Alis anticis brunneis fuscis vel nigris; proxima marginis, sinuosa linea punctorum flavorum." Tarf, Algeria.

" The forewings are brown mixed with reddish, or completely black, and possess parallel to the fringe, and not far from it a sinuous line very clearly composed of a series of yellow dots. The upper portion of this line is expanded into a very clear yellow spot which is extended to the apex."

ab. *grisescens*, (Obthr.) Culot, *N. et G.*, I (2), 12 (1913).

Fig.—*l.c.*, plt. 39, f. 17.

Orig. Descrip.—" Differs by the grey colour largely suffused or spread over the reddish-brown ground of the forewings; the thorax remains a little red as in the type; sometimes clearer."

ab. *robusta*, (Engr.) (Obthr.) Culot, *N. et G.*, I (2), p. 12 (1913). (Gn. var. C.)

Fig.—*l.c.*, plt. 49, f. 1.

Orig. Descrip.—" The wings are entirely of a fawn-yellowish with only the lines and the outer margin ferruginous."

ab. *hübneri*, (Obthr.) Culot, *N. et G.*, I (2), p. 12 (1913).

Fig.—*l.c.*, plt. 40, f. 7-8.

Orig. Descrip.—" This var, which has the ground of the wings more or less blackish, is the *polita*, Hb., which is in no way referable to the *polita*, Schiff. Hübner did not refer it to the *polita* of W. V. (Schiff.), although apparently belonging to the same stem species, and Obthr. has called it *hübneri* to avoid confusion. It is certainly in error that Stdgr. & Reb. have attributed *polita*, Hb. (178) to *ligula*. They have confused *vaccinii-polita* and *staudingeri-polita*; there is no *ligula-polita*."

ab. *polita*, (W.V.) (Gn. var. A.) Culot, *N. et G.*, I (2), 12 (1913).

Fig.—*l.c.*, plt. 39, f. 18 (nec Hb. 178).

Orig. Descrip.—" Of a uniform ferruginous red with the marking very little apparent; the upper wings are unicolorous."

ab. *obscuro-spadicea*, Heinr., *Deut. Ent. Zts.*, 521 (1916).

Orig. Descrip.—" Uniting the characters of *obscura*, Tutt, and of *spadicea*, Hb."

ab. *caerulescens*, Preiss. et Galv., *Verh. z. b. Wien*, LXX (85) (1920).

Orig. Descrip.—" According to Warren in Seitz, *Pal. Noct.*, III, 148, this appears to be a divergence of ab. *glabroides* in which the dark suffusion of most of the central area of the forewings has decreased, but the suffusion is not deep brown, but slate-grey or black, for which we suggest the name *caerulescens*." Klosterneuberg, near Vienna.

ab. *fusca*, Lenz, *Osth. Schm. Sudbey.*, II (2), 330 (1927).

Orig. Descrip.—" Ground colour blackish-brown without the light bands."

ab. *mixta-grisea*, Lenz, *Osth. Schm. Sudbey.*, II (2), 330 (1927).

Orig. Descrip.—" Forewings with light marginal border, and with grey discal suffusion."

ab. *elegans*, Hörham, *Ent. Zts.*, L, 359 (1936).

Orig. Descrip.—" The ground colour is dark chestnut-brown. The band marking is clear blackish as in ab. *spadicea*, Hb. But to this is added the marking of ab. *glabroides*, Fuchs, the clear yellow margined orbicular, the clear yellow filled reniform and the broad yellow marginal band." S. Bavaria.

ab. *albovenosa*, Schwda., *Ent. Rund.*, LV, 524 (1938).

Orig. Descrip.—" A completely unmarked dark red-brown male with fine white vein marking takes the name *albovenosa*, n. ab." Albarracin, Spain.

Orrhodia, Hb. (1821), Stdgr., Splr., Sth., Culot [*Glaea*, Hb. (1806), " Tent." = *Glaea*, Steph., Curtis (1829): *Cerastis*, Hb. (1821), Dup., Barr.: *Conistra*, Hb. (1821), Meyr., Hamp. (Sth.), Warr.-Stz., Meyr., Drdt.-Stz.] *ligula*, Esp. (1788-?).

Tutt, *Brit. Noct.*, III, 4 (1892), IV, 121: Meyr., *Hand.*, 65 (1895): Barr., *Lep. Br. Is.*, VI, 17, plt. 234, 2 (1900): Stdgr., *Cat.*, IIIed., 209 (1901): Hamp., *Lep. Phal.*, VI, 455 (1906): South, *M.B.I.*, II, 25, plt. 11, 7-10 (1907): Splr., *Schum. Eur.*, I, 256, plt. 46, 33 (1907): Warr-Stz., *Pal. Noct.*, III, 148, plt. 36 cd (1910): Culot, *N. et G.*, I (2), 14, plt. 40, 9-13 (1914): Meyr., *Rev. Hand.*, 119 (1928): Drdt.-Stz., *Pal. Noct. Sup.*, III, 149 (1934).

Reliable differentiation of the named forms is practically impossible. Scarcely any author can be sure of what form is meant by the name. The same name has been used for more than one form. The collation of the various forms has not been possible so that Warren and Draudt in both volumes of Seitz have simplified their summaries omitting much that was inexplicable.

The older authors seemed to confuse the two species so much that it appears futile to give notes on the illustrations or on the descriptions. Even Herrich-Schaeffer in his figure labelled *brigensis*, 459, said to be an ab. of *ligula*, has not the distinctive shape of *ligula*. He does not consider the species in his text.

Esper, *Abbild.*, IV, plt. 162, f. 6, gave a figure of an insect he called var. *vanescens* of *vaccinii*, L. Wernebg., *Beitr.*, II, 48 (1864), generally very reliable in judgment, places this form to *dolosa*, Hb., but Draudt in Stz. (1931) considered it a form of *ligula*. The build of *canescens* is not that of *ligula*, which has a more pointed forewing and is slightly hollowed out below the apex, nor has it much resemblance to *dolosa*, Hb., which has more and different marking. According to the figure of Esper the striking feature is the radiation of the marginal markings of the underside forewing, with a much lighter ground of the hindwing below and contrasted darker markings.

H.-S., *Sys. Bearb.*, II, f. 459, named *brigensis*, is stated by Culot to be referable to *vaccinii-polita*, Hb., 178, and not to *ligula-brigensis*, Bdv. H.-S. gave no letterpress on *ligula*.

Gn., *Noct.*, V (1), 381, did not recognise *ligula*, Esp., as the typical figure, a form practically unknown in England, but took the *spadicea*,

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Printed by T. Buncle & Co. Ltd., Arbroath.

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No. 3

MARCH 1941.

NTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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THE MELANIC FORMS OF ORTHOLITHA MUCRONATA, SCOP. AND O. SCOTICA, COCKAYNE.

By E. A. Cockayne, D.M., A.M., F.R.C.P.

Since I wrote my paper showing that three species, all found in Great Britain, were included under the name *Ortholitha mucronata* (*Proc. South. Lond. Ent. and N.H. Soc.*, 1939-40, p. 59) I have seen melanic forms of both *O. mucronata* and *O. scotica*. The recognition of *O. umbrifera*, Prout, and *O. scotica* as species distinct from *mucronata* has made the names applicable to the melanic forms uncertain. Hitherto both ab. *luridaria*, Bkh., and ab. *nigrescens*, Cockerell, have been regarded as synonyms for the melanic form of *mucronata*, the former accepted as its correct name in the original edition of Seitz and the latter in the Supplement. I appealed to Mr L. B. Prout for help and he kindly wrote as follows:—" You will notice that Cockerell's name (*Entom.*, 1889, xxii, 55) is founded solely on a bibliographical reference (*Entom.*, 1883, xvi, 188), and that therefore the indisputable type is a specimen, which Porritt took on Strensall Common, July 14th, 1883. It is described as almost uniformly sooty-black. The rust-coloured lines, which in the ordinary type are so much darker than the ground colour, are paler in the variety. It is erected as an ab. of *palumbaria* (*mucronata*) and should under normal circumstances be attached to that species, unless the placing can be proved erroneous."

Fortunately, the type is in the Tolson Memorial Museum, Huddersfield, and Mr Aubrook, the Curator, very kindly sent it to me for identification. It is the only melanic specimen in the Porritt collection and is a male. Mr L. B. Prout, Mr W. H. T. Tams, and I agreed independently that it was a form of *mucronata*, and Mr Tams confirmed this by an examination of the genitalia *in situ*. Ab. *nigrescens*, Cockerell, is therefore a form of *mucronata*. The figure in Barrett's *British Lepidoptera* (Pl. 378, fig. 1c), although it does not agree very well with Porritt's description, must be a figure of the type, since Porritt only possessed the one specimen.

Borkhausen's types are lost, so that it can never be proved to which species ab. *luridaria* belongs. All we know about Borkhausen's *palumbaria* is what is found in his own volume (vol. v, pp. 59-61). Its two lines were almost straight, and it was common with him and flew twice in the year, in May or the beginning of June and again in July and the beginning of August. As to *luridaria* as a new species (p. 62), Borkhausen had taken it only once at the beginning of June in a wood near Darmstadt, where it flew with the *palumbaria*. Mr Prout says that if we could find out that both species occur there and are tolerably regular as to their times of appearance, we might from the date early June find a definite argument for making *luridaria* = melanic *umbrifera* or *scotica*. The former is the more likely, since it is doubtful if *scotica* occurs in Germany. Unfortunately, Mr Prout has no material from Darmstadt and it is uncertain whether only one species occurs there or whether both *mucronata* and *umbrifera* are found there in the same locality. Most of the central European material, so far as tested, seems to be *mucronata*, and as Heydemann was the first author to attach it in any critical sense to *mucronata* rather than to *umbrifera* or *scotica*, it may

be allowed to rest there unless the determination can be proved erroneous.

Borkhausen's *luridaria* had " dull black glossy ground colour nearly as in *Ph. Bombyx jacobaeae*, the hindwing becoming lighter at base, shading off in some measure to black-grey. Lines of forewing straight, on their reverse sides light-edged; in addition traces of a sub-basal line. Hindwing unmarked."

The melanic form of *O. scotica* is as yet unnamed, and I propose to name it

ab. **nigrescens** n. ab.

The large discoidal spot often separated into two parts and the wavy lines of typical *scotica* are visible. In some specimens the antemedian from the costa to the subcostal nervure runs towards the base and not towards the apex as in *mucronata*. The ground colour is blackish grey, not so dark as in melanic *mucronata*, and the lines are blackish, showing little or none of the rust colour so characteristic of melanic *mucronata*. The sub-basal line is edged distally by a clear light line and the antemedian is edged proximally and the postmedian distally by a line equally pale and clear. In some specimens the line distal to the postmedian is not sharply defined, but merges into the ground colour, which becomse gradually darker towards the termen. In such specimens the submarginal line is clearly visible. The ground colour in some is darker in the basal and median areas, so that the space between the sub-basal and antemedian appears distinctly lighter. The light edges to the lines are much more conspicuous than in melanic *mucronata*. The hindwings are grey with a darker grey transverse line edged by light grey, and the discoidal spot is more distinct than in melanic *mucronata*. Like typical *scotica*, it is smaller and has narrower wings than melanic *mucronata*.

There are 9 males in beautiful condition in the British Museum (E. R. Bankes Coll.) taken at Aviemore, Inverness-shire, 9-22,vi.1909, by E. R. Bankes. I have a slightly damaged female without abdomen with no data from Canon Cruttwell's collection. All these can be taken as syntypes. I have a male also without data from Canon Cruttwell's collection. This is darker without light lines, but with large discoidal spots in both fore and hindwings. The lines, though straighter than in most *scotica*, are not rust coloured. It is probably a melanic *scotica*. It is not unlikely that these came from Rannoch, where Canon Cruttwell used to collect. We have, therefore, *Ortholitha mucronata*, Scop., ab. *luridaria*, Bkh., 1794 (ab. *nigrescens*, Ckll., 1889) and *O. scotica* Ckyne., ab. *nigrescens*, n. ab. So far no melanic form of *O. umbrifera*, Prout, has come under my notice.

O. mucronata, ab. *luridaria* appears to be rare, but widely spread. There are three in the Zoological Museum, Tring, a male labelled New Forest, 15.vii.1886, and two females, one from the O'Reilly collection, labelled Tunbridge Wells, 1868, and the other without data. Mr C. N. Hawkins has a fine male from the New Forest, and Mr A. A. W. Buckstone has some taken the first week of July at Headley. Apart from those mentioned above, I know of no *O. scotica*, ab. *nigrescens*.

GLANURES MYRMECOLOGIQUES.

By Horace Donisthorpe, F.Z.S., F.R.E.S., etc.

Hymenoptera—Formicidae.

In Dr F. Santschi's "Fourmis d'Indochine. Faune Entomologique de L'Indochine Française, **8**, 95-117 (1924)," all the species and varieties described, and recorded as new, had already been described by him in *Ann. Soc. Ent. Belg.*, **60**, 158-176 (1920). In fact, the two papers are almost identical, except that the figures in the 1920 publication do not appear in that of the 1924; and in the latter a few forms are recorded from Indo-China not mentioned in the 1920 paper!

This is very misleading, as, of course, the dates for the publication of the species are incorrect when recorded again in the *Zoological Record* for 1926 (in which the 1924 names appear).

Pseudomyrminae—Tribe Pseudomyrmini—Pseudomyrma.

De Dalla Torre (1893) and Wheeler (1911) give Lund as the author of this genus, and Emery (1921) gives Latreille. As neither of these views is correct, I have gone into the matter, and give the results of my investigations in full as follows:—

Lund [*Annales des Sciences Naturelles*, **23**, 137 (1831)] in a letter addressed to M. Audouin on the habits of some ants from Brazil, after mentioning some species with very large eyes and solitary habits, says—"M. Latreille, à qui j'ai fait part de ces individus, a proposé de leur donner le nom de *Pseudomyrme* qui leur convient en effet parfaitement. J'en ai rapporté cinq à six espèces."

F. E. Guérin Méneville ["*Iconographie du Règne Animal* de G. Cuvier," Insectes, p. 427 (1844), Paris, 1829-1858. Sub. "Sous-genre *Pseudomyrma*"] gives a good description and writes—"Après avoir écrit ces lignes, nous trouvons à la fin d'une lettre de M. Lund sur les habitudes des Fourmis du Brésil (*Ann. des Sc. Nat. 1st Série*, t. 23, p. 137) l'indication d'un groupe de Fourmis solitaires, dont les yeux sont grands et dont le pédicule de l'abdomen est formé de deux noeuds. Latreille, a qui M. Lund avait montré cinq à six espèces différentes, a eu la même idée que nous, et il se proposait de créer un genre avec ses espèces sous le nom de *Pseudomyrme*. Nous adoptons cette dénomination."

Smith [*Trans. Ent. Soc. Lond.*, **3**, 156-7 (1855)] in a paper on some ants from Brazil under *Pseudomyrma*, writes "Genus *Pseudomyrma*, Guér. The name *Pseudomyrma* is proposed for the insects comprised in this genus by Lund in the *Annales des Sciences Naturelles*, 1831; but the only character there given is the extraordinary size of the eyes; the genus is fully characterized by Guérin in the *Iconographie du Règne Animal*."

Smith [*Cat. Hym. Ins. Brit. Mus.*, **6**, *Formicidae*, 153 (1858)—"Genus 9, *Pseudomyrma*. *Pseudomyrma*, Guér., *Icon. Règ. Anim.*, 427 (1835-8)."

De Dalla Torre [*Cat. Hym.*, **7**, *Formicidae*, 55 (1893)]—"*Pseudomyrma*, Lund, *Ann. Sc. Nat.*, 1831, p. 137."

Wheeler, in a paper " A List of the Type Species of the Genera and Subgenera of *Formicidae* " [*Ann. New York Acad. Sci.*, **21**, 171 (1911)], gives " *Pseudomyrma*, Lund, *Ann. Sci. Nat.*, xxiii, p. 137, 1831."

Emery, *Genera Insectorum*, Fasc. 174 A, p. 28 (1921), gives " *Pseudomyrma*, Latreille, in Lund. *Pseudomyrme*, Latreille, in Lund, *Ann. Sci. Nat.*, Vol. 23, p. 131 (1831)."

Sherborn, *Index Animalium*, 1801-1850. March, 1929, p. 5196, gives " *Pseudomyrma*, F. E. Guérin, M. *Iconographie*, 1844, Ins. 427, Hem. (sic!). *Pseudomyrme*, Latreille, *Ann. Sci. Nat.*, xxiii (90), June, 1831, 137, Hym."

Nomenclator Animalium, 1758-1922, *Preus. Akad. Wissens. Zu. Berlin*, Bd. 4, N-P., p. 2916 (1935). Berlin, 1932-35, gives " *Pseudomyrma* [pro. *Pseudomyrme*, A. W. Lund, 1831]. F. E. Guérin, *Méneville, Iconogr. Règne an.*, V. 3, Ins., p. 427, 1844, Hym. Form."

Neave, *Nomenclator Zoologicus*, Vol. iii, M-P., p. 993 (1940):— " *Pseudomyrma* (pro. *me*, *Latreille*, 1831). Guérin Méneville, 1844, *Iconographie*, Ins. 427, Hem. *Pseudomyrme*, Latreille, 1831, *Ann. Sci. Nat.*, **33** (90), 137, Hym."

Lund (1831) did not describe the genus sufficiently; furthermore, " Pseudomyrme " is in the vernacular and cannot stand.

Latreille did not describe it at all.

Guérin (1844) gave a good description, and was also the first to latinize " Pseudomyrme " into *Pseudomyrma*; therefore he is the author of the genus.

Smith was correct (1855), only he overlooked the fact that in Lund " Pseudomyrme " was proposed, not *Pseudomyrma*.

Smith (1858) correct, except for the date.

It is curious that such authorities as Dalla Torre (1893), Wheeler (1911), and Emery (1921) should go back to Lund, and Latreille, as the authors of this genus.

Sherborn (1929) showed that the part containing *Pseudomyrma* was published in 1844. He unfortunately writes " Hem." (Hemiptera) instead of Hym. (Hymenoptera), no doubt as a slip; and Neave (1940) repeated the error by copying Sherborn.

I should quote the reference to this genus thus:—*Pseudomyrma*, Guér., *Iconogr. Règ. An. Ins.*, 427 (1844).

(*To be continued.*)

COLLECTING NOTES.

Notes on British Moths.—*Continued from page 20.*

Drepana falcataria.—I have taken these larvae, fairly commonly, on young Birch bushes, from July to October. Moths have emerged as early as the 17th May; but the main emergence appears throughout June. Stragglers (of ? a second brood) have come out in July and August.

Drepana binaria.—I have beaten full-fed larvae, from Oak trees, throughout September. Moths have emerged, in my cages, during the following May. I caught a female, in my moth-trap, on the 28th of August.

Drepana cultraria.—I have never succeeded in finding the larva of this beech-feeding species; but I have disturbed the moths from Beech

trees in May and June and, again, in September. When on the wing, the moth might be mistaken for the common " Yellow Shell " (*C. bilineata*).

Drepana lacertinaria.—I have found full-fed larvae of *lacertinaria* throughout August and September, up to early October. Moths usually emerge in May, but have appeared as early as the 17th of April. A second brood is " on the wing " in July and August. The earlier emergencies produce moths of a browner colour and more closely striated pattern. Moths of the second brood are of a more uniform tawny colour.

Cilix glaucata.—Full-fed larvae occurred in September, on *Crataegus oxyacantha*. Their presence is indicated by the skeletonization of the upper surface of the leaves. Moths have appeared in May and—again—in July and August.

Earias chlorana.—I have usually found these larvae within leaves on the terminal shoots of willow. But, when collecting Tortrix larvae on Sallow bushes, in a swampy field near Aldershot, I was surprised to find a larva of this species amongst my collection of Sallow shoots. This larva formed a boat-shaped cocoon on the 18th of August and the moth emerged on the 22nd of the following March. Larvae found on willow, in July, have not appeared, as moths, before May

Hylophila prasinana.—Full-fed larvae are common on the underside of Oak leaves, towards the end of September. They are recognizable by the crimson line on each side of the anal claspers. Moths have appeared, in my cages, towards the end of April up to mid-June.

Hylophila bicolorana.—I have beaten out young larvae, from Oak trees, in September and October; but have never brought them through to the adult stage. I have taken the moths, at light, in June and July.

Sarrothripus revayana.—Larvae are abundant on Oaks during July and—again—in September. They may be recognized by the sparse white hairs on the back. I have found the boat-shaped cocoons, surmounted on a short pedicel, attached to Oak leaves in June. Moths have emerged towards the end of July and during August. The moth apparently hibernates as I have beaten it out from bushes quite late in the year.

Nola cucullatella.—I have not seen the larva of this species; but have, on several occasions, found the cocoons attached to twigs of hawthorn. The resulting moths have appeared in July.

Nola strigula.—I have collected moths, on tree-trunks in the New Forest, in July.

Nola confusalis.—This species is common at Camberley, where I have taken it, on tree-trunks, in May and June. I have also taken it, at light, early in July.

Arctia caja.—Larvae of the so-called " Garden Tiger " are common objects in most gardens. My first interest in entomology dates from when, a child of six years, I was allowed to keep one of these caterpillars in a cardboard box, with a panel cut out of it and muslin pasted over it, and was encouraged to watch its transformations from larva to cocoon and then to the gorgeous moth appearing in July. I have never succeeded in raising any of the remarkable varieties that appear in many collections.

Arctia villica.—A friend (Mr Gordon Cuff) raised, from ova, a series of larvae, which he fed through the winter on " Chickweed." He gave me some of the cocoons, which produced moths in April and May.

Callimorpha dominula.—I have taken this moth at Bere Regis, in Dorset, and have received larvae from the neighbourhood of Dover. These latter emerged in mid-July. I have also had larvae from Stroud (Glos.), which I turned down in my garden at Camberley, in a thicket of nettles and Comfrey (*Symphytum*), hoping to establish the species here, but with no success.

Spilosoma lubricipeda (menthastri).—Larvae of this species, to be recognized by the reddish stripe along the middle of the back, are abundant in my garden. It is not particular upon what it feeds; but I have usually found it upon *Tropaeolum*. The moth flies readily to light and I have taken it from April to June.

Spilosoma urticae.—I have received young larvae of the "Water Ermine," raised from ova by Mr Charles de Worms. The moths hatched out (in captivity) during May and early June. I have taken other moths at Wicken Fen.

Spilosoma lutea (lubricipeda).—This larva, marked by a whitish line on each side of the back, is equally common on low plants in my garden. I have reared it many times but have never obtained any striking varieties. Moths are on the wing in June and July.

Diaphora mendica.—I have bred the larvae from ova. The resulting moths appeared in May.

Parasemia plantaginis.—I have taken the moths, on the wing, at Emsworth, Hants, early in June.

Diacrisia sanio.—I have never taken the larva of this species, but have, occasionally, found the cocoons amongst heather. The moth, which is abundant on heaths around Camberley, is on the wing in June and July. The males are seen more commonly than the females.

Coscinia cribrum.—I have taken the moths, at light, on a heath near Wareham, in July.

Deiopeia pulchella.—The only British caught that I have seen was shown me by a school-boy who knocked it down with his hat, on a cricket-field at Eastbourne, in the year 1917.

Hipocrita jacobaeae.—The larvae of this species are abundant wherever "Ragwort" occurs.

Nudaria mundana.—I found moths, at rest, in Wales, at the end of July, and I have raised it from larvae taken at Stroud (Glos.).

Comacla senex.—The moths were common at light, in the Wicken Fen, in early July. I have seen it at Camberley on one occasion only, when a single specimen came to light in my moth-trap.

Miltochrista miniata.—This pretty little rosy moth is common in the Camberley district. I have beaten it out from shrubs and trees in July and August.

Cybosia mesomella.—The "Four-dotted Footman" occurs, commonly, amongst heather around Camberley, where it may be disturbed throughout the month of June.

Lithosia deplana.—I have taken this moth frequently, in my moth-trap, in July, and, occasionally, the varieties *ochreola* and *unicolor*.

Lithosia lurideola.—Abundant everywhere. The moth is on the wing in July and August.

Lithosia complana.—I have found the so-called "Scarce Footman" to be equally common, at Camberley, as the previous species.

Lithosia sororcula.—I have taken this species only in the New Forest, in June.

Habrosyne derasa.—Larvae of this species may be beaten from Raspberry and Bramble bushes, at night, in September. The resulting moths emerge the following June and July.

Thyatira batis.—Larvae of the pretty "Peach-blossom" moth have the same habits as the preceding species. In beating brambles it is advisable to be provided with a beating-tray armed with corners of tin.

Palimpsestis octogesima.—Almost full-fed larvae were taken on "Silver Poplar" on 28th August. The resulting moths emerged early in the following June. Others have been taken, in my moth-trap, in July.

Palimpsestis duplaris.—I have not found the larvae of this species, but the moths frequently come to light in July.

Asphalia diluta.—I have taken the moth on street lamps on the outskirts of Camberley, in September.

Polyploca ridens.—I have frequently beaten full-grown larvae of this species from Oaks in the Camberley woodlands, towards the end of June. The larvae are unusually flaccid and might be mistaken for diseased caterpillars. But they pupate and have emerged, in due course, in March and April.

Polyploca flavicornis.—Larvae of the "Yellow Horned" may be beaten from small Birch bushes in June, and the moths are common, at light, in March.

Demas coryli.—I have found larvae in various months from June to October. A half-grown larva was beaten from Beech on 10th October. Moths have emerged, in my breeding cages, as early as the 20th of April, and, again, in the middle of July.

Acronicta leporina.—These larvae occur commonly around Camberley, in all stages, from July to late September. The resulting moths have emerged throughout June and I have taken fresh examples, at light, towards the end of July.

Acronicta aceris.—I have not seen the larva in the neighbourhood of Camberley, but I have taken it elsewhere. The moths have appeared early in June.

Acronicta megacephala.—I find the larva commonly on Aspen and "Silver Poplar." They often rest on the stems of these trees where their colour harmonizes with the bark. I have taken the moth, at light, in June and July.

Acronicta psi.—Larvae of the "Grey Dagger" are abundant everywhere, on the foliage of various trees. They may be known by the tall and slender hump near the front of the middle of the back. I am quite unable to distinguish between the moths of *psi* and *tridens*. I admit, in my cabinets, only such as have been bred by myself. Moths appear in June and July.

Acronicta tridens.—The only larvae of the "Dark Dagger" that I have seen were given to me. They are distinguished by a smaller and tufted hump in the same place.

Acronicta rumicis.—I used to find larvae of this species in Kent, feeding on thistles. The resulting moths emerged towards the end of May.—E. Ernest Green, F.R.E.S.

HEODES (LYCAENA) PHLAEAS IN NORTH SCOTLAND.—Though this species was reasonably common at Keiss in the autumn of 1935, not more than two individuals were seen in each of the following four years. I could find no explanation for this sudden disappearance, and I can offer none for its reappearance in 1940, when about forty were seen. I saw one in good condition on the moors on 11th June, and, during the following two days, four more in widely separate places of differing character. This first brood lasted until 25th June. On 12th August, two fresh specimens were seen at the seashore, and a week later five, in fine condition, on the moors. During the rest of the season nine more were observed, the last being among sand dunes on 2nd October. This note should dispose of the widely-held theory that *phlaeas* does not occur north of Forres.—SINCLAIR SWANSON, M.A., Keiss Village, Wick, Caithness.

VARYING ACTIONS OF BEES.—5th April 1940, being a very fine day, I decided to try some experiments with bees suggested by Françon's book. Accordingly I primed three bees on a mixture of sugar and water, and observed the results.

As soon as I marked the first bee, it flew away hastily, but returned to the sugar after 14½ minutes (the hive was about three hundred yards distant). It remained for 1¼ minutes, then flew to the side. It returned for a few seconds, after which it again flew to the side and cleaned itself. Finally, it flew away and did not return for 23 minutes. It visited the sugar several times for a few seconds, and also visited flowers nearby. Ten minutes after returning it flew away and did not come back.

The second bee did not return to the sugar, though I saw it several times visiting flowers. Perhaps it was not properly primed. With the third bee there was no such doubt, yet it did not return to the garden.

While I was making these experiments, other bees from the same hive, which were visiting flowers in the vicinity completely ignored the sugar.—SINCLAIR SWANSON, M.A., Keiss Village, Wick, Caithness.

BOTYS FERRUGALIS, HB., IN CUMBERLAND—NEW COUNTY RECORD.—This moth appears to be somewhat erratic in its occurrence and there are also wide gaps in its recorded distribution in the British Isles.

Barrett (Vol. ix, p. 215) says it is "scarcer in Durham, possibly absent from the three other northern counties." Over the border, however, he mentions it from Kirkcudbright. Nothing was known of it in Cumberland, when the Carlisle Natural History Society published its "Catalogue of the Lepidoptera" of the county a few years ago in Vols. i to v of its *Transactions*.

It will therefore be of interest to record that it can now be added to the Cumberland list. I took a specimen in September last in my garden in Carlisle, presumably an intruder from outside, as this small plot of ground has been under observation for many years and I have never noticed the species before. A casual occurrence like this is, however, in keeping with the moth's erratic habits.—F. H. DAY, 26 Currock Road, Carlisle, February 5, 1941.

CURRENT NOTE.

We regret to record the death of Mr P. M. Bright, of Bournemouth, as the result of an accident.

RECORDS AND FULL DESCRIPTIONS OF VARIETIES AND ABERRATIONS,

intended for the Annual Exhibition of the South London Entomological Society which, owing to the war, could not be held.

Compiled by S. G. Castle Russell and Hy. J. Turner for publication in the *Entomologist's Record* and for the *Proceedings* of the Society.

Mr J. L. Atkinson.—*Nymphalis antiopa*, L. A specimen taken by the exhibitor sunning on a fence in his garden at Tankerville, Kent, at 6.30 p.m. on the 8th November 1940.

Mr F. W. Andrews.—*Polygonia c-album*, L. A suffused form with pale spots of submarginal area obsolete. Mid costal spot rather broad, otherwise forewings have only two points of aberration—(a) suffused marginal area, (b) only one black spot in region of inner margin: this is the central one and is larger than normal. Hindwings almost entirely suffused with dark scales having two central darker blotches only, one above the other of which the upper one is larger than normal. Under side is of the dark type with metallic green submarginal spots heavily marked on upper and lower wings. Taken at Brockenhurst, 22nd July 1940. Sex dubious but probably ♂. Also an extreme melanic form nearly approaching Frohawk's fig. 19 on Pl. 21. Taken in the Oxford district, 8th July 1940, by Mr Andrews, Junr. *Nymphalis io*, L. An example with the ocelli obsolete on hindwings: they appear as pale grey circular patches with two small brown spots in the centre. There are no signs of blue scales. Somewhat similar to Frohawk's fig. 16 on Pl. 24. *Limenitis camilla*, L. An example of ab. *semi-nigrina* taken in the Forest, July 1940. *Colias croceus*, Frcry. A remarkable specimen of true *hyale* primrose colour taken at Folkestone.

Mr E. S. A. Baynes.—*Apamea secalis*, L. A gynandromorph taken at sugar at the Lizard, 10th August 1939, left side being ♂ and right side ♀. *Diarsia festiva*, Hb. A somatic mosaic: the head collar and thorax are beautifully divided with the two colours. Antennae, frenulum and (so far as can be seen) genitalia are ♀ on both sides. Taken at Aviemore, 24th July 1909. *Procus* (*Miana*) *versicolor*, Bdv. An unrecognized form identified by Mr Tams and taken with two other similar specimens in North Wales, June 1917. In this form the ground colour is pale brownish, the central band darker with a cherry reddish tinge, while the stigmata being of the same tint as the ground colour, stand out distinctly from the central band. *Notodonta camelina*, L. Bred from a larva taken in Anglesey, September 1907. The general colour of the upper wing on the left side is a typical reddish-brown, but on the right side the colour is reduced to a pale buff with traces of reddish-brown at the base. The reduction in colour on the right side extends to the hindwings and is presumably due to some fault in the pigment. All the above insects are figured in the *Entomologist's Record* for 1940, vol. lii.

Dr G. V. Bull.—*Pieris rapae*, L. Females with the spots on the forewings nearly united by black scaling. *Pieris napi*, L. Semitransparent

with veins showing through on upper side. *Aglais urticae*, L. A dark suffused example; one with the spots on the forewings absent; a *polaris*, Stdgr., the two large costal spots united; another with the blue lunules on the hindwings elongated; and one in which the spots on the forewings were absent with the hindwing dark suffused. *Vanessa io*, L., in which the ground colour is of a curious brown coloration. *Argynnis aglaia*, L., from Rannoch had a suffusion of black scales below. *Erebia aethiops*, Esp. (*blandina*, Fb.), with the outer half of the forewing very pale, possibly a scale defect. *Pararge megera*, L., with the central area of the forewings darker than usual. *Brenthis euphrosyne*, L. A fine suffused form of all four wings; another with the hindwings suffused while the forewings were devoid of nearly all the black markings; another heavily blotched; a straw-coloured form; and two examples with strongly marked forewings. *Brenthis selene*, Schiff., one with the central markings on the forewings absent with some radiation on the margins; and two examples dusted with black scales. *Maniola jurtina*, L., with xanthic, almost pure white areas on the forewings. *Maniola tithonus*, L. Three examples of the *addenda*, Tutt, form from Royston, Devon, and Ashford respectively. *Aphantopus hyperantus*, L., ab. *lanceolata*, Frohawk, and ab. *obsoleta*, Tutt. *Heodes phlaeas*, L., the straw-coloured ab. *schmidtii*, Gerh.; ab. *eleus*, Fb., the dark suffused form; ab. *caeruleo-puncta*, Stdgr.; and some partially obsolete forms, *Polyommatus icarus*, Rott., obsolete forms. *P. coridon*, Poda, ab. *biarcuata*, Tutt, and *P. bellargus*, Rott., ab. *digitata*, Tutt.

Mr A. A. W. Buckstone.—*Pieris brassicae*, L. Two males with a black spot on the disc of the forewings: bred from ova obtained from Ashstead in May 1940. *Pararge aegeria*, L. Series of dark examples of spring, summer and autumn broods: bred from I. of Wight ova. *Polyommatus icarus*, Rott., ab. *obsoleta*, Tutt, taken at Dorking, May 1940. *Aricia agestis*, Schiff. (*astrarche*, Bergs.); a short series form *alous*, Hb., taken at Fetcham, Surrey, 1940.

Mr S. G. Castle Russell.—*Argynnis selene*, L. An aberration with primary and secondary wings suffused with black, New Forest, July 1940. *Pieris brassicae*, L. Three ♀ examples of ab. *interjuncta*, Cabeau. Black spots on upper wings coalesced and forming a bar. *Plebejus argus*, L. A gynandromorph showing mixed male and female colouring: the right side wings are mostly male and the left side wings mostly female. Taken by the late E. C. Joy, New Forest, July 1940. *Lysandra coridon*, Poda. Examples of abs. *obsoleta*, *caeca*, *digitata*, and *antijuncta*. A ♀ example of ab. *caeca* all wings being of ♀ colouring, but the body is conspicuously male: probably a gynandromorph.

Mr H. A. Leeds.—Captures near Wood Walton, Hunts, in 1940. *Satyrus galathea*, L., and *Coenonympha pamphilus*, L., under sides of faded and washed out appearance—ab. *transformis*, all wings. *Polyommatus icarus*, Rott. ♂ upper side ab. *pallidula-caeruleo*. ♂ under side ab. *post-discoelongata*; ♀ upper sides abs. *syngrapha-caeruleo*, *syngrapha-lavendula*, *syngrapha-transparens*, *glabrata*, and *postcaeruleo-signata*. *Heodes* (*Lycena*) *phlaeas*. ♂ upper sides abs. *eleus*, Tutt, and *auroradiata*; ♂ under side ab. *costajuncta*; ♀ upper sides *auronitens*, Tutt, *anti-transiens*, *antijuncta*, *anti-discoelongata*, and *anti-centre-*

juncta; ♀ under side ab. *confluentiae* (*semi-costajuncta-basijuncta*). *Pieris brassicae*, L. ♂ under side with hindwings peppered all over with black scales, ab. *post-metallica*. *Euchloë cardamines*, L. ♂ upper side ab. *flavescens*. Except where Tutt is added the terms are from the "Monograph of *Lysandra coridon*, Poda."

Rev. J. N. Marcon.—An example of the form called *polonus*, assumed to be a hybrid between *L. bellargus* and *L. coridon*, taken in Sussex, 15th June 1940. *Lysandra coridon*, Poda. ♂ upper side abs. *margo-transformis*, *viridescens*, *pulla*, *semi-livida*, *fowleri*; ♀ abs. *albescens* and *pulla*. Under sides of abs. *caeca-antijuncta*, etc. *Lysandra bellargus*, Rott. ♂ upper side of ab. *argentea*; ab. *radiata*, a ♀ with six extensive stripes on each forewing and short radiations on the hindwings on chalky-white ground. Lunules on all four wings white, giving the insect a striking appearance. Another somewhat similar ♀, the radiations being on forewings only and very thin. Hind wings normal, white lunules on all wings. *Polyommatus icarus*, Rott., a male example of ab. *radiata*. *Plebejus argus*, L. An under side ab. *glomerata*. *Coenonympha pamphilus* L. An homoeotic example: on the left under side hindwing is a large patch of forewing colouring almost filling veins 3 and 4. *Maniola jurtina*, L. A fine golden female. *Argynnis cydippe*, L. A ♀ heavily banded on fore and hindwings. All above were taken by exhibitor in Sussex.

Messrs W. E. Minnion and B. S. Goodban.—Insects bred or captured in 1940. (1) Series of *Saturnia pavonia*, L., bred from larvae taken at Robin Hood's Bay, N.E. Yorks. (2) Series of *Lasiocampa quercus*, L., var. *callunae*, Palm., bred from the same locality. (3) Series of *Biston betularia*, L., var. *carbonaria*, Jord. (*doubledayaria*, Mill.), bred from Banstead ova; the series included 3 typical and 1 intermediate assembled at Chalfont. (4) Series of *Arctia caja*, L., full fed in October and forced at the end of November. (5) Insects taken at Chiddingfold, 25th April 1940: 3 *Leptidia sinapis*, L.; 6 *Eulype hastata*, L.; 3 *Numeria pulveraria*, L.; 1 *Anagoga nebulata*, Scop. (*obliterata*, Hufn.); 1 *Ectropis extersaria*, Hb. (*luridata*, Bork.); 3 *Cepphis advenaria*, Hb.; 1 *Synanthedon spheciformis*, Schiff.; 6 *Pyrausta octomaculata*, Fb.; and 2 *Chesias legatella*, Schiff. (*spartiata*, Hrbst.) bred from larvae taken at the same time. (6) Insects taken at Ruislip during 1940: 10 *Lobophora halterata*, Hufn.; 3 *Boarmia roboraria*, Schiff.; 1 *Hipparchus papilionaria*, L.; 1 *Polyploca flavicornis*, L.; 1 *Zeuzera pyrina*, L.; 1 *Stauropus fagi*, L.; 12 *Endotricha flammealis*, Schiff.; 1 *Boarmia lichenaria*, Hufn. (7) Insects taken at Chalfont Field Meeting, 1940: 1 *Stauropus fagi*, L.; 12 *Hydrelia testaceata*, Don. (*sylvata*, Schiff.); 8 *Discoloxia blomeri*, Curt.

Mr C. G. Priest.—A series of extreme blue forms of ♀ *Polyommatus icarus*, Rott., taken at Box Hill, 7th August 1940, summer brood. *Pieris brassicae*, L. Spring brood, bred in May 1940, all with exceptionally deep black markings. *Endromis versicolora*, L., bred in March 1940, and a ♀ bred 19th October 1940, but somewhat ill developed. *Biston betularia*, L., a fully black form, ab. *carbonaria*, Jord., bred May 1940. *Hemerophila abruptaria*, Thbg., ab. *brunneata*, Tutt, captured in Holland Park, May 1940. *Acronicta aceris*, L., bred June 1940.

Mr A. E. Stafford.—*Lysandra coridon*, Poda. A fine male *radiata* on a white ground with heavy black radiations: the upper side is ab. *ultra fowleri*. A similar form of ♀ ab. *radiata* more extreme than the above on a cream ground with intense black radiations. Three *antico-caeca* males, one with white forewings and grey hindwings. A series of ab. *obsoleta* forms including *caeca* and *post-caeca*: all males except one ♀ *post-caeca*. Upper sides abs. *pulla*, *fowleri*, and a gynandromorph with left hindwing three-fourths blue, the other wings brown. All above insects were taken by the exhibitor in Sussex. *Plebejus argus*, L. (*aegon*, Schiff.). A series of female forms banded or margined with blue on the upper sides. A series of twenty-one intersexes, some almost halved brown and blue, and one splashed with blue over all wings. Several examples of under side abs. including *costa-juncta*, *basijuncta*, and a ♀ ab. *striata*. All Surrey. *Polyommatus icarus*, Rott. A male upper-side with forewings of normal colour, hindwings opalescent: a series of females including extreme brown forms to extreme blue forms (*supra-caerulea*), a banded form and a specimen of the rare ab. *rufina*, Obthr. *Lycaenopsis* (*Cupido*) *argiolus*, L. A male underside ab. *antico-radiata*. All Surrey.

Mr G. H. Stovin.—A series of the hybrid *Laothoë* (*Amorpha*) *populi*, L. ♂*Smerinthus ocellatus*, L., ♀ *rothschildi*, Stndf. *Abraxas grossulariata*, L. Striking aberrations of (1) *nigrosparsata*, Rayn., in varying degrees of black pigmentation; (2) *inframaculata*, Raynr.; (3) *aberdoniensis*, including specimens with almost completely black forewings; (4) *hazeleighensis*, Raynr., and (5) sundry asymmetrically marked forms.

Mr K. W. Self.—*Maniola tithonus*, L. A white ♀, ab. *minckii*, New Forest, 1940. *Maniola jurtina*, L. A ♀ with four well defined spots on each forewing, a very rare form. Another with bleached hindwings. *Coenonympha tullia*, Müll. An example of ab. *lanceolata*, Westmorland, 1935. *Argynnis paphia*, L. A ♂ with confluent spots on hindwings, New Forest. *Coenonympha pamphilus*, L. A white example, ab. *pallida*, New Forest. *Aglais urticae*, L. An example with melanic hindwings, South Hants, 1940. *Aricia agestis*, Schiff. An *obsoleta* under side, Westmorland. *Lysandra coridon*, Poda. Four male examples of ab. *cinnameus*, and a female of whitish ground colour. Also forms of *obsoleta*, South Hants, 1940. *Heodes phlaeas*, L. A male example of ab. *alba* and another of ab. *schmidti* and other forms including abs. *radiata*, *eleus*, etc. *Strymon w-album*, Knoch. An under side form in which the white line on the right lower wing is duplicated. *Polygonia c-album*, L. An example with melanic hindwings, South Hants, 1940.

Mr Hy. J. Turner had prepared a further selection of species of Heterocera from Manchuria, exhibiting the Palaearctic nature of the fauna, just as did the two sets of Rhopalocera previously received from that area of Eastern Asia. Many of the species received are non-British, but belong to the Fauna of Western Europe. *Gastropacha quercifolia*, L.—A ♂ of a bright reddish-brown with costa of hindwing having a wide orange streak. The transverse markings are practically quite absent on the hindwing, those on the forewings are narrow and not very clear, ab. *cerridifolia*, Fldr. *Theophila mandarina*, Mre.—A ♂ of a species closely allied to the well known *Bombyx mori*, L., but of an olive-brown ground

colour. Shape very similar to *B. mori*: falcate forewings. *Dendrolimus undans*, Walk.—An East Indian species, which has a few forms in the Palaearctic Region. ♂ forewing light reddish-ochreous with basal and marginal areas and the hindwings dark brown. Markings very irregular: the ♀ is much larger, dull greyish-brown. This Amur form is known as f. *excelsa*, Stgr. *Callambulyx tatarinovi*, Brm. & Gry.—The only Sphingid sent me: a very beautiful insect standing close to *Mimas tiliae*, L. Seitz's figure does not do justice to the beauty of the green form or of the brown form *eversmanni*, Evers, with its beautiful shades of delicate green. *Rhyparoides amurensis*, Brem.—A ♂ of this purely E. Asian species of Arctiid in which the usual sparse marking on the bright yellow forewing was less than that of the figure in Seitz, there being no trace of the three discoidal spots. *Arctia caja*, L.—A ♂ example in which the usual two elongate central blotches on the costa were completely united into one large feature, which was united to the usual blotch in the centre of the inner margin by a very small extension. This form occurs in this country occasionally. *Stilpnotia salicis*, L.—Two specimens of the East Asian form *candida*, Stgr., a glossy pure white form and more thickly scaled than the European specimens. *Lymantria dispar*, L.—A very dark brown ♂, darker and smaller than r. *japonica*, Motsch., and probably to be classed as *fumida*, Btlr., a smaller and darker form. *Hyphorma minax*, Walk.—Two examples of a Lymacodid described by Walker from N. China, and according to Seitz not since reported from that area, although occurring in India. The marking is quite distinct, the two transverse bands form an inverted Λ starting from near the apex of the forewing. Abundance of reddish-golden-brown hair on body.

Ennomos autumnaria, Wrnbg.—A ♂ like British examples. *Abraxas suspecta*, Warr.—A ♂: a smaller and more heavily marked species than our *A. sylvata*, Scop., of S. China origin. *Hemerophila emaria*, Brm.—Somewhat similar to *abruptaria*, Thbg. *Timandra amata*, L.—A very pale specimen, probably worn. *Aspitates formosaria*, Ev.—A pretty species very local in West Europe but common in E. Asia. *Chiasmia clathrata*, L.—The Eastern specimens are a combination of *chretieni*, Th.-Mg., ground colour pure white without yellow admixture and *cancellaria*, Hb., in which all transverse bands are present but often narrowed into mere lines. One example sent is an extreme *cancellaria*.

Dermaleipa juno, Dalm.—A long-known striking Indian species of the subfamily *Catocalinae*. The forewing shades of brown, the hindwing with basal area jet black containing a light blue irregular and incomplete band, with a wide outer margining area crimson. Found also in Japan, China, and the Amur. *Phytometra chryson*, Esp.—The brassy blotch somewhat ill-defined. *Scoliopteryx libatrix*, L.—A typical example: this species is found also in Canada. *Rhizedra* (*Calamia*) *lutosa*, Hb.—The usual dull white dusty form, not the *griseata*, Warr., of Japan, etc. *Eustrotia uncula*, Cl.—A very pale example and unusually small. It may have been paled by long exposure. *E. candidula*, Schiff.—A normal form like those from Eastern Europe. *Heliothis* (*Chloridea*) *dipsacea*, L.—A typical form and not the large Eastern Asia form *adaucta*, Btlr. *Hydroecia basalipunctata*, Graes.?—A small species of a deep yellow ground with orange-red dusting. Another *Phytometra* is *P. festata*, Graes.—This is

a paler and smaller species than *P. festucae*, L., of which it takes the place in the East.

Amongst the Pyrales received were *Orobena extimalis*, Scop., *Botys fuscalis*, Schiff., *Psammotis hyalinalis*, Hb., *Loxostege verticalis*, L., *Pionea forficalis*, L., *Endotricha flammealis*, Schiff., *Crambus perlellus*, Scop., and f. *warringtonellus*, Stain., *Ilithyia semirubella*, Scop., *Eurrhypara urticalis*, L., and *Hydrocampa nymphaeata*, Schiff.

Amongst the Deltoids identified were *Colobochyla salicalis*, Esp., and ab. *lactalis*, Stdg., *Herminia derivalis*, Hb., *H. crinalis*, Hb., *Aëthia trilinealis*, Brem., *Zanclognatha tarsipennalis*, Hb.

Mr H. O. Wells.—*Lysandra coridon*, Poda, ab. *striata*, from Epsom, where the insect was abundant. *Coenonympha pamphilus*, L.—An example without spots and one with white blotches on three wings.

Baron de Worms.—Bred series of *Callimorpha dominula*, L., Wilts. *Acronicta tridens*, Schiff., from Cotswold ova. *Agrotis ashworthii*, Dbldy., from larvae collected in N. Wales. *Triphaena comes*, Hbn.—A series of 80 examples bred from a ♀ taken at Forres, including many forms of ab. *consequa*, Hbn., ab. *rufescens*, Tutt, ab. *curtisii*, Newn. *Nonagria geminipuncta*, Hatch., *Dyschorista* (*Orthosia*) *fissipuncta*, Haw., and *Triphosa dubitata*, L., from the Salisbury area. *Euphyia rubidata*, Schiff., from ova laid by a Sussex ♀. *Callimorpha dominula*, L.—A remarkable bred specimen having the forewings ochreous, the hindwings rosy red with the black markings replaced by pale brown, Wilts. *Oria musculosa*, Hb.—Specimens taken near Salisbury with a batch of ova, the first to be obtained in this country. Captured series of *Harmodia* (*Dianthoecia*) *nana*, Rott. (*conspersa*, Esp.), from the Surrey downs, and *Chlorissa* (*Nemoria*) *viridata*, L., from Surrey heaths. Aberrations and rarities taken or bred in 1940. *Pieris napi*, L.—A diminutive specimen measuring 3 cm. taken near Salisbury. *Maniola* (*Epinephele*) *jurtina*, L.—Several xanthic examples and others with large and small ocelli. *Coenonympha pamphilus*, L.—A straw-coloured ♀, Salisbury. *Heodes phlaeas*, L., with much enlarged spots on under side. *Aricia agestis*, Hb. (*astrarche*, Brgstr.).—A diminutive example from Wilts. *Polyommatus* (*Lysandra*) *coridon*, Poda.—A male ab. *obsoleta*, Tutt: a form with white under side: a fine ab. *caeca* ♀ and other *obsoleta* forms: an ab. *fowleri*, Sth. *Polyommatus* (*Lysandra*) *bellargus*, Rott., ab. *parvipuncta*, Tutt. *Polyommatus icarus*, Rott.—An example of ab. *extensa* on forewings.

Mr L. T. Ford.—A large number of species collected around Morecambe, Lancs., a district quite new to him. His captures were mainly Micros. The few Macro-Lepidoptera noted were *Erebia aethiops*, Esp., *Coenonympha tullia*, Müll. (*davus*, Fb.), *Phothedes captiuncula*, Tr., *Polia chi*, L., *Odezia atrata*, L., and *Carsia paludata*, Thnbg., and in addition a *Vanessa c-album*, L.—March. A freshly killed and somewhat battered specimen lying on the road near Torrisholme; probably hit by a car.

Amongst the more interesting species captured or seen were:—*Crambus margaritellus*, Hb.—30th June. Abundant on Meathop Moss, resting in the daytime mainly in small fir trees and flying wildly when disturbed therefrom. *Crambus falsellus*, Schiff.—June. Larvae of this

species could be found feeding on moss growing on the top of stone walls all over the district. Imagines emerged throughout July and until the middle of August. *Scoparia truncicolella*, Stain., and *S. crataegella*, Hb.—17th August. At 7.30 p.m., *S. crataegella* were flying freely on the middle slopes of Warton Crag, over mixed bracken and heather. At the same time *S. truncicolella* could be found at rest on the large limestone rocks amongst the bracken, harmonizing very closely with the stone. *Phalonia rupicola*, Curt. *Phiteden gerningana*, Schiff.—3rd August. Imagines flying freely in the late afternoon on the southern slopes of Arnside Knott accompanied by swarms of *Peronea aspersana*, Hb., *Tortrix paleana*, Hb., and *Peronea rufana*, Schiff. *Peronea lipsiana*, Schiff., and *P. rufana*, Schiff.—14th July. Larvae plentiful on a moss near Whitbarrow feeding in the spun shoots of bog myrtle. About 80% of the larvae were parasitized; the remainder produced a varied series of *P. rufana* and about a dozen *P. lipsiana*. *P. calidoniana*, Steph., and *Eucosma mercuriana*, Hb.—4th August. Both of these species were plentiful flying over the heather on the slopes of Barn Fell in the late afternoon. *Ancylis biarcuana*, Steph. (*diminutana*, Haw.). *Eucosma vacciniana*, Zell.—1st June. Flying about 6 p.m. in large numbers over bilberry growing on the roadside banks approaching the top of Caton Moor from Brookhouse. *E. pygmaeana*, Hb., and *Argyroploce dimidiana*, Sodof. *Argyroploce rufana*, Scop.—30th June. Mr Wright kindly showed me a locality near Witherslack for this very local species. The imagines are, it seems, only to be found amongst bramble *growing on stony ground*. From such a patch of bramble, a few square yards in area, I dislodged several specimens, which fly freely when disturbed in the daytime. The land surrounding the bramble patch was grass-land with bramble bushes, thistles, etc. I could not find a single specimen except on the stony patch. *Gelechia longicornis*, Curt., and *G. velocella*, Dup. *Phthorimaea viscariella*, Logan.—April. Larvae feeding in the spun shoots of *Lychnis* in lanes near Bare. The larva lives in the stem and comes up to feed on the flower buds. *Amphisbatis incongruella*, Stain.—28th April. Imagines flying at mid-day over the waist-high heather on a Moss near Witherslack. The imago did not fly except on a still sunny day—a very rare event in this locality. *Depressaria ocellana*, Fb., and *D. carduella*, Tr. *Depressaria angelicella*, Stain.—May. Larvae feeding in the young leaves of *Heracleum sphondylium*, L., spun together in a thick sticky mass, each "spinning" containing 5 or 6 larvae. Hitherto I have found the larvae of this species only on *Angelica*. I was much struck with the extraordinary abundance of the larvae and also larvae of *D. propinquella*, Tr., *D. arenella*, Schiff., *D. ciliella*, Stain., and *D. applana*, Fb., the last occurring in vast numbers in the lanes near Bare and Torrisholme. *Elachista kilmunella*, Stain.—19th May. Plentiful on Meathop Moss, commencing to fly about 5.30 p.m. for an hour or so. *Elachista perplexella*, Sta.—April. Larvae in fair numbers feeding in the tips of leaves of *Aira caespitosa*, L., growing by the roadside near Aughton. *E. subalbidella*, Schl.—26th May.—Imagines beaten out of the lower branches of small birch trees on Meathop Moss. *Scythris fallacella*, Schlag.—26th May. Flying freely in the early afternoon over *Helianthemum* with which some rough ground near Meathop Moss is carpeted. This species was on the wing throughout June. The larva feeds on the leaves of *Helianthemum*, spinning

a silken tube extending from the roots to the lower leaves of the food-plant. In sunny weather the larva can occasionally be seen on the upper leaves; if disturbed it quickly retreats into the silken tube. *S. fletcherella*, Durr. (*fuscocupraea*, Meyr.). *Coleophora adjunctella*, Hodgk.—5th June. The salt marshes at Bolton-le-Sands extend for some miles, the herbage thereon being very short—quite different from the salt marshes in the Thames estuary. The evening of the 5th June was still and warm and at 8 p.m. the imagines of *C. adjunctella*, *Aristotelia brizella*, Tr., *Bucculatrix maritima*, Stain., *Phalonia vectisana*, Ww., and *Polychrosis littoralis*, Curt., were on the wing in countless numbers. In September I found the cases of *C. adjunctella* feeding on the seeds of *Juncus gerrardi*, Loisl. *Coleophora obtusella*, Stain.—November. Larvae feeding on the seeds of *Juncus maritimus*, Sm., growing on the salt marsh at Carnforth, in considerable numbers. A new record for Lancashire I have been told. In the following September I found cases of this species in quantity on the Lochorham salt marshes. *Gracillaria phasianipennella*, Hb.—18th August. Larvae abundant, feeding on *Polygonum persicaria*, L., growing on cultivated ground near Whitbarrow. The larva makes a cone with a strip bitten off the edge of a leaf, feeding on the inner side of the cone. Each larva makes 2 or 3 cones and pupates in a cocoon inside the cone on which it has last fed. About 90% of the larvae I collected were parasitized. In early September the imagines could be smoked out of clumps of heather growing at least 100 yards from the feeding ground in great numbers. *Lithocolletis heegeriella*, Zell. *Sterrhopteryx hirsutella*, Hb.—23rd June. I found two cases of this rare species on Meathop Moss, each attached to the upper side of a leaf of a small birch tree. One case produced an ichneumon fly, the other still has a living larva in it.

Schiff. (1775), as the typical form, and the figure of Hb., 179, for his description.

South, *M.B.I.*, II, 25, plt. 11, figs. 7-10 (1908), gave four very good figures of *ligula*, which compare well with the good figures of *vaccinii* on the same plate (figs. 3-6); 7 is *subnigra*, 9 is *polita*, Hb., 10 is *spadicea*, Haw. (nec Hb., which is *vaccinii*), and 8 is an ab. from Kent.

Warr.-Seitz, *Pal. Noct.*, III, 148 (1910), considered *subnigra*, Haw., as a synonym of *ligula*, Esp., the *polita*, Hb., as the *dolosa*, Dup. (nec Hb.), the *subspadicea*, Stdgr., as the *spadicea*, Haw. and the *polita*, Dup. (nec Hb.). They considered the *canescens*, Esp., and the *turtur*, Hamps., as forms of *ligula*. They added a paler form as *canilinea*, and recognised the *brigensis*, Bdv.

They gave on plt. 36 ed 11 figures, *ligula*, ♂ and ♀; *polita*, ♂ and ♀; *subspadicea*, ♂ and ♀; *canilinea*, ♂ and ♀; *canescens*, and *turtur*.

Culot, *N. et G.*, I (2), 14 plt. 40 (1914), gave five figures, three taken from the Guenée collection. f. 1, *ligula*, dark markings, grey lined; f. 10 and f. 11, *spadicea*, the actual specimens from which Gn. made his description (var. A.); f. 12, *pulverulenta*, Gras., from the Gn. coll., and was near ab. *brigensis*; and f. 13, *brigensis*, Bdv., also from the Graslin coll. There appears to be so little difference between the figures 10, 11, 12, 13 that one is almost unable to separate them; Culot's figures, almost without exception, are generally most reliable.

Culot, *l.c.*, II, 15 (1914), stated that two examples of *brigensis* were in the Bdv. collection with two others in the collection of Bellier, and that fig. 459 of H.-S. was not referable to *brigensis* as stated.

Draudt-Stz., *Pal. Noct Supp.*, III, 149 (1934), recognized in addition the *pulverulenta*, Culot (Gras.), and *julieni*, Culot. The latter was described as a species, a small pale sand-brown form, a "transition to *brigensis*, Bdv." Vorbrodt declared that *julieni*, Culot, was a local form of the Valais and not a species.

Barrett remarked on the Variation:—

"Rather variable in colour, varying from reddish-chestnut to deep dark purplish-brown or black-brown, sometimes with a pale stripe before the hind margin; this in the redder forms is light chestnut, but in those of the darkest colour occasionally greyish-drab and conspicuous. These striped forms seem almost confined to the West, and are most frequent in Wales. Probably this is the supposed species called *subnigra* by Haworth."

He referred to a series "Of unusually large size, many specimens having forewings more than usually broad, and the hind margin rather increasingly expanded yet angulated and the apex pointed."

What evidence have we of the genitalia distinction of *vaccinii* and *ligula (spadicea)*? F. N. Pierce, *Gen. of Brit. Noct.*, 59-60 (1909), gave the following description of the genitalia of *vaccinii*:—"Harpe long, slender and pointed, without corona; clasper long, slender and twisted; uncus flattened at the tip; vesica has a long cornutus at the base, a bunch of *cornuti in the centre, and a bulbed cornutus above; juxta peaked, indented at the tip."

spadicea (*ligula*):—The description agrees exactly with that of *vaccinii* with two exceptions, (1) the word " long " is inserted at *, and the last word " tip " is altered to " top."

Examination of the structural figures on plate 20 give no material help and we are thrown back upon the ancient differentiation of shape of forewing.

The Names and Forms to be considered:—

ligula, Esp. (1789-?), *Schm. Abbild.*, IV, 598, plt. 166, 8.
??ab. *canescens*, Esp. (1789-?), *l.c.*, 549, plt. 162, 5-6.
ab. *cruda*, Hb. (1800-3), *Noct.*, 172.
f. *polita*, Hb. (1800-3), *l.c.*, 178.
f. *spadicea*, Haw. (1809), *Lep. Brit.*, 233.
f. *subnigra*, Haw. (1809), *l.c.*
[*polita*, Dup. (1826), VI, 124, plt. 81, 1 = *spadicea*, Haw. (1809), nec Hb. (1800-3).]
f. *brigensis*, Bdv. (1840), *Gen. Ind. Meth.*, 148; Gn. (1852), *Noct.*, V, 380.
ab. *pulverulenta*, Grasl. (1863), *Ann. S. ent. Fr.*, 318 (nec 314). Culot gave a figure of this actual example.
f. *subspadicea*, Stdgr. (1871), *Cat.*, Hed., 119 = *spadicea*, Haw. (1809), and *polita*, Dup., 1836.
ab. *ochrea*, Tutt (1892), *Brit. Noct.*, III, 4.
f. *turtur*, Hamp. (1906), *Lep. Phal.*, VI, 455.
ab. *canilinea*, Warr.-Stz. (1910), *Pal. Noct.*, III, 148, plt. 36 d.
ab. *julieni*, Culot (1914), *N. et G.*, I (2), 14, plt. 40, f. 9-13.

Tutt dealt with (1) *ligula*, Esp., dark chestnut colour, lines deep reddish-brown, often shaded with greyish, paler on the outer margin. (2) *polita*, Hb., very deep reddish, unicolorous, no pale nervures like the type, white (not ashy-grey) subterminal band. (3) ab. *ochrea*, Tutt, pale nervures, pale outline to stigmata, ochreous (almost orange) submarginal band. (4) *subnigra*, Haw., unicolorous, with an ochreous subterminal. (5) Unicolorous with subterminal obsolete [*subspadicea*, Stdgr. = *polita*, Dup.] = *spadicea*, Haw. (1809). (6) ab. *subspadicea*, Stdgr., reddish-brown ground mixed with yellow-grey. (Lepsa, Asia.) [(7) f. *politina*, Stdgr., light ashy-grey forewings, faint reddish-brown band before the reddish-white fringe. (7) f. *subspadiceana*, Stdgr., like *politina*, but with hindwing light in colour. (Central Asia.)] The last two are now considered to belong to another good species, *staudingeri*, Gras.

ab. *cruda*, Hb., *Saml. Noct.*, 172 (1800-03).

The shape is compatible with *ligula*, but the size is rather larger than the average specimen, nor does there seem the *ligula* black-brown ground of average *ligula*. It has been considered as a form of *dolosa*. The transverse lines are somewhat too thin and not diffuse enough for *ligula*.

f. *brigensis*, Bdv., *Index Method.*, 148 (1840).

FIG.—Culot, *N. et G.*, plt. 40, 13 (from the Bdv. collection).

ORIG. DESCRIP.—" Alis longior(ibus) cinerea-marmorat(ibus)." The figure is the *ligula* shape and size; there is a slightly lighter submarginal band, with a somewhat darker and narrower band between that

and the marginal band along the base of the fringe. The ground is perhaps not the original after about 100 years in the cabinet. The black spot at the base of the almost non-existent reniform is clearly apparent. There are traces of other bands. Culot gives no description.

For Herrich-Schaeffer's *brigensis*, fig. 459, see above under H.-S.

f. *pulverulenta*, Gras., *Ann. Soc. ent. Fr.* (1863).

Fig.—Culot, *N. et G.*, plt. 40, f. 12 (from the Graslin collection).

Descrip.—Shape and size of *ligula* but ground lighter than most specimens in both fore and hindwings. There are no appreciable markings except where the lighter submarginal band is marked out but not present. No doubt deterioration from age has affected it.

ab. *subspadicea*, Stdgr., *Cat. Lep. Eur.*, IIed. (1871).

Orig. Descrip.—" Rufa sive brunnea, saepius albido reticulata."

" On the extraordinary variability of this species it is very difficult and almost impossible with certainty to say, regarding many specimens, to which form they can best be placed, it is not therefore certain whether *ligula* be a species differing from *vaccinii*." Amur.

ab. *turtur*, (Bang-Hs.) Hamp., *Cat. Lep. Ph.*, VI, 454 (1906).

Orig. Descrip.—" Similar (to *polita*, Hb.) but forewings with the grey markings distinct and the veins streaked with grey."

ab. *canilinea*, Warr.-Seitz, *Pal. Noct.*, III, 148 (1910).

Fig.—*l.c.*, plt. 36 d.

Orig. Descrip.—" A pale form, red-brown or rufous, has the inner and outer lines pale leaden-grey or ochreous-grey."

f. *julieni*, Culot, *N. et G.*, I (2), 10 (1914).

Figs.—*l.c.*, plt. 39, f. 13.

Orig. Descrip.—" The main characteristic is the regularity of the elbowed line, in the place of being festooned or maculate; the markings here consist of two double lines, clear, regular, without appreciable festoons nor discontinuous between the costa and the inner margin. The median shade, in place of oblique position to the internal border, runs vertically in *julieni*."

Note.—Mr A. J. Wightman, who has had long experience with the two species *vaccinii* and *ligula*, considers the 26 figs. on plt. 36, if the shape and colour be reasonably correct, that only 4 figures represent *ligula*, viz., A.4, C.4, C.5, C.6. Also the fig. of *canescens* is not at all like the poorly executed fig. of Esp.

Orrhodia, Hb. (1821), Stdgr., Sth., Culot [*Cerastis*, Hb. (1821), Hamp., Barr.: *Conistra*, Hb. (1821), Meyr. (Sth.), Warr.-Stz., Meyr., Draudt-Stz.] *erythrocephala* (Schiff.) Fab. (1787).

The names *erythrocephala* and *glabra* were both used by Schiff. (1775), the former *Wien Verz.*, 77, the latter 314 (in the Appendix), and considered in Vienna as an aberration of *vaccinii* (Illiger & H., *Neu. Ausg.* (1801), I, 301). There were no notes with these names, which could serve as adequate descriptions, although the former is distinguished as

having " blackish dots on the outer margin," and is called the " *Plantago lanceolata* Noctuid," and the latter " the pale brown dusky streaked Noctuid."

Tutt, *Brit. Noct.*, III, 6 (1892): Meyr., *Hand.*, 65 (1895): Stdgr., *Cat.*, IIIed., 208 (1901): Hamp., *Lep. Phal.*, VI, 449 (1906): Splr., *Schm. Eur.*, I, 254, plt. 46, 28a (1907): Warr.-Stz., *Pal. Noct.*, III, 146, plt. 35g (1910); South, *M.B.I.*, II, 23, plt. 11, 1-2 (1907): Culot, *N. et G.*, I (2), plt. 39, 2-4 (1914): Meyr., *Rev. Hand.*, 118 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 148 (1934).

Warr.-Stz., *Pal. Noct.*, III, 146 (1910), recognized only ab. *glabra*, ab. *impunctata*, and ab. *pallida*. No notice was taken of the *glabra*, Schiff., nor of *erythrocephala*, Schiff. They gave four figures on plt. 35g. The figure labelled *pallida* is by no means pale, it is the darkest of the four figures, whereas the *impunctata* figure is pale.

Culot, *N. et G.*, I (2), 7 (1914), treated *erythrocephala*, Hb., as a " polymorphic species," with three principal European forms, which he designated as (1) *intricata*, Gn.—plt. 39, 2; (2) *erythrocephala*, Hb. (fig. 176)—plt. 39, 3; (3) *glabra*, Hb. (fig. 438)—plt. 39, 4.

NOTE.—*intricata*, Gn., is not *intricata*, Dup., which is a var. of *vau-punctatum*, Esp.

Form *intricata* has scarcely any marking on the forewings, which are of a uniform reddish-brown. But there is a subterminal series of dots better developed.

The typical form has the forewings clearly and neatly marked.

The form *glabra* has a strong melanic tone on the forewings, which are of a deep brown, while the reniform and orbicular stigmata and the submarginal are of a clear ochreous tint.

An extreme melanic form from Algeria is ab. *lucasi*, Obthr. The forewings are of a very strong and shining black-brown, with the stigmata and points also more emphasized.

South, *M.B.I.*, II, 23, plt. 11, 1-2 (1907), gave two very good figures: (1) is a typical reddish-brown, almost unicolorous form; (2) is a capital figure of ab. *glabra*.

The Names and Forms to be considered are:—
erythrocephala, Schiff. (1775), *Verz.*, 77, M.
glabra, Schiff. (1775), *l.c.*, 314, R.
erythrocephala, Fb. (1787), *Mant.*, II, 176.
ab. *glabra*, Hb. (1805), *Saml. Noct.*, 438.
ab. *intricata*, Gn. (1852), *Noct.*, V, 383.
ab. *pallida*, Tutt (1892), *Brit. Noct.*, III, 6.
ab. *impunctata*, Splr. (1907), *Schm. Eur.*, I, 254.
ab. *glabra-impunctata*, Splr. (1907), *l.c.*
ab. *unicolor*, D. Luc. (1910), *Ann. Soc. ent. Fr.*, 482.
r. *lucasi*, Obthr. (1918), *Lép. Comp.*, XVI, 119.
[ab. *caeca*, Lempke (1934), *Ent. Rec.*, XLVI, 89.]

Tutt dealt with (1) *erythrocephala*, Fb., the reddish-ochreous form; (2) ab. *pallida*, pale whitish-grey, without reddish or ochreous; (3) ab. *glabro*, Hb., the purplish-brown and much mottled.

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Printed by T. Buncle & Co. Ltd., Arbroath.

VOL. LIII.

No. 4

APRIL 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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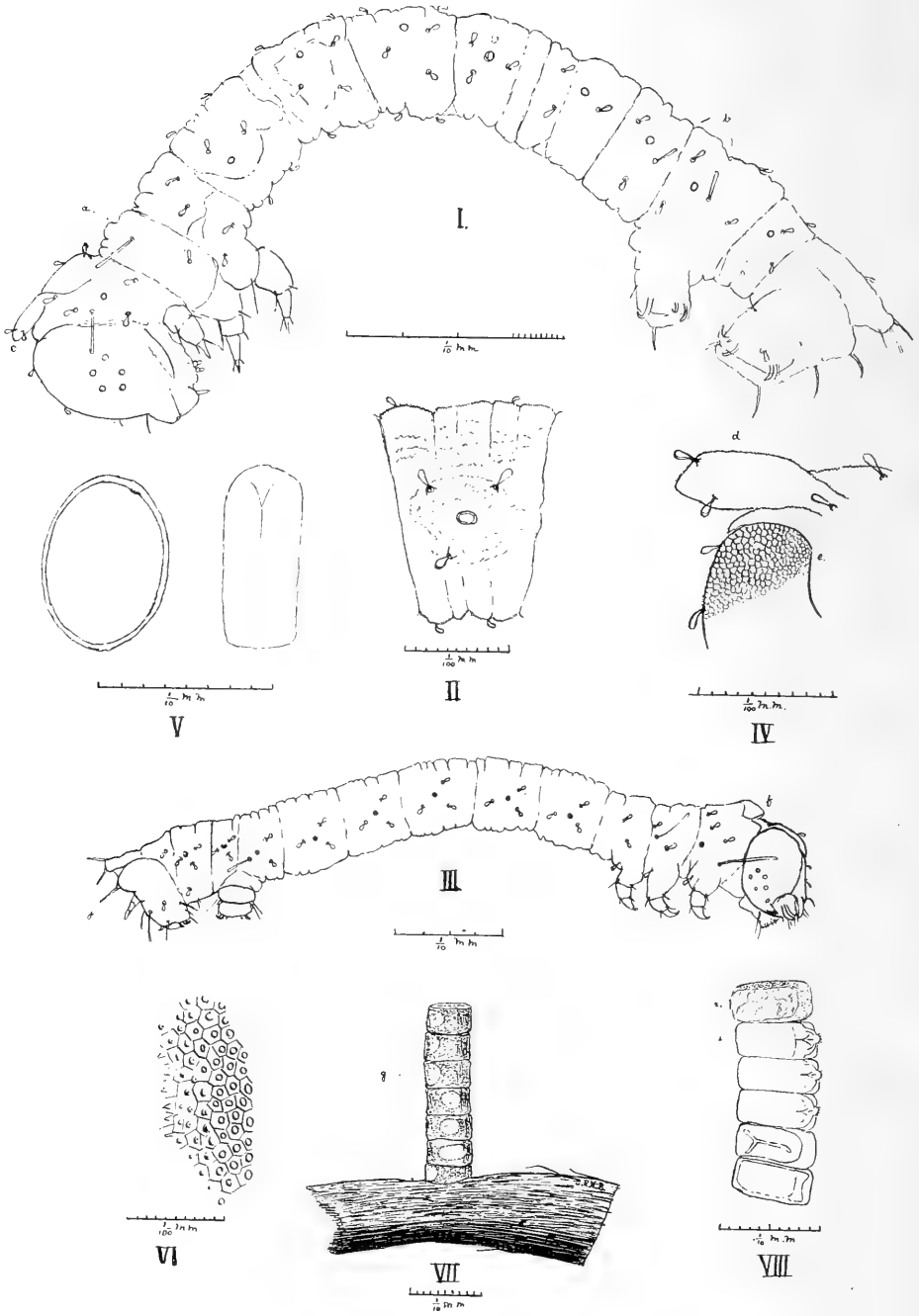

P. 33. *Del. C. R. N. Burrows.*

IODIS CHRYSOPRASARIA, Esp. = IMMACULATA, Thnbg.

IODIS CHRYSOPRASARIA, ESP.

By the Late Rev. C. R. N. Burrows, F.R.E.S.

Again I have to introduce the insect, which we have to consider, by a somewhat unfamiliar name—unfamiliar inasmuch as it has not as yet come into common use. But Mr Prout in his paper on the " Synonomy of Some of the Emerald Moths " (*Entom. Record*, 1900, p. 180), threshed the matter out, rejecting *vernaria* of Schiffermüller (1775), *volulata*, of Fabricius (1775), *aeruginaria* of Borkhausen (1794), as all invalid, leaving *chrysoprasaria*, of Esper (1794), as the correct name. Prout has now revised this name to *immaculata*, Thnbg. (Seitz, *Pal. Geom. Supp.*, iv, 219). The passage to which I have been so much indebted is too long to quote, but is well worth bearing in mind when dealing with this " Emerald." Staudinger in his last Edition of the *Catalog*, 1901, retained the name *vernaria* with which we are so familiar, and gave *chrysoprasaria* as a synonym. In Buckell and Prout's " List of the Fauna of the London District " *Iodis chrysoprasaria* is substituted for *vernaria*. So far for the name.

Mr Prout in his paper before quoted from the *Ent. Record* speaks of this insect as a " non-variable species." I have certainly not myself observed any signs of variation, although, judging from several of its relatives, it would appear not unreasonable to expect such. The two lines upon the upper, and the single line upon the under-wings, appear to be invariable, so far as published records go, and I would suggest to those who are so circumstanced as to be able to collect this insect, that it might be worth while to rear it for aberrations, and aberrations would be worth having.

I confess that I have become somewhat impatient of colour variations of this most delicate group of insects. Suspicion arises—the loss of colour through fading or change of colour through accidental staining. The " Emeralds " are sometimes given to producing individuals in which mal-nutrition or some purely accidental cause has reduced or possibly removed entirely the normal green colour. I feel some sort of respect for a white " Emerald," but none for a yellow one. The colour of our present species must be fairly permanent for my very ancient specimens still retain almost their original appearance. I am not then surprised when turning to my " Index Entomologicus " (which is, however, not brought up to date by many years) that aberrations of *Iodis chrysoprasaria* are not often recorded. In the *Entomologist* for 1873, p. 363, Mr H. W. Green records a specimen of " a pale yellowish green." And in the same magazine for 1889, p. 212, the Rev. G. M. A. Hewitt records the capture of " a variety of *G. vernaria*, pale salmon colour, with the green tint showing in a dash on the two under-wings only." To this is appended an editorial note, suggesting that the effect was brought about by the result of moisture upon the fugitive green colour.

I am not able to say much about the life-history or habits of this insect. For a great many years I have lived away from its haunts, although I believe that it generally occurs at least in the South of England, where its food plant, *Clematis vitalba*, is fairly common. This plant chiefly affects chalky districts, but is by no means rare in

places which cannot be called chalk localities, and I believe that where *Clematis* occurs there our insect is also found. The food plant is somewhat rare in the Mucking district, especially on the low lands, and I have not so far taken this " Emerald " thereabouts. Meyrick gives its locality as South England and Hereford and Norfolk. Kanes gives one specimen from Ireland, " probably imported with a plant of *Clematis*." The life-history was published in the *Entomologist* for 1872, p. 168, and from time to time there have been notes in this magazine upon the wonderful protective coloration of the naked larva.

I have beaten the larvae from *Clematis* from 1st September until 4th June. A little later, about the middle of June, it pupates, and the moth emerges in captivity before the end of June—but wild about the beginning of July. It can be beaten out of *Clematis* during the daytime, or netted at dark. It also flies freely to light, but I have no record of its capture at sugar. The male assembles freely to a virgin female, and has been observed (L. W. Newman, etc.) to evolve a strong scent.

When I commenced my examination of the early stages of the Emerald Moths I scarcely realised the importance of the work which I had taken in hand, nor have I yet been able to sift and systematize the information which I have obtained, and I feel, now that I have arrived at the end of the eight British species upon which I set myself to work, that there is still a vast field of work needed to bring the whole into line. I had asked myself whether it would not be possible to use the evidence of the early stages of the larvae to amend or rearrange the generic distribution of the species. Now at the end I feel it safe to remain dumb until I have been able to put together the result of the examinations.

The unwisdom of jumping at conclusions is very evident when one takes in hand the present species, which, although lumped with *papilionaria* in the genus *Geometra*, by Staudinger, and in *Euchloris* with *pustulata*, *smaragdaria*, and *lactearia*, by Meyrick, appear to be separated widely from all these by the structure and form of the egg, as well as the habit of oviposition, and from all but *lactearia* by the larval structure. The eggs of this species are laid upon the leaf stalks or stems of the food plants in columns. I believe a most unusual method of oviposition amongst Lepidoptera (Figure VII of my drawing) will give an impression of this habit. The series figured is a column of 7 eggs which have been vacated by the larvae. The eggs are set cross-wise on the base, so that they present the end view of the egg. It will be seen that the larva has not always emerged at the centre of the egg. So regular is the position that there is not one egg but is placed in an exactly parallel position. The number of eggs laid in series varies according to the will of the mother; sometimes only one or two, but sometimes as many as 12 to 14 (E. Newman, *Entom.*, 1865, p. 314). I have myself counted 13 in one column.

I have represented (Figure VIII) a short series of eggs actually at the point of hatching. Unfortunately, I cannot say—for the series was broken from its support when it reached me—which is the top and which is the bottom of the column, but that point does not seem very material. It will, however, be observed that the highest egg is a failure

—either infertile or injured, or not ready to emerge. The yelk-mass has collapsed and split; no larva has been formed within. The second is intended to show the larva which has emerged to the greatest extent, and I have indicated with some lack of success how of these three fully-formed larvae there is a distinctly—though infinitely small—progression in the advance of the larval head from below, as also in actual development. The fourth egg is another failure and the fifth appears not to have become sufficiently developed to begin its exit.

But it is not only in the matter of oviposition that this insect is so abnormal compared with the rest of the " Emeralds." The shape of the egg itself is (Figure V) quite different, resembling more the "brick" form of some of the " Thorns." The severely flattened sides are, of course, a matter of necessity; while the square base—if one may call it the base—compared with the rounded micropylar face is more or less abnormal.

In the rest of the group the sculpturing of the egg surface is more or less regularly and distinctly hexagonal, without any additional irregularities. In our present insect, however, the sculpturing is extremely indistinct and difficult to detect, for it is dominated and obscured by the multitude of pits (or points) which cover the surface of the egg and between which the hexagonal sculpturing is only by careful foscussing to be seen (Figure VI).

The freshly-hatched larva is not a very remarkable creature, and does not differ much from that of the other " Emeralds." It is chiefly remarkable for the prominence of the subsegments, which have given me the greatest possible trouble and anxiety.

The figure (1) proves (as is very often the case) to be unsatisfactory, as it has taken upon itself a nasty tilt which throws the parts out of their relative position. As a result the spiracles and their tubercules are not represented as they should be. There are no remarkable hairs. The body is wrinkled longitudinally, so closely and intraceably that I have been unable to follow the convolutions, while the before-named subsegments intrude themselves, hopelessly obscuring the lateral flange, which, however, exists. I can find but one tactile hair upon the first thoracic segment and one upon the second, but both are thick and blunt. Again on the sixth and seventh abdominal segments are to be seen these same thick-blunt hairs. The bifurcated front of the first thoracic segment seems rather remarkable and I have drawn it separately and in larger scale (Figure IV). This great projection is in duplicate, that is to say there are two projections, side by side, separated by the central ridge, which is shown in part. I may remark that the sculpturing upon this figure represents the larval countenance or complexion, whichever you like to call it. I can imagine no more terrifying feature than this seen at close quarters by the eyes of another larva. The enlarged first abdominal segment is shown in Figure II.

A more advanced larva in the first stadium is represented in Figure III. There is nothing much to remark about it. It is larger and older. The same hairs are present in the same positions. The bifurcate front of the first thoracic segment has given me some anxiety, for in all my specimens arrived at the same stage the points have disappeared. I conclude that they have become modified, and tend towards a simple bluish bifid

" frons " so usual in the " Emerald " larvae. I would also ask attention to the subanal organ whose presence I first noticed in the larva of *I. lactearia*. My material fell short of my requirements, and I was, therefore, unable to follow the larval development further, much to my regret.

I feel that I owe some sort of apology for the poorness of my remarks. I have perhaps given more attention of late to other matters, and I find that I have most certainly got out of touch with fine microscopical details. Working, as I have been for months with objectives of small enlargement, has more or less unfitted me for minute investigations.

EXPLANATION OF PLATE, IODIS CHRYSOPRASARIA, ESP.

I. The larva newly emerged.
   a. Tactile hairs on 1st and 2nd thoracic segments.
   b. Tactile hairs on 6th and 7th abdominal segments.
   c. Bifid front of 1st thoracic segment.

II. 1st abdominal segment.

III. Larva further developed, but in same stadium.
   f. Bifid front of 1st thoracic segment modified.
   j. Sub-anal organ.

IV. Bifid head of newly emerged larva further enlarged.
   d. The frontal projection.
   e. The complexion or countenance.

V. The egg.

VI. The egg sculpturing.

VII. Series of eggs.
   g. Emergence holes.

VIII. Eggs hatching.
   h. Dead egg.
   i. Larva emerging, more advanced.

GLANURES MYRMECOLOGIQUES.

By H. Donisthorpe, F.Z.S., F.R.E.S., etc.

(*Concluded from p. 28.*)

Myrmicinae—Tribe Crematogastrini.

Crematogaster, Lund, *Ann. Sci. Nat.*, **23**, 132 (1831), is given by De Dalla Torre, *Cat. Hym.*, 7 (*Formicidae*), 79 (1893), as *Cremastogaster*. Lund, however, did not spell it with two s's; therefore *Crematogaster* is correct. F. Smith, *Cat. Hym. Brit. Mus.*, **6**, 134 (1858), gives it correctly, as does Emery, *Ann. Soc. Ent. Belg.*, **56**, 272 (1912): *Gen. Ins.*, **174B**, 127 (1922). Emery (1922 *l.c.*) gives the type of *Crematogaster as Formica acuta*, F., because Lund was writing about species from Brazil; but as Bingham had definitely cited *C. scutellaris*, Oliv., as the type, *Faun. Brit. Ind. Hym.*, **2**, 124 (1903), that species must stand.

Tribe Leptothoracini.

Myrmammophilus, Menozzi, *Atti. Soc. Nat. Mat.* (6), **3**, 32 (1924). Modena, 1925. Subgenus of *Leptothorax*. The reference to this subgenus is not given as such in the *Zoological Record* (1925), nor is it mentioned at all in Neave, *Nomenclator Zoologicus* (1940).

Dolichoderinae—Tribe Tapinomini.

Tapinoma erraticum, Latr., subsp. *ambiguum*, Emery, "Revision des espèces paléarctiques du genre *Tapinoma*," *Rev. Suisse Zool.*, **32**, 57 (1925), rests on the characters of the male ant, for Emery states that the only differences between it and the typical form in the worker and female are the smaller size, especially in the ♀. Concerning the ♂ he writes as follows:—"Le caractère le plus remarquable de cette sous espèce réside dans la lame sous-génitale, qui est large du point qu'elle apparaît, dans la vue dorsale de l'armure génitale, latéralement à la squamula; l'échancrure de cette lame est large, évasée et séparé des lobes latéraux étroits et arrondis comme chez *nigerrimum*. L'armure génitale est faite d'ailleurs à peu près comme chez le type d'*erraticum*; le stipes est un peu plus petit et moins courbé. Longeur = 4 mm. à 4 mm., 5." One of the localities he mentions for this ant is—"Sud de l'Angleterre (Donisthorpe) ♂," and he adds it is probable that a small ☿ and ♀, given to him by Crawley, also belong to this same form. This subspecies, therefore, must be added to the British list. I gave him males from the New Forest.

Formicinae—Tribe Lasiini.

Chtonolasius, Ruzsky, *Kas. Zap. Vet. Inst.*, **29**, 630, 633 (1912), is spelt incorrectly by Emery, *Gen. Ins.*, **183**, 228, 231 (1925), as *Chthonolasius* by adding a second h, which was not used by Ruzsky. Emery also gives the reference as *Arch. f. Naturg.*, **79**, 59 (1913), and states that Ruzsky did not cite a type for this subgenus of *Lasius*; giving *L. umbratus*, Nyl., as type. In the reference given by us, however, Ruzsky distinctly cites *L. flavus*, De G., as type; which must stand.

Tribe Formicini.

Adformica, Lomnicki, *Polsk. Pismo ent.*, **3**, 164 (1925), founded the subgenus "*Adformica*" for the species of *Formica* in which the head is excised posteriorly in the worker, female, and male. He did not, however, cite either as type, but he had overlooked the fact that Müller, *Bol. Soc. Adriat. Sci. Nat.*, **28**, 133 (1923), had already founded a subgenus *Coptoformica* for the same two ants—*F. exsecta*, Nyl., and *F. pressilabris*, Nyl., but he also did not cite a type. I cited *F. exsecta*, Nyl., *Brit. Ants*, 2nd Edition, 316 (1927), as the type of *Adformica*, Lomnicki, but as that subgenus falls into the synonymy, I now propose *F. exsecta*, Nyl., as the type of *Coptoformica*, Müller, by present designation.

Tribe Camponotini.

In 1926 Wasykiewicz gave the name of *barbatus* to a subspecies of *Camponotus*:—*Camponotus* (*Myrmentoma*) *fallax*, Nyl., subsp. *barbatus*, Wasyk., *Trans. Tomsk. St. Univ.*, **77**, 118 (1926); but Menozzi had already given the same name to a species of *Camponotus* in 1925:—

Camponotus (*Myrmotarsus*) *barbatus*, Menoz., *Atti. Soc. Mat. Nat. Modena* (6), **4**, 94 (1925).

As Wasykiewicz's name sinks, I propose the name of *barbiger* nom. nov. for this subspecies.

DIPTERA—SYRPHIDAE.

Microdon: M. H. Maneval, *Bull. Soc. Ent. France*, **42**, 67 (1937), says that the myrmecophilous larvae of these flies live at the expense of the plant-lice cultivated by the ants. This, however, is quite incorrect for, as pointed out by Wheeler, *Nat. Acad. Sci.*, **10**, 244 (1924), " The nature of the food of the *Microdon* larvae in the ants' nests was for a long time problematic till Donisthorpe [*Ent. Record*, **24**, 36 (1912)] succeeded in proving that the British species, *M. mutabilis*, which lives with ants of the genera *Formica*, *Lasius*, or *Myrmica*, is a scavenger and feeds on the minute pellets expelled by its hosts from their infrabuccal pockets."

I reared a very young larva of this fly in a colony of *Formica fusca* housed in a " Janet " plaster nest. It became full grown, hibernated during the winter, pupated at the end of April, and emerged in May, having lived in the observation nest for just over twelve months. I pointed out that it was quite clear that the food of the larva consisted of the droppings and pellets (" Boulettes de nettoyage ") of the ants. See " Guests of British Ants," 126 (1927).

Entomological Department, Brit. Mus. (Nat. Hist.), 10.ii.41.

LOOKING FORWARD.

BY AN OLD MOTH-HUNTER.

January 19th. Two days ago the barometer, after standing high for several days, due to an east wind which brought twenty degrees of frost at night, fell to 29.2, and it began to snow. It has been snowing ever since. Snowing heavily and incessantly. The hills, which rise steeply to 1750 feet about the house, are blotted out and I might be living on an ice-floe. The lane down to the village two miles away is impassable, for it is sunk below the level of the fields and the snow has now topped the hedges. There is no telephone; I am cut off from the world—or should be were it not for a strange voice which remarks, at monotonously regular intervals, " This is the B.B.C. home service."

Supplies? I have plenty of tobacco. I have the wherewithal to refresh the inner man several times a day and to give him a grateful feeling amidships last thing at night. The cows are munching contentedly in their byre. We killed a pig not so long ago. From the kitchen department comes the scent of freshly-baked bread. The churn was busy this morning long before dawn. But I cannot go to the village for my weekly ration of margarine: I shall have to eat butter instead, perhaps for weeks on end. Such is war.

Like many another I have been driven far afield. Fate has set me down, *nolens volens*, in a country like that of my birth but utterly unlike my habitat of fifty years. Entomologically it is, for me, *terra incognita*. Indeed, I cannot find that an entomologist has ever " worked " this particular part of our island: the aged librarian in

the nearest town has never heard of such a being. The textbooks ignore it. What, then, shall I find here in the way of moths when spring and summer come?

Polia chi is, I know, as common as a barndoor fowl, for a boxful was sent to me, in Hertfordshire, last summer. *Socia* was found, in autumn, roosting high up in the chink of an oak. *Trepida*—*trepida* of all moths—occurred in the shape of a full-fed larva beneath an oak hard by the front door, after a torrential downpour. And who, before, ever heard of *trepida* at his very doorstep? These things, sent to me by a forerunner (gifted with such eyesight as can spot a sleeping *socia* in a chink of oak-bark ten feet from the ground) have set me wondering. What else shall I find if Fate keeps me prisoner for spring and summer in such a wonderland?

There is no poplar nor aspen, but much alder, sallow and willow. Ash grows everywhere, in the valleys and up on the hills. Hazel is the chief hedgerow plant, hawthorn being almost uncommon and blackthorn rare. Oaks, ancient oaks, are still unfelled, with plenty of beech and an occasional elm. Higher, on the hills, there are birches, both trees and bushes, and, of course, heather and bilberry. Scots pine and larch are now the chief forest trees in a land that once was famous for its oaks.

It is, of course, the birches that will claim my first attention in the spring. Moonlight aiding me I shall, I am sure, gather *tincta* larvae from them and, later, ova of both *dromedarius* and *dictaeoides*. And I shall find the wee larvae of *papilionaria*, awakening from their long winter sleep, no matter how cunningly camouflaged they may be. I may even find *versicolora*—no, not the silly little moth that most of us still call *strigilis*, but the great, the noble, the handsome Glory of Kent, as old Moses Harris delightedly dubbed it. For these birches on the hillsides are sturdy bushes five and six feet high, such as *versicolor* likes. They are sprinkled among the bilberry and bracken which add ochre, brown and purple tints to the grey limestone of the crags. Surely *versicolor* must be here.

In April, too, perhaps even at the end of March if the Gods are benign, I shall find *flavicornis* perched at all sorts of angles on twigs and bark and dead bracken stems. *Parthenias* would not be out of place in such a spot, and if indeed he be here I shall need no net: I shall try again, as I have tried so often in the past, to box him as he sits, his wings a-pent like a sleeping *thaumas* (but right way up), on a twig within easy reach. For it is one of my ambitions to box a roosting *parthenias*. He has eyes all over his wings, and in his tail, too, I think: one inch is the nearest I have ever come to him with a box. Like a hare in her form he watches me approach, notes the stealthy movements of my hands, eyes the nearing box, measuring its distance with critical eye, and then, just as I am about to cry *Got him*! he takes the words out of my mouth and sideslips off his perch in the twinkling of an eye. *Notha* is just the same; a family trait I suppose. But *notha* will not be here: aspens are non-existent.

Perhaps the birches will also provide me with Pebble Hooktips; for *falcataria* hits it off well with *parthenias* and indeed rivals the Orange Underwing in its dislike of pill-boxes—when it condescends to fly low. Happily its larva is easy to find and often prefers ridiculously small

bushes, whereon, full-fed, it is as conspicuous to the entomologist's eye as is a unicorn in a water-meadow. Three of the *Cymatophoridae* should come my way in addition to *flavicornis—duplaris*, *diluta*, and *fluctuosa*; and since *trepida* is here I see no reason why *ridens* should not be present as well. Not that I am particularly fond of this family, for the larvae of all of them, except perhaps *ridens*, are wrigglers, and I prefer a caterpillar to move with becoming dignity. But it is pleasant to pit one's wits against their attempts to defy inquisitive eyes.

In the valleys, and indeed in every little bottom among the hills, alder and sallow flourish. *Furcula*, doubtless, I shall find; but *biscuspis*? Never yet have I taken *bicuspis*. Shall I indeed have the thrill this year of seeing my first *bicuspis* larva browsing or sleeping on an alder leaf swaying gently in the hot August breeze? And I shall expect *fagi* too; for there are beechwoods in plenty, just the kind of woods that *fagi* likes. Will he, I wonder, be of the palest grey, like some of those which, years agone, we took from sapling trunks on the Oxfordshire bank of Father Thames; or will he be as dark as Erebus, akin to his Epping brethren? Whichever he be, he will be welcome; for *fagi* has a personality. He sits as no other British moth sits, and he sleeps like Rip van Winkle. Not even *hirtaria* sleeps more deeply. He eschews, too, the great beeches of his wood, preferring a sapling that can lull him to sleep as it sways in the morning wind. He is a most dignified insect.

The alders will, I know, yield me *dromedarius* in *perfusca* form, for I have found this moth in plenty on the hills of a neighbouring county. On birch, too, I shall come across him and, what is more, high up on wind-twisted trees close to the 2000-foot contour. *Leporina* should gladden me sometimes, and surely the abundant hazels on the hillsides will harbour *coryli*.

Chaonia I shall find at half-past four, as he runs a foot up the trunk of some ancient oak to dry his wings before seeking safety aloft. And in June I shall cut a hazel wand from a neighbouring hedge, strap my walking-stick to one end, and, hooking the crooked handle over high branches, shake his larvae from their lofty seats.

On the 7th June I shall look for the Wood Tiger. He may be, as he so often is in the south, local, occurring in swarms in some grassy hollow of the hillside and nowhere else for miles. The Ruby Tiger, too, buzzing along in the sunshine for all the world like a red beetle a-wing, should remind me of his presence in the first week of May. He is a cheery little fellow and can sham dead as well as any beetle. Emperor moths there will be in plenty, and Fox moths and Oak Eggers will career about me when I cross the hills in June.

And what of the Noctuae? Nearly forty that I have never set eyes on in Hertfordshire. *Porphyrea*, *lucernea*, *pyrophila*, *agathina*, *castanea*, *depuncta*, *ditrapezium*, *sobrina*, *contigua*, *glauca*, *furva*, *nigra*, *turca*, *anomala*, *leucographa*, *opima*, *fulvago*, *solidaginis*, both the Swordgrasses—all these and many others are "possibles."

Butterflies? They do not interest me; but I shall notice small brown hairstreaks with green undersides flitting about the brooms that grow so freely on some of the hills. And on scabious plants in the meadows I expect to see, presently, nests of *artemis*. The Marsh Ringlet I shall

look for high up in the mountain bogs where cotton-grass abounds. *Aglaia*, of course, will be everywhere in July, on both low ground and high. There will be Blues and Graylings and Vanessids and Skippers . . .

Will be? Who knows what Fate has in store for us in these times? We live from day to day, and when spring comes I may be far away from these lovely hills, these ancient oaks, these shaded beechwoods. But not even Fate herself can rob me of my daydreams, and come what may I shall go on dreaming until . . .

It is still snowing? Then hand me that tumbler; put two lumps of sugar in it and a small stick of cinnamon; and give me that bottle. Now put the kettle on. To-morrow I shall clear the snow from that oak on the lawn and dig for *trepida*.

COLLECTING NOTES.

Hibernating P. atalanta.—A boy told me to-day (24th February) in the museum that he had that morning caught a "Red Admiral." On making enquiries I found that it had been taken in his father's yard when a quantity of scrap iron was being overhauled. It is quite obvious that this specimen could not be a this year's immigrant; it had evidently hibernated among the scrap iron and had been disturbed when this was being sorted.—Rev. George Wheeler, Worthing.

Sphingidae from the Bournemouth District, 1940.—*Sphinx pinastri*, Linn., was seen as early as 19th May, when a male was found drying its wings at the foot of a Scots Pine. This species was fairly common during 1940. A specimen of *Deilephila nerii*, Linn., was found at rest on a fence at Southbourne on 14th September. It was a fine female. I have seen the moth. It is in the possession of a local collector. Another *nerii*, also a female, was found at Fawley, near Southampton, and sent alive wrapped in cotton wool to a friend of mine. Considering how it was sent, it is not in bad condition. This one was taken on 16th September. *Deilephila livornica*, Esp., has been noted twice in the district. One taken at Southbourne on 21st July and another taken in May at Hengistbury Head by Mr R. L. Ford of the Imperial Institute of Entomology.—S. C. S. Brown, Bournemouth, 14th February.

Effect of Rain on Cells of Odynerus parietum.—Last July cells of this species were lashed by heavy rain (aided by a stream of water from a roof). Half-completed cells were washed away, but the finished ones were unharmed. A few days later the wasps had made new cells to replace those destroyed.—Sinclair Swanson, M.A., Keiss Village, Wick, Caithness.

Notes on the Genus Staphylinus, L.—Fowler restricts this genus to six British species, but Beare's *Catalogue* of 1930, by incorporating the genus *Ocypus*, Er., enumerates sixteen species. Following Fowler I find that five of his six species occur in Cumberland, two being fairly common, one of infrequent occurrence, and two rare.

S. pubescens, De G. I meet with almost every season in dry horse dung, which in colour it very much resembles. I have seen as many as half-a-dozen on one heap of droppings in a field in which horses were grazing, and the beetles were well-nigh invisible until they moved.

S. erythropterus, L., is often picked up running on roads in spring and under stones on mossy hedge banks, while later in the year it may be found in flood rubbish and in tufts of herbage and at tree roots.

S. stercorarius, Ol. I do not often see in Cumberland but have taken a few in the entrance to rabbit burrows on the coast sandhills, and also in the Eden Valley. A year or two ago I met with it in Ross-shire near Loch Maree, and also have a specimen from the Isle of Skye.

S. parumtomentosus, Stein. (*caesareus*, Ceder.—of Fowler's book) appears to be a southern species. The only Cumberland specimen I have seen is one I captured on the wing in Carlisle in 1931.

S. fulvipes, Scop., which Mr Donisthorpe recorded from Windsor Forest in the January number of the *Ent. Record*, p. 10, is rare in Cumberland, as it is everywhere. I took one under a stone near Keswick, while working nests of the Wood Ant, so long ago as 1898. Some years later (1912) my old friend, the late W. E. Sharp, took another near the west end of Buttermere, so the Lake district is evidently where further occurrences may be expected.—F. H. Day, 26 Currock Road, Carlisle, February 5, 1941.

Notes on Variation from the Worthing Museum.—*Z. quercus.*—The specimen of ab. *fisoni* ♀, with yellow replacing orange, not being very fresh, might be supposed to be merely faded. This is not so, as the original specimen in Mr Fison's collection is very fresh.

R. phlaeas.—The first brood specimens in England are lighter than those of later broods. There is one August specimen from Scotland (Fife) which is very bright. The French spring brood specimens are not so bright as the English; the summer brood from Digne, though definitely *eleus*, have only short "tails." June specimens from the Tyrol are very bright, as is also an Italian spring specimen, which has also a very broad border to the hindwing. The Italian examples from Fiesole, both in the summer and September broods, show a dark suffusion but are not *eleus*, they might be described as *suffusa*, Tutt, but not with "*ab.*" before it. The Corsican specimens are puzzling. July specimens from Corte are mostly *eleus*, but one is very bright without suffusion; others, both June and July, from Corte and Vizzavona are also bright and show no suffusion. The Swiss spring brood are much like the English, but rather paler; the second brood from Berisal are dark, and though one shows much suffusion, they generally show very little. Summer specimens from Reazzino and the Val Naggia vary a good deal with regard to the amount of suffusion they show, some being quite of the *eleus* form, while others of the same date show no suffusion at all. Specimens of the early brood from Cyprus are less bright than the English ones, the summer brood are of the *eleus* form. April specimens from Greece are much like English ones but rather lighter and with much duller border. There is one April specimen from Palestine, small, with a rather dull broad border to the forewing, while May, June and July specimens are much suffused on the upper side while the under side of the forewings is of a pale buff colour. There are two specimens from S. Finland both of a pale colour. This is

somewhat remarkable, as further north the bright *hypophlaeas* occurs.

L. arion.—This species is not very well represented from the Continent. There is a good series of Cornish specimens all lighter and brighter, and on the average smaller, than any other specimens in the collection. Those from the lower levels in Switzerland, e.g., from Weson on the Walinsee, approach them most nearly; those from Alpine localities are generally of the form *obscura*, the blue, though bright, being almost covered with black. These are generally of large size on the Simplon, but smaller from other mountain localities, some from the Laquinthal being decidedly small. There is one very large specimen from Iselle entirely black and another from the Sarnthal in the Tyrol almost as dark. One small specimen is from the Pyrenees (Vernet), and a few from the Abruzzi almost as small as the English, but dark and dull. There are only two French specimens, a ♂ from La Grave and a ♀ from La Chambotte, above Lac Bourget, both large and bright, especially the ♀.

L. argiolus.—I do not find the border of the ♀ noticeably broader in the second generation, though slightly so in one ♀ from Royston, but the under side is less spotted in both sexes in most cases. In the case of Italian specimens, all of which are less spotted, those of the second brood are generally almost without. Further south the border of the ♀ becomes much broader, e.g., from Digne and Corsica, and in Cyprus it covers most of the disc. Most specimens from France, Switzerland and the Tyrol are large. In Italy the specimens of the first brood are small, those of the second brood are large.

This species is generally quite common in my garden at Worthing in both broods, and I have taken it as early as March 31st. Outside the town it seems to be rather scarce, but I have taken it on the way up to Chanctonbury.

E. argiades.—It is hardly necessary to say that there are no English specimens in this collection. At Mendrisio (S. Switzerland) the ♀ is brown with two orange spots on the upper side of the hindwing. At Hautecombe on the Lac Bourget I have taken this species and the closely related *E. alcetas* at the same time in the same field. Here the ♀ *argiades* is blue and suffused with black and easily separable from ♀ *alcetas* which is entirely brown in all specimens from France, Switzerland, Italy and the Tyrol. All the small specimens of the latter are of the second brood, so if *polysperchon* belongs to *alcetas* it is quite wrong to speak of this as a *spring* brood. The first brood specimens of *argiades* from Hautecombe are also at least as large as the summer brood from Mendrisio.—Rev. G. Wheeler, M.A., F.R.E.S.

CURRENT NOTES.

We are very pleased to record the election of Dr Hugh Scott, an Assistant Keeper of Entomology, British Museum (Natural History) to the Fellowship of the Royal Society. It will be remembered that some years ago Dr Scott went on a Natural History Expedition to Abyssinia.

We have just received notice of the early issue of the final volume of the series commenced by Mr F. N. Pierce, F.R.E.S., and the late Rev.

C. N. Burrows, F.R.E.S., on the Genitalia of the Lepidoptera of the British Isles, viz., " The Genitalia of the British Butterflies and Larger Moths." Subscribers in advance can obtain a copy for 12/6, by sending to the Author at The Old Rectory, Warmington, Peterborough, Northants. Dr Bryan P. Beirne, F.R.E.S., of the Dublin Museum, is joint author of this present volume.

In the last number we regretfully reported the death, by an accident, of Mr P. M. Bright. Our readers will doubtless remember that an intensive study of the Variation of *Polyommatus* (*Lysandra*) *coridon* was issued by Messrs Bright and Leeds a while ago. We now have to report that the whole of the specimens detailed in that work contained in a cabinet of 52 drawers has been bequeathed to the well-known and popular South London Entomological and N.H. Society. The collection will be on view in the Hope Museum, Oxford, under the care of Prof. Hale Carpenter for the duration, after which it will be housed in the rooms of the Society at the Chapter House, St Thomas Street, Southwark. As a member of this Society for over 50 years we can be a witness to its continued steady stability and advance. It has a most useful Library for those interested in the British Fauna and Flora and its collections of all orders are very complete. Just at present, of course, its activities are somewhat restricted, but still a limited number of meetings, both indoor and in the field, are in the printed programme for the summer sessions, and several papers are to be read as is usual.

Extract from a Letter from A. H. Hamm.—" I have just been reading your note in the current number of the ' Record ' on *V. inanis* in Kent, which caused me to remember that I once took a ♀ sitting in the entrance of a wasp's nest, and on looking it up in my collection found the specimen mounted with the wasp that I caught by placing my net over the entrance of the nest. Here is the note copied from the label: ' ♀ *V. inanis*, sitting in entrance to nest of *Vespa vulgaris* in bank, Hollands Wood, New Forest, August 16, 1908. Fly and wasp caught in nest together.' Two others were captured near Brockenhurst, one ♂, 14th August 1914, and a ♀ 16th August 1908. Have also taken it in S. Devon, Newton Abbot, ♂ 11th August 1900, ♂ 8th August 1902. I believe hornets are scarce in Devon. Have only once taken it here at Oxford, Shotover Hill, ♀ August 1897. If you care to supplement your note with the above or any portion you are welcome to do so."—A. H. Hamm.

[I think the facts in Hamm's letter about the association of *V. inanis* and *Vespa vulgaris* are worth putting on record. I do not think we have any " direct " evidence that it breeds in nests of that species in this country, and his capture is fairly strong " circumstantial " evidence, much more so than my record if the capture of *V. inanis* in a locality in which I have not noticed hornets.—H. W. A.]

Our correspondent, Mr A. J. Wightman, writes me: " As regards *vaccinii* and *ligula*, in *Nature* they are unmistakable. I never saw a specimen which could equally well be either species. *Vaccinii* is a woodland insect, *ligula* a low country species, most abundant just above the marshy wet ground, but it occurs in most places outside the woods."

ssp. *solimana*, Drdt., *Mitt. Münch.*, XXVIII, 29 (1938).

Orig. Descrip.—" Forewings clear soft bluish-grey; markings fine, especially the very narrow black basal streak. Quite distinct from *psi* by wholly dark brown-grey hindwings. Hindwing fringes especially white with indistinct fine blackish streaks between the veins. Underside strongly suffused with black." Elburz.

race *crassistriga*, Latt., *Zeit. Oestr. Ent. Ver.*, XXIII, 96 (1938).

Fig.—*l.c.*, plt. 8, figs. 1-12.

Orig. Descrip.—" The ground colour of this race is a pure clear ashy-grey, which only in the female appears somewhat brownish; the transverse lines and marginal dots are only slightly developed, etc." Corsica.

This is a long comparative description, the sum total of which is that the markings and emphasis, are moderately increased in all the Corsican specimens as compared with a series of typical forms.

P. (66) Add to the List of Forms of *A. auricoma*, Schiff., ab. *virgo*, Lempke, and ab. *obscura*, Lempke.

P. (352) Add the Orig. Descrip. of these two forms after line 16 from the top.

ab. *virgo*, Lempke, *Tijds.* (1939), 206.

Orig. Descrip.—" The marginal area of the forewings is darker than the rest of the wings." Breda.

ab. *obscura*, Lempke, *Tijds.* (1939), 206.

Orig. Descrip.—" Ground of the forewings of a very dark blackish-grey-brown, markings in general less in evidence." Groningen, etc.

P. (71) Add to the List of Forms of *A. euphorbiae*, v. *andalusica*, Schwrd.

P. (352) Add the Orig. Descrip. of v. *andalusica* at the bottom of the page.

var. *andalusica*, Schwrd., *Int. Ent. Zt.*, XXVIII, 416 (1934).

Figs.—*l.c.*, 7, 10.

Orig. Descrip.—" Many ♂♂ near Algeciras have somewhat narrower and more pointed wings, a brownish tone of colour of the forewing and the inner marginal portion of the darkened discal area, which suggest at first that there is a new species. Examination of the genitalia shows that it is *euphorbiae*."

" Interesting from the contrast in marking of the forewings. Around the stigmata and in the inner marginal area there appears a strong black coloration, especially in the basal and the outer area. Between the stigmata at the base, on the costa in the transverse double streak and in the stigmata whitish-grey. The fringes strongly chequered black and white. Distinguished from *montivaga* and *acerbata* by the strong whitish-grey, from *euphorbiae* by the decided black. This form and the typical form do not have the black spots on the forewings." Algeciras.

P. (79) Add to the List of Forms of *A. albovenosa*, ab. *tjurana*, Drdt., and ab. *geminipuncta*, Boldt., after line 12 from the top.

P. (354) Add the Orig. Descrip. of these two after line 7 from the top.

f. *tjurana*, Drdt., *Ent. Rund.*, LIII, 457 (1936).

Fig.—*l.c.*, plt. a 1.

Orig. Descrip.—" Forewings white sparsely brownish powdered, the dark, longitudinal streaks bronze-brown, that below the median extends from base to margin and touches the length of the white vein 5. Veins are streaked with bronze-brown. Marginal dots absent. Hindwings white with brownish veins and marginal line." Central Asia.

ab. *geminipuncta*, Boldt., *Tijds.* (1939), 199.

Orig. Descrip.—" The forewings have two black dots in the upper and lower corners of the median cell." Amsterdam.

P. (85) Add after line two the Orig. Descrip. of ab. *concolor*, Lempke.

ab. *concolor*, Lempke, *Tijds.*, 81, 245 (1938).

Orig. Descrip.—" Ground colour uniform deep grey, no white, normal marking." Holland.

P. (146) Add to the List of Forms of *N. dissoluta*, Tr., ab. *brunnescens*, Rang.

P. (147) Add the Orig. Descrip. of ab. *brunnescens*, Rang., after line 15 from the bottom.

ab. *brunnescens*, Rang., *Int. Ent. Zt.*, XXVII, 531 (1934).

Orig. Descrip.—" Has black scaling in the discal area of the forewing and a very prominent black discal spot on all four wings, as well as a more distinct row of black dots just before the margin. Further, the underside is much more glossy." Vienna.

P. (151) Add to the List of Forms of *N. algae*, Esp. (*cannae*, Ochs.), ab. *fusca*, Bowles, ab. *rosea*, Bowles, and ab. *obsoleta*, Bowles.

P. (152) Add the Orig. Descrip. of the above three forms after line 7 from the bottom.

ab. *fusca*, Bowles, *Ent. Rec.*, X, 287 (1898).

Orig. Descrip.—" Anterior wings very dark fuscous-brown, with the markings scarcely visible. ♀ Fuscous-brown, the markings distinct." Norfolk Broads.

ab. *rosea*, Bowles, *Ent. Rec.*, *l.c.*

Orig. Descrip.—" Anterior wings and fringe of hindwings of a warm red in the males, and suffused with a rosy shade in the females. This is much brighter in fresh specimens, and after drying fades away slightly." Norfolk Broads.

ab. *obsoleta*, Bowles, *Ent. Rec.*, *l.c.*

Orig. Descrip.—" Anterior wings pale yellow, with wainscot markings wanting, except the two lowest black dots." Norfolk Broads.

P. (154) Add to the List of Forms of *N. sparganii*, Esp., ab. *immaculata*, Dufr., ab. *uniformis*, Dufr., and ab. *obscura*, Dufr.

P. (356) Add the Orig. Descrip. of the above three forms after line 6 from the top.

ab. *immaculata*, Dufr., *Lambill.*, XXXV, 54 (1935).

Orig. Descrip.—" Like the typical form, but on the forewings the dots forming lines, even those of the outer line, have completely disappeared." Vallée de la Sambre, Belgium.

ab. *uniformis*, Dufr., Lambill., XXXV, 54 (1935).

Orig. Descrip.—" Like the typical form but less dark, with less reddish; the only remaining, as markings, are the dots forming the external line of the forewings. The hindwings deeper than in the forewings." Vallée de la Sambre, Belgium.

ab. *obscura*, Dufr., *Lambill.*, XXXV, 54 (1935).

Orig. Descrip.—" The forewings are regularly strewn with reddish-grey atoms, and among them are easily seen the dots forming the external line. Hindwings very dark." Vallée de la Sambre, Belgium.

P. (176) Add to the List of Forms of *H. crinanensis*, Burrows, ab. *jutlandica*, Hoffmr. & Kndn.

P. (176) Add the Orig. Descrip. of ab. *jutlandica* after line 13 from the bottom.

r. *jutlandica*, Hoffmr. & Kndn., *Flor. og Fn.*, 65 (1935).

Descrip.—Stz., *Pal. Noct. Supp.*, III, 262 (1937), " is the Danish form; specimens with small dark and narrow wings."

P. (178) Add to the List of Forms of *H. micacea*, Esp., ab. *discolor*, Krul.

P. (179) Add the Orig. Descrip. of ab. *discolor*, Krul., after line 6 from the top.

ab. *discolor*, Krul., *Bull. Soc. Mosc.* (1893) sep., p. 60.

Descrip.—Stz., *Pal. Noct. Supp.*, III, 188 (1935)—" Specimens with grey or black-brown colour, frequently with greenish, but not coppery, sheen." Wiatka.

P. (181) Add to the List of Forms of *H. leucostigma*, Hb., ab. *pallida*, Heydm.

P. (182) Add the Orig. Descrip. of ab. *pallida*, Heydm., after line 11 from the bottom.

ab. *pallida*, Heydm., *Ent. Zt.*, LII, 47 (1938).

Fig.—*l.c.*, I, 18.

Orig. Descrip.—" This Dutch (Lobith) captured, with perfect fringes, is wholly pale reddish-brown, the dull grey marginal area having wholly disappeared, so that the forewings show only the yellowish-white reniform stigma. Hindwing dusky-white, equally paler than in the typical form, with dull grey veins and marginal line.

P. (184) Add to the List of Forms of *A. putris*, L., ab. *juncta*, Lempke.

P. (185) Add the Orig. Descrip. of ab. *juncta*, Lempke, after line 13 from the bottom.

ab. *juncta*, Lempke, *Tijds.* (1939), 237.

ORIG. DESCRIP.—" The two stigmata touching, but with unbroken encirclement." Holland.

P. (187) Add to the List of Forms of *X. conspicillaris*, L., ssp. *ankarensis*, Hrng.

P. (189) Add the Orig. Descrip. of ssp. *ankarensis*, Hrng., after line 2 from the top.

ssp. *ankarensis*, Hering, *Int. ent. Zt.*, XXVI, 412 (1933).

ORIG. DESCRIP.—" Recognizable by the slightly contrasting colour. The ground colour is almost pure grey, without the brownish toning of the typical form, but not so black-brown as in the likewise distinctive form *melaleuca* from Ankara. The somewhat brownish toning is found chiefly in the paler costal area before the apex. The new subspecies differs from the otherwise almost unicolorous European examples easily by the pure grey colour and more distinct marking. The thorax has dark grey hairing. The underside of the forewing and the costal marginal area of hindwing is strongly powdered grey as in our native specimens. The male has much less contrast of marking than the female." Ankara.

P. (243) Add to the List of Forms of *M. furuncula*, Schiff. (*bocoloria*, Vill.), ab. *pseudonychina-striata*, Schultz, and ab. *antitheris*, Schultz.

P. (246) Add the Orig. Descrip. of the above two forms after line 9 from the bottom.

ab. *pseudonychina-striata*, Schultz, *Int. Ent. Zt.*, XXVIII, 419 (1934).

ORIG. DESCRIP.—" [See *Int. Ent. Zt.*, Heydemann, XXXVII, 331 (*pseudonychina*)] with the following very conspicuous marking: from the fine black basal streak there extends a straight-line black longitudinal streak through the whole of the forewing to the margin. This is the same marking as given by Warren in his form *longistriata* (Seitz, *Pal. Noct.*, III, 173, plt. 40 l)."

ab. *antitheris*, Schultz, *Int. Ent. Zt.*, XXVIII, 419 (1934).

ORIG. DESCRIP.—" The outer half of the forewing chalk-white, the marginal portion of the whole slightly tinged brownish. The waved line on the outside slightly margined with brown. The fringes sharply chequered pale and dark. The inner half of the forewings light brownish with darker marking. A deep black V-like marking stands out very distinctly in the centre of the wings somewhat above the inner margin (the so-called *conjuncta*-streak). Of the reniform stigma only the fine black inner marginal line is present. Orbicular stigma white, dark centered, basal and marginal sides lined finely black. Hindwing unicolorous grey, consequently causing a sharp contrast with the chalk-white ground of the forewing. Fringes whitish with dark lining. On the underside the hindwings are almost unicolorous whitish." " Quite different from the description of ab. *pallida*, Tutt." Borkum.

All MS. and EDITORIAL MATTER should be sent and all PROOFS returned to HY. J. TURNER, "Latemar," 25 West Drive, Cheam.

We must earnestly request our correspondents NOT TO SEND US COMMUNICATIONS IDENTICAL with those they are sending to other magazines.

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TO OUR READERS.—Short Collecting Notes and Current Notes. Please, Early.—EDS.

Will any subscribers who have changed their addresses recently and not notified the Hon. Treasurer please do so. Several subscriptions have been received this year from addresses other than those in his books, causing delay in receipt of their copies of the magazine, which have been sent to the old addresses.

EXCHANGES.

Subscribers may have Lists of Duplicates and Desiderata inserted free of charge. They should be sent to Mr HY. J. TURNER, "Latemar," West Drive, Cheam.

Urgently Wanted for Experimental Purposes.—Pupae of *hirtaria* and *lapponaria*. I can offer duplicates of very many species in return.—*Harold B. Williams, Croft Point, Bramley, Surrey.*

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Wanted—American Hesperiidae, especially from Costa Rica, West Indies, the Guyanas, Guatemala, Honduras, Nicaragua, Venezuela, Colombia and Bolivia. Write *K. J. Hayward, Estación Experimental, Casilla Correo 71, Tucuman, Republica Argentina.*

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MEETINGS OF SOCIETIES.

WAR-TIME ARRANGEMENTS.

THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON : 41 Queen's Gate, S.W.7. (Nearest stations : S. Kensington and Gloucester Road.) General Meetings at 8 p.m., on the first Wednesdays of the month, February-June; October-December. Annual Meeting, third Wednesday in January.

THE SOUTH LONDON ENTOMOLOGICAL AND NATURAL HISTORY SOCIETY. —April 19th (Sat.), May 8th (Thurs.), June 12th (Thurs.) : Saturdays, 2.0 for 2.30 p.m.; Thursdays, 6.0 for 6.30 p.m., Chapter House Hall, St Thomas Street, S.E.1. *Hon. Sec., F. Stanley-Smith, F.R.E.S.*, " Hatch House," Pilgrims Hatch, Brentwood, Essex.

THE LONDON NATURAL HISTORY SOCIETY, London School of Hygiene and Tropical Medicine, Keppel Street, Gower Street, W.C.1.—Meetings on fourth Saturday in the month, at 2 p.m., in Forster Hall of the Chapter House, Southwark Cathedral, London Bridge, S.E.1. *Hon. Sec., A. B. Hornblower*, 91 Queen's Road, Buckhurst Hill, Essex.

ENTOMOLOGICAL SECTION, BIRMINGHAM NATURAL HISTORY AND PHILOSOPHICAL SOCIETY.—Evening Meetings. On the third Monday of each month, 7 p.m., at 55 Newhall Street, Birmingham. Visitors welcomed. Those who would like to attend or exhibit please apply to *G. B. Manley*, 72 Tenbury Road, King's Heath, Birmingham.

SOCIETY FOR BRITISH ENTOMOLOGY.—All meetings suspended till further notice. *Hon. Sec., E. Rivenhall Goffe*, 102 High Street, Southampton.

Communications have been received from or have been promised by T. Bainbrigge Fletcher, A. J. Wightman, W. P. Curtis, H. Willoughby-Ellis, E. Ernest Green, H. Donisthorpe, P. B. M. Allan, Rev. G. Wheeler, (The late) Rev. C. N. Burrows, H. W. Andrews, S. G. Castle Russell, Dr E. A. Cockayne, S. Swanson, Prof. J. W. Heslop Harrison, F. H. Day, Thos. Greer.

All communications should be addressed to the Acting Editor, Hy. J. TURNER, " Latemar," 25 West Drive, Cheam.

Printed by T. Buncle & Co. Ltd., Arbroath.

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No. 5

MAY 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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FOUR YEARS' CAPTURES OF INSECTS IN LIGHT TRAPS IN IRELAND.

By Bryan P. Beirne, Ph.D., F.R.E.S.

During the years 1936-39 I have regularly used a moth trap during the summer months for collecting specimens, particularly Microlepidoptera, but unfortunately, beyond noting the different species that came to the trap, no detailed records as to the number of specimens, weather conditions, etc., were kept.

The trap used was of the box type, four and a half feet square and open at the front, the insects entering through a vertical slit between the edges of three sheets of glass, two at one side and one at the other, extending vertically from floor to roof and inclined inwards and slightly overlapping, but not touching, in the mid line, leaving a space of an inch or so between their inside edges. The inside of the trap was painted white and illumination supplied by a 100-watt pearl electric bulb suspended in the middle near the back.

The primary disadvantage of this type of trap is, of course, that the illumination is given out, and the insects enter, at one side only and for this reason the type of trap described by Williams (*Trans. R. Ent. Soc. Lond.*, **83**: 523) and de Worms (*Entom.*, **63**: 226), in which the insects enter at all four sides, would probably be more efficient. The chief advantage of the large box type is that there is plenty of room inside for the insects to fly around and consequently less chance of their escaping, as nothing was used to kill or quieten them once they were inside the trap. I also used a smaller trap, two and a half feet square and illuminated by a 40-watt bulb, but this was much less efficient. In previous years I had experimented with different sizes and arrived at the conclusion that the larger the trap the greater its efficiency, not merely for attracting the insects, but for retaining them after their entry into the trap. Even in the large trap the proportion of escapes was probably high, perhaps 15-30% of the moths; or, at least, the larger and more active species, entering the trap, were not there in the morning, but in the smaller trap perhaps at least half, if not more, escaped. Naturally, the proportion of escapes was higher amongst the larger and more active Agrotidae than amongst the Microlepidoptera and probably few of the Tineina ever escaped. In the trap the moths tend to fly up and down the glass and for this reason there is probably less chance of their escaping from a trap with a vertical aperture than from one in which the entrance is horizontal.

The large trap was in use in my garden at Seapoint, Co. Dublin, during the summers of 1936-39 every night from about the middle of April to the end of October and in it were captured 310 species, or 28% of the total definitely recorded Irish Lepidoptera. The small trap was in use at Flesk, Killarney, Co. Kerry, for about ten days during August 1936 and 1937, and from the middle of June to the middle of July 1939. In this 41 additional species were taken, bringing the total up to 348, or 31.3%.

The Seapoint trap was elevated about five feet from the ground on four railway sleepers and faced north, over Dublin bay. It overlooked a garden, with fruit trees and various shrubs and plants, at the end of which there is a sloping grassy bank, about thirty feet high, followed

by a small area of waste ground bordered on the far side by a railway, on the other side of which there is a high wall separating it from the sea. On either side of the trap, about 15 yards away, was a house with a road in front, the garden being situated between the ends of two blind roads which were strongly lit with arc lamps until 0.30 a.m. every night. One of these lamps shone directly on the front of the trap from each side, with the result that they probably attracted the majority of insects before 0.30, and most of those entering the trap must have done so between that time and dawn. About 30 yards behind the trap was another house and behind, or rather in front of, this main road which was well lighted all night.

The situation was by no means favourable for Lepidoptera, as the nearest open country is at least two miles away behind the trap, the nearest woodland and heath over three miles to the south, and the nearest ponds or streams about two miles away in any direction; there are no sandhills on this, the south, side of the bay, but there are extensive areas about five miles away directly across the bay and extensive heaths and some woodland at Howth, also on the north side of the bay and about six miles away. I consider it probable that many of the heath and sandhill species came directly across the bay from Howth rather than up along the coast from Killiney or other locality.

The species of Lepidoptera captured during the four years were made up as follows, the figures in brackets representing the number of species, taken in the trap at Killarney, which were not taken at Seapoint:

	Spp. captured.	Total Irish spp.	% of total Irish spp.
Bombyces, etc.	20 (+3)	90	22 (+3)
Noctuidae (Agrotidae)	82 (+3)	220	37 (+1)
Geometridae	44 (+15)	204	24 (+8)
Pyralidae, etc.	42 (+8)	98	42 (+8)
Tortricina	51 (+2)	194	26 (+1)
Tineina	71 (+10)	300	24 (+3)
Total	310 (+41)	1106	28 (+3)

In addition, ten species of Trichoptera, all Limnophilidae, were taken at Seapoint and two more, both Leptoceridae, at Killarney. As stated above, the nearest breeding-ground for these insects is about two miles away from Seapoint.

The species of Lepidoptera may be divided into four groups: *i.* Rare: those of which not more than three specimens were taken over the period of four years, and in most cases only one or two specimens; *ii.* Occasional: those of which more than three specimens were taken but which did not occur every year; *iii.* Frequent: those which occurred every year but not in any numbers; *iv.* Common: those which occurred in considerable numbers every year. The following are the proportions taken in the Seapoint trap:

	Rare.	Occasional.	Frequent.	Common.
Bombyces, etc.	35 %	20 %	30 %	15 %
Noctuidae (Agrotidae)	28 %	20 %	33 %	18 %
Geometridae	25 %	14 %	41 %	18 %
Pyralidae, etc.	19 %	26 %	14 %	41 %
Tortricina	37 %	18 %	22 %	24 %
Tineina	24 %	16 %	28 %	32 %
Average	27 %	19 %	28 %	25 %

Over half (53%) of the species taken at Seapoint came in each of the four years, but only about 45% of the Bombyces and Tortrices were regular visitors, while about 60% of the Tineina and Geometridae were regular. The fact that the Geometridae in general fly early in the night probably accounts for the fact that only 24% of the total Irish species appeared, as compared with a general average of 28%. The low proportion of Bombyces (22%) was probably due to the general scarcity of most of the species in Ireland, and the low proportion of Tortrices and Tineina to their weaker powers of flight and more localised distribution, while the large proportion of Noctuids (37%) may be due to their strong powers of flight.

Many interesting species were captured, including a number new to the Irish list, all Microlepidoptera with the exception of *Plusia moneta*. A particularly interesting species is *Eumichtis lichenea*, which occurred in large numbers every autumn, as many as 147 in a single night—far commoner than any other species of Noctuid during September. There were only four previous Irish records for this species, odd specimens from three localities in Co. Dublin and a record from Rossbeigh, Co. Kerry. It apparently flies very late at night, perhaps just before dawn, and certainly later than 0.30. The Irish specimens are green and strongly marked and tend to be large in size.

The following is a list of the species captured, specimens marked "Killarney" were taken in the Killarney trap, but not at Seapoint, the remarks as to the abundance or otherwise of each species apply to Seapoint only:

Sphingidae. 1 sp.
Laothoë populi. Frequent.
Notodontidae. 5 spp.
Pheosia tremula. Rare.
P. gnoma (*dictaeoides*). Rare.
Notodonta ziczac. Rare.
Lophopteryx capucina (*camelina*). Rare.
Phalera bucephala. Frequent.
Thyatiridae. 2 spp.
Habrosyne derasa (*pyritoides*). Rare.
Thyatira batis. Rare.
Drepanidae. 1 sp.
Cilix glaucata. Frequent.
Nolidae. 1 sp.
Celama confusalis. Occasional.
Arctiidae. 9 spp.
Spilosoma lubricipeda (*menthastri*). Common.
S. lutea (*lubricipeda*). Common.
Diacrisia sannio. Killarney.
Arctia caia. Occasional.
Callimorpha jacobaeae. Occasional.
Nudaria mundana. Frequent.
Lithosia quadra. Rare.
Eilema lurideola. Frequent.
E. deplana. Killarney.
Noctuidae (Agrotidae). 85 spp.
Apantele (*Acronicta*) *psi*. Frequent.
Cryphina (*Bryophila*) *perla*. Common.
Agrotis segetum. Frequent.
A. vestigialis. Occasional.
A. trux (*lunigera*). Rare.
A. exclamationis. Common.
A. ipsilon (*suffusa*). Frequent.
A. ripae. Rare.
Euxoa nigricans. Rare.
E. tritici. Frequent.
Lycophotia varia (*porphyrea*). Frequent.
Graphiphora augur. Rare.
Amathes c-nigrum. Frequent.
A. xanthographa. Common.
A. sexstrigata (*umbrosa*). Frequent.
Diarsia brunnea. Frequent.
D. festiva. Frequent.
D. rubi. Frequent.
Ochropleura plecta. Rare.
Axylia putris. Killarney.
Triphaena comes. Frequent.
T. pronuba. Common.
T. ianthina. Frequent.
Mamestra brassicae. Frequent.
Diataraxia oleracea. Common.
Hadena nana. Occasional.
H. cucubali (*rivularis*). Occasional
H. bicruris (*capsincola*). Occasional.
H. lepida (*carpophaga*). Occasional.
Tholera popularis. Occasional.
Cerapteryx graminis. Frequent.
Eumichtis adusta. Frequent.
E. lichenea. Common.
Dryobates protea. Rare.
Luperina testacea. Common.
Apamea obscura (*ravida*). Occasional.

A. sordens (*basilinea*). Occasional.
A. secalis. Frequent.
A. ophiogramma. Rare.
A. crenata (*rurea*). Frequent.
A. lithoxylea. Occasional.
A. monoglypha. Common.
Procus strigilis. Occasional.
P. fasciuncula. Occasional.
Antitype chi. Occasional.
Meganephria oxyacanthae. Rare.
Euplexia lucipara. Rare.
Phlogophora meticulosa. Frequent.
Naenia typica. Frequent.
Hydroecia oculea (*nictitans*). Frequent.
H. micacea. Common.
Arenostola pygmina (*fulva*). Rare.
Rhizedra lutosa. Rare.
Leucania pallens. Common.
L. impura. Common.
L. comma. Frequent.
L. lithargyria. Occasional.
L. conigera. Frequent.
Meristis trigrammica. Frequent.
Caradrina clavipalpis. Occasional.
Amphipyra pyramidea. Rare.
A. tragopoginis. Frequent.
Orthosia gothica. Common.
O. stabilis. Common.
O. advena (*opima*). Rare.
Cosmia trapezina. Rare.
Omphaloscelis lunosa. Common.
Agrochola circellaris. Rare.
A. lychnidis. Rare.
Citria lutea (*flavago*). Killarney.
Xylocampa areola. Occasional.
Cucullia umbratica. Occasional.
Pyrrhia umbra. Occasional.
Eustrotia uncula. Killarney.
Rivula sericealis. Frequent.
Scoliopteryx libatrix. Rare.
Polychrysia moneta. Rare.
Plusia chrysitis. Frequent.
P. bractea. Rare.
P. festucae. Rare.
P. pulchrina. Rare.
P. ni. Frequent.
P. gamma. Common.
Abrostola triplasia. Rare.
A. tripartita. Rare.

Hypeninae. 3 spp.
Zanclognatha tarsipennalis. Rare.
Z. grisealis. Rare.
Hypena proboscidalis. Occasional.

Geometridae. 59 spp.
Pseudopterpna pruinata. Killarney.
Hipparchus papilionaria. Killarney.
Hemithea aestivaria. Common.
Sterrha aversata. Common.
S. biselata. Frequent.
Larentia clavaria (*cervinata*). Common.
Orthonitha mucronata (*plumbaria*). Killarney.
O. chenopodiata. Frequent.
Anaitis plagiata. Rare.
Operophtera brumata. Frequent.
Ecliptopera silaceata. Killarney.
Lygris prunata. Rare.
L. testata. Killarney.
L. pyraliata. Occasional.
Cidaria fulvata. Rare.
Dysstroma truncata. Frequent.
Chloroclysta miata. Frequent.
Thera firmata. Killarney.
T. obeliscata. Killarney.
Xanthorhoë ferrugata. Frequent.
X. designata. Occasional.
X. montanata. Common.
X. fluctuata. Common.
Colostygia pectinataria. Killarney.
Epirrhoë alternata (*socia*). Frequent.
Euphyia unangulata. Killarney.
Lyconometra ocellata. Killarney.
Perizoma alchemillata. Rare.
P. albulata. Frequent.
P. bifaciata. Rare.
Euphyia bilineata. Rare.
Hydriomena coerulata (*impluviata*). Frequent.
Earophila badiata. Frequent.
Caenotephria derivata. Rare.
Eupithecia centaureata. Common.
E. pulchellata. Frequent.
E. absinthiata. Occasional.
E. vulgata. Occasional.
3 other *Eupithecia* spp. 1 frequent and 2 rare.
Chloroclystis rectangulata. Frequent.
Orthonama lignata. Killarney.
Abraxas grossulariata. Frequent.
Cabera pusaria. Killarney.
C. exanthemata. Killarney.
Anagoga pulveraria. Rare.
Campaea margaritata. Rare.
Deuteronomos alniaria. Rare.
Selenia bilunaria. Common.
Gonodontis bidentata. Common.
Colotois pennaria. Occasional.
Crocallis elinguaria. Frequent.
Ourapteryx sambucaria. Frequent.
Opisthograptis luteolata. Frequent.
Cleora rhomboidaria. Occasional.
C. lichenaria. Killarney.
Ectropis crepuscularia. Killarney
Itame wauaria. Frequent.

Phycitidae. 7 spp.
Pempelia dilutella. Rare.
Salebria fusca. Rare.
Ephestia elutella. Occasional.
E. kuehniella. Occasional.
Homoeosoma binaevella. Killarney.
H. saxicola. Common.

Galleriadae. 2 spp.
Achrooia (*Meliphora*) *grisella*. Occasional.
Aphomia sociella. Common.

Crambidae. 9 spp.
Crambus pascuellus. Common.
C. culmellus. Common.
C. pratellus. Common.
C. hortuellus. Common.

C. perlellus. Common.
C. inquinatellus. Killarney.
C. geniculeus. Common.
C. tristellus. Common.
C. selasellus. Rare.
Pyraustidae. 21 spp.
Schoenobius mucronellus. Killarney.
Cataclysta stratiotata. Rare.
Hydrocampa nymphaeata. Killarney.
Notarcha ruralis. Frequent.
Eurrhypara hortulata (*urticata*). Frequent.
Phlyctaenia lutealis. Common.
P. ferrugalis. Common.
P. prunalis. Occasional.
P. fuscalis. Occasional.
P. sambucalis. Frequent.
Nomophila noctuella. Common.
Pyrausta purpuralis. Killarney.
P. cespitalis. Killarney.
P. olivalis. Frequent.
Scoparia angustea. Occasional.
S. resinea. Rare.
S. cembrae. Occasional.
S. dubitalis. Common.
S. ambigualis. Common.
Evergestis straminalis. Killarney.
Mesographe forficalis. Common.
Pyralidae. 1 sp.
Pyralis farinalis. Rare.
Alucitidae. 7 spp.
Platyptilia gonodactyla. Frequent.
P. pallidactyla. Occasional.
Alucita pentadactyla. Occasional.
Pterophorus monodactylus. Common.
Stenoptilia bipunctidactyla. Common.
S. saxifragae. Common.
S. pterodactyla. Frequent.
Phaloniadae. 5 spp.
Phalonia cnicana. Rare.
P. atricapitana. Common.
Euxanthis straminea. Frequent.
E. zoegana. Common.
E. hamana. Common.
Tortricidae. 19 spp.
Cacoecia oporana (*podana*). Occasional.
C. rosana. Rare.
Pandemis ribeana. Common.
Tortrix paleana. Common.
T. viburniana. Rare.
T. forsterana. Occasional.
T. costana. Rare.
T. unifasciana. Frequent.
Cnephasia chrysantheana. Occasional.
C. conspersana. Frequent.
C. incertana. Common.
Argyrotoza bergmanniana. Frequent.
A. conwayana. Occasional.
Peronea holmiana. Frequent.
P. contaminana. Rare.
P. latifasciana (*schalleriana*). Common.
P. variegana. Common.
P. hastiana. Rare.
P. sparsana (*sponsana*). Rare.
Eucosmidae. 29 spp.
Spilonota ocellana. Common.
Acroclita naevana. Occasional.
Ancylis lundana. Frequent.
Notocelia uddmanniana. Occasional.
N. rosaecolana. Killarney.
N. suffusana (*trimaculana*). Rare.
N. aquana (*roborana*). Frequent.
Eucosma trimaculana. Rare.
E. cana. Common.
E. hohenwarthiana (*scopoliana*). Rare.
E. tripunctana. Common.
E. solandriana. Rare.
E. semifuscana. Rare.
Bactra lanceolana. Occasional.
Polychrosis dubitana (*littoralis*). Common.
Endothenia ericetana. Occasional.
E. antiquana. Occasional.
Argyroploce nubiferana (*variegana*). Frequent.
A. pruniana. Frequent.
A. striana. Rare.
A. lacunana. Frequent.
A. decrepitana (*bifasciana*). Rare.
Pammene fasciana (*juliana*). Killarney.
Pammene regiana. Rare.
Laspeyresia formosana (*woeberiana*). Rare.
L. pomonella. Rare.
L. succedana (*ulicetana*). Rare.
Gelechiadae. 16 spp.
Telphusa fugitivella. Rare.
T. vulgella. Rare.
Bryotropha domestica. Common.
B. terrella. Common.
Gelechia diffinis. Occasional.
G. mulinella. Occasional.
Phthorimaea plantaginella. Rare.
P. obsoletella. Occasional.
P. instabilella. Rare.
P. costella. Common.
P. leucomelanella. Rare.
Stomopteryx anthyllidella. Frequent.
S. sangiella. Frequent.
Acompsia cinerella. Killarney.
Anarsia spartiella. Frequent.
Brachmia rufescens. Rare.
Cosmopterygidae. 2 spp.
Blastodacna atra (*vinolentella*). Common.
Batrachedra praeangusta. Occasional.
Blastobastidae. 1 sp.
Blastobasis lignea. Common.
Oecophoridae. 12 spp.
Endrosis lactella. Common.
Borkhausenia fuscescens. Common.
B. pseudospretella. Common.
Carcina quercana. Frequent.
Depressaria heracliana. Occasional.

D. badiella. Occasional.
D. costosa. Frequent.
D. umbellana. Rare.
D. liturella. Rare.
D. assimilella. Killarney.
D. propinquella. Occasional.
D. yeatiana. Rare.
Orneodidae. 1 sp.
Orneodes hexadactyla. Rare.
Elachistidae. 6 spp.
Elachista cinereopunctella. Killarney.
E. atricomella. Common.
E. kilmunella. Rare.
E. obscurella. Killarney.
E. rhynchosporella. Rare.
E. cygnipennella. Common.
Hyponomeutidae. 6 spp.
Argyresthia semitestacella. Killarney.
Swammerdammia lutarea. Common.
S. pyrella. Frequent.
Prays curtisellus. Frequent.
Hyponomeuta padella. Frequent.
H. cognatella. Frequent.
Eupistidae (Coleophoridae). 8 spp.
Eupista (*Coleophora*) *spissicornis*. Frequent.
E. deauratella. Frequent.
E. frischella. Frequent.
E. pyrrhulipennella. Rare.
E. discordella. Frequent.
E. annulatella. Common.
E. apicella. Rare.
E. glaucicolella. Occasional.
Gracilariadae. 13 spp.
Lithocolletis messaniella. Common.
L. mespiliella (*pyrivorella*). Common.
Acrocerops brongniardella. Frequent.
Ornix guttea. Rare.
O. anglicella. Common.
O. scoticella. Common.
O. betulae. Killarney.
Gracilaria phasianipennella. Killarney.
G. syringella. Occasional.
G. tringipennella. Common.
G. elongella. Rare.
G. alchimiella. Rare.
G. stigmatella. Killarney.
Epermeniadae. 1 sp.
Epermenia chaerophyllella. Frequent.
Plutellidae. 4 spp.
Cerostoma xylostella. Common.
C. vittella. Frequent.
Plutella porrectella. Occasional.
P. maculipennis. Common.
Lyonetiadae. 4 spp.
Opostega salaciella. Killarney.
Leucoptera laburnella. Frequent.
Lyonetia clerckella. Occasional.
Tischeria marginea. Frequent.
Tineidae. 6 spp.
Monopis rusticella. Frequent.
M. ferruginella. Common.
Tinea cloacella. Common.
T. insectella (*misella*). Killarney.
T. lapella. Frequent.
T. semifulvella. Common.
Hepialidae. 4 spp.
Hepialus humuli. Frequent.
H. fusconebulosus. Occasional.
H. lupulinus. Frequent.
H. hectus. Killarney.

TRICHOPTERA.

Limnophilidae. 10 spp.
Glyphotaelius pellucidus.
Limnophilus lunatus.
L. vittatus.
L. auricula.
L. hirsutus.
L. luridus.
L. sparsus.
Stenophylax permixta.
Micropterna sequax.
Halesus digitatus.
Leptoceridae. 2 spp.
Leptocerus albifrons. Killarney.
Mystacides azurea. Killarney.

"THE PTINIDAE OF ECONOMIC IMPORTANCE."

(By H. E. Hinton.)

Bull. Ent. Research, **31**, 331-81, 59 text figs. (1941).

This paper appears to us to be well written; the key to the species mentioned seems to be sound; the descriptions good; and the figures and dissections of the genitalia excellent.

This review must, of necessity, be imperfect, for we do not profess to possess the knowledge required to criticise the morphological part of the paper. To do this properly a study of the Ptinidae would require to have been made, extending over a period of many years. We are

only more or less well acquainted with the British Ptinidae, having taken all the well-established species and all but one or two of the more recently imported ones ourselves

Therefore, we can only accept the species mentioned to be such as the author considers them to be.

The paper, we believe, is chiefly based on the specimens in the fine general and British collections in the British Museum, so well arranged by our Dr Blair.

Considering this fact, the principal criticism we have to make is that the British point of view of the subject has not been sufficiently ventilated, and considerable information that the British coleopterist might ask for is wanting.

We propose to add some small details, which may be of interest, on some of the species dealt with.

Mezium affine, Boield. In fresh specimens the elytra are covered with fine yellow hairs. We have taken it alive in a sugar castor in a hotel at Windsor.

Gibbium psylloides, Czem. The *Gibbium scotias*, F., of nearly all the British catalogues, etc., was found by B. G. Rye, in 1893, in a beer cellar in a public-house in Shoe Lane in some numbers, and where we had the pleasure of taking it with him. The insects occurred in sawdust, etc., damp with the drippings from beer casks.

Niptus unicolor, Pill. & Mitterp. The *Niptus crenatus*, F., of nearly all the British catalogues, etc., occurred on the wall of an outdoor lavatory in a hotel at Windsor and in a bedroom at Old Windsor.

Niptus hololeucus, Fald. It has been found in some numbers in " penny-in-the-slot " meters, which seems curious. We took a specimen in a fungus dump in Windsor Forest. The only explanation appears to be that it had been introduced in the food for pheasants.

Trigonogenius globulus, Sol. Was first taken in Britain in corn refuse in a mill at Oldham in 1900 (Tomlin), and has since been spreading, occurring at Hoylake, Manchester, Birmingham, Gurningham, etc.

Eurostus hilleri, Reitt. Had not been recorded in Great Britain before 1939; Scotland (Howe, 1940); England (Blair, 1940); London, Liverpool, Newcastle, etc. Mr Hignett took it last year in a granary at Oswestry.

Ptinus raptor, Sturm. This species is not recorded as British by Hinton. It was recorded from Harrietsham, Kent, by Stephens in 1841, and there is a specimen in the National Collection labelled " Pentland."

Ptinus palliatus, Perris (1849). As this beetle has always been recorded as *P. germanus*, F., in British literature (except in *Beare Cat.*, 1930, and Newbery and Sharp's exchange list, 1915) the synonymy should have been given.

Ptinus lichenum, Marsh. Pool took it in the green mould (on which we believe it was feeding) on an old fence at Enfield, and where we also obtained it.

Ptinus exulans, Er. The late Frederick Bates took a number of specimens feeding in the dry carapace of a crab (Tropical) at Chiswick, and Tomlin records it in imported shells from Ealing and St Leonards.

Ptinus sexpunctatus, Panz. Is said to be " of no economic importance," but we doubt this, as Laing records it as damaging a lead roof and it is also often found in houses. We have taken it in houses at

Putney and in the tower of a house (" The Mansion," our father's country house) at Earls Shilton, Leicestershire, 1879.

Ptinus hirtellus, Sturm. The author gives the synonymy as *P. testaceus*, Oliver (1790), *P. brunneus*, Duftschmidt (1825), *P. hirtellus*, Sturm (1837), and points out that as *P. testaceus*, Oliv., is a homonym of *P. testaceus*, Thunb, 1784, and *P. brunneus*, Duft., is a homonym of *P. brunneus*, Gemelin, 1789, *P. hirtellus*, Strm., is the earliest available name for this species. This is the insect taken in some numbers by Hignett by beating dry skulls of cattle in a tannery at Oswestry, and where we took it with him in 1935. In the British Collection, beyond the specimens presented by Hignet and oneself, there are only two others, ♀♀, taken by Power at Birdbrook and Mickleham, and considered by Hinton to be this species. One bears a label *brunneus* in pencil. A specimen which we recorded as *P. brunneus*, Duft., on the authority of Fowler and Gorham, was taken by us on Purley Downs among dead leaves in 1892. This we had personally determined as *P. subpilosus*, Sturm, and Hinton agrees with this determination. *P. brunneus*, Duft., has also been recorded in Britain from Bermondsey, Smallheath, Knowle, Edmonton, Oxford district, and Reading. It is decidedly doubtful if these are all *P. hirtellus*, Sturm.

Ptinus latro, F. There are only two specimens in the British Collection now standing under that name (teste Hinton) from Symons Tolley. Fowler states that on the authority of two examples in Mr Waterhouse's Collection, one from an old Collection with no history, and the other labelled " Scotland, Turner," Waterhouse apparently introduced the species into his catalogue. These specimens should be in the Royal Scottish Museum, Edinburgh, now.

The specimen we took in a bathroom in Kensington Mansions, and recorded as *P. latro*, F., Hinton considers to be a large form, or var., of *hirtellus*, Strm. To our mind it is certainly not a typical specimen of *hirtellus*, even if it is that species at all; though, of course, it is not the *latro* of Hinton's paper. It agreed exactly with a foreign specimen of *latro* in the collection of the late Frederick Bates.

Ptinus pilosus, Müll. This species is left out of Hinton's paper altogether. Fowler records it as from Horsell and Enfield (Power), Chatham, and Tilgate. Hinton has determined the two Power specimens as *subpilosus*, Strm. It stands in Beare's Catalogue (1930) as a British species; and, in any case, as our author states, that " embodied in this paper is a revision of all the British species of the family *Ptinidae*," it should at least have been mentioned.—HORACE DONISTHORPE, Entomological Department, British Museum (Natural History).

COLLECTING NOTES.

ACRONICTA EUPHORBIAE, FAB., IN ROSS-SHIRE.—Some time ago I had occasion to cross Ross-shire and, in doing so, was compelled to camp just under Ben Wyvis. Naturally, I took advantage of the fact to study the insect fauna of the adjoining moorlands, when quite a number of larvae rewarded my efforts. Amongst these, I was greatly surprised to capture all three members of the *Acronicta euphorbiae* group feeding on

the same patch of " Eared Sallow " (*Salix aurita*) bushes. Of the three species concerned, I have taken *A. euphorbiae* itself from birch, sallow, and heather on the Isles of South Rona and Raasay and from sweet gale in Coll. *A. menyanthidis*, for the most part, has been obtained from birch, although captures from sweet gale, heather, and sallow formed the bag in the Outer Hebrides; whilst at least 80% of the *A. rumicis* larvae came from Iris, both in the Inner and Outer Isles.—Prof. J. W. Heslop Harrison, King's College, University of Durham.

Lycia hirtaria, Cl., in Morayshire.—For many years I was acquainted with the existence of a colony of this insect on birches on the Culbin Sands a mile of two from Forres. However, I fear that this insect no longer exists there—a state of affairs brought about by the felling of the bulk of the birches and their replacement by conifers. Still, it is pleasant to be able to record that the species may still be obtained in the district for I have beaten larvae from ash (*Fraxinus excelsior*) in an old quarry lying south of the Altyre Woods, themselves two or three miles south of Forres.—Prof. J. W. Heslop Harrison, University of Durham.

A Scottish Occurrence of Nonagria typhae, Thunb.—If one is to believe Meyrick, the British range of this insect is " England, Ireland, local." This, however, seems to be almost impossible in view of the fact that the insect exists in every suitable locality with which I am acquainted in Northumberland and Durham. Moreover, to my certain knowledge a strong colony exists far to the north of Scotland on a large bed of *Typha latifolia* growing in the old course of the Findhorn river, a mile or two west of its present mouth. Surely other habitats exist in the area between Northumberland and Morayshire? That the insect is overlooked is amply demonstrated by the fact that, for *Nonagria typhae*, Robson, in his " Catalogue of the Lepidoptera of Northumberland and Durham," was only able to report it from North Northumberland in our area. In spite of this, it occurs in many parts in both counties, one within the Borough of Gateshead!—Prof. J. W. Heslop Harrison, University of Durham.

The Northern Limits of Apocheima hispidaria, F.—For this interesting insect Meyrick supplies the range " England to York, local." In making this statement he has evidently overlooked Robson's record in his " Catalogue " of an occurrence in Chopwell Woods, Co. Durham, in which station it still exists. In addition, I have detected it in two Northumbrian localities, one on each side of the Tyne. In one of these, at Styford, I beat larvae from oak whilst in the other, in a wood lying along the Devil's Water, larvae were secured in numbers from wych elm. As they came down a curious combination of captures was obtained in the form of *Oporabia christyi* and *A. hispidaria*. The *hispidaria* forms bred were very light examples, indeed; in fact they were the palest I have ever seen!—Prof. J. W. Heslop Harrison, King's College, University of Dudham.

Callophrys rubi, L., in the two North-eastern Counties.—Of the " Green Hair Streak " Robson's " Catalogue " remains silent. Until recently it was supposed to be absent from our district although far from rare in the *Vaccinium* areas of the adjacent Cleveland district of

the North Riding of Yorkshire. The "ice" was broken by my detection of the insect on Waldridge Fell in Durham followed almost immediately by its discovery in Dipton Woods, Northumberland, by Mr J. R. Johnson and Major F. W. Gardner. Next, it turned up in the Shull area of Durham, and lastly, its occurrence last season in Redesdale in North Northumberland provided a station for the Watsonian vice-county 68. In my opinion it will be found to exist in many other places where bilberry grows in sufficient quantity.—Prof. J. W. HESLOP HARRISON, King's College, University of Durham.

THE REPUTED OCCURRENCE OF LIGDIA ADUSTATA, SCHIFF., AND OF XANTHIA CITRAGO, L., IN THE OUTER HEBRIDES.—Meyrick and South both report these two insects from the Outer Hebrides, and there can be no doubt but that they are relying upon the material discussed in the paper appearing in the 1888 *Entomologist* (Vol. xxi, pp. 24-27). Frankly, I cannot understand these records, for the first named insect feeds on Spindle-tree (*Euonymus europaeus*) and the second on lime (*Tilia europaea*), neither of which plants grows, or is likely to grow, in the Outer Isles. Can anyone throw light on the matter If they can, are they able to supply the exact localities of the captures? As is probably well known, this Department is preparing a Flora of the Inner and Outer Hebrides, and it will be seen that the reported occurrence of these species there, if not a mistake, has a direct bearing on our work.—Prof. J. W. HESLOP HARRISON, King's College, University of Durham.

RANDOM NOTES FROM EAST TYRONE, 1940.—After a very hard winter with much frost and heavy snow, *Philedone prodromana* first appeared on 5th April, the ♂s flying in plenty over the heather; *Nymphalis io* and *Aglais urticae* were observed.

On 11th April at the sallows *Taeniocampa gracilis* was fairly common and varied from almost white to a deep pink form; *Nothopteryx* (*Lobophora*) *carpinata* and *Earophila* (*Anticlea*) *badiata* were flitting around the bushes.

On the 24th, the first of a brood of *Diaphora mendica* race *rustica* emerged; some of the ♂s with forewings light buff and hindwings smoky-grey; later ♀s were fairly common flying in the afternoon sun. The form named *venosa* by the late Robert Adkin (*Entom.*, **59**, 1922, p. 79) came from this district; a worn ♀ obtained in May 1918, which laid a few ova, when boxed (*Entom. Record*, **31**, 1919, p. 73) was sent to T. Salvage of Arlington, who supplied Mr Adkin with this form. Needless to state, this streaked form has not been found at large since.

On 4th May *Eucosma immundana*, Spring emergence, were flying in numbers around birch and alder; and *Ancylis lundana* and *Laspeyresia perlepidana* were abundant in rough meadows among *Lathyrus pratensis*. An aberration of *Euchloë cardamines* ♂ was taken on the 7th with discoidal spot very small on left forewing and large on the right.

Near Pomeroy, on the 28th, in a deep valley beside the railway which here has a stiff rise of 650 feet to overcome on its passage through the Tyrone hills on the way to Omagh, in damp meadows *Pieris napi* was flying in swarms and some nice dark forms were selected. *Heodes* (*Lycaena*) *phlaeas* was also abundant, but with little variation; it was here in May 1939 that a fine golden aberration was found; *Euclidia mi* was frequent, and a number of *Eupithecia pygmaeata* were netted flying

over *Cerastium*, the food plant here; several *Ortholitha umbrifera* were disturbed from gorse.

Just before leaving a nice pale yellow ♂ *E. cardamines* was taken.

On 1st June *Euclidia glyphica* was observed in a boggy meadow with numbers of *Procris statices*.

At Cregganconroe a heather covered hill crowned with a rocky outcrop, on the 2nd, *Calostigia salicata* was in numbers at rest on the rocks, *Tortrix rusticana* was flying over *Myrica gale*, and *Eulia politana* among the heather.

D. mendica race *rustica* ♀ was again observed on 3rd June, a very late date; and ♂s of *Euphydryas* (*Melitaea*) *aurinia* freshly emerged were flying in a damp meadow, other scabious frequenting lepidoptera present at the same time were *Chlidonia baumanniana* and *Endothenia oblonguna* (*marginana*).

On the 5th *Ligdia adustata* and *Hydriomena ruberata* were beaten out of rough hedges consisting mainly of sallow and some *Euonymus*; birch scrub produced *Cosymbia pendularia* and numbers of *Eulia ministrana*.

At Altadiawan glen on the 6th *Lycaenopsis argiolus* was common flying over hollies on the steep hillside. On the hills near Pomeroy on the 16th the ♂s of *Polyommatus icarus* race *clara* were just out, and the first *Zygaena lonicerae* emerged from collected cocoons; these later produced several confluent aberrations. The habitat here is a very swampy meadow often flooded; the cocoons are generally formed on rushes; if left *in situ* a great many are destroyed by the Reed Bunting, which tears them open and eats the enclosed pupae.—Thomas Greer, Dungannon, Co. Tyrone. (*To be continued.*)

Notes on Variation from the Worthing Museum Collection. II. —*C. minimus*.—Specimens from France and Switzerland differ slightly in size from the English, being on the average rather larger. In Italy I have always found this species scarce. Three specimens which I took at Bödö in the Arctic Circle came rather as a surprise, one of these is very small. The form *alsoides*, which is racial in the Laquinthal on the Simplon Pass, is very large, the largest specimens being quite as large as an average English *icarus*; those which I have seen from the other side of the pass near the 6th Refuge are not quite so large.

P. icarus.—There is a long and very varied series of ♀s from the N. and S. Downs, the Chilterns, the Cotswolds, Royston, Witherslack, and Bude, ranging from entirely brown to entirely blue up to the border of orange spots; the finest of all are from Grange-over-Sands. Specimens of the 2nd brood always average smaller than those of the 1st brood, the blue ♀s being also commoner in the latter, though the blue, when it occurs, is quite as bright in the former. In the N. of England where it is single brooded the specimens are considerably larger than those of the double-brooded areas. The finest of all come from Borrowdale, those from E. Durham are not quite so large, especially the ♀s; all of the latter show a good deal of rather dull blue. In single-brooded areas they are out in July. ♀s from Derry, though larger, are no brighter than those from the N. Downs, Chilterns, and Cotswolds. French specimens from Aix-les-Bains are very much like English ones except that blue on the ♀s is rare and dull. The same is true of most of the Swiss forms, but those from the Rhone Valley are larger. Further south the

♀s show no blue except for one 2nd brood ♀ from Digne, though there is also a very slight trace of dull blue on two small ♀s from Granada. This holds good for all those from the Lido and elsewhere in Italy (three broods), from Corsica, the Tyrol, Cyprus, and Palestine, the last two are rather small, and those from Palestine have small spots on the underside, which is unusually light. Amongst the Italian specimens those from Assisi, Palena in the Abruzzi and Subiaco are generally large except for the 3rd brood which is small. The underside of Italian ♂s varies much in colour, but a beautiful golden-brown is quite common. There is also a ♂ from Guernsey with a deep brown underside having quite the appearance of a ♀.

Specimens from Finland and Scandinavia are generally large, but one or two from within the Arctic Circle are small, though this is exceptional. There is a very fine ab. *striata* from Veytaux, a good ab. *semi-persica* from Bex, and a good ab. *persica* from Altmatt. Ab. *arcua* is frequent; there are specimens from England, France, Switzerland, and Italy. Neither ab. *iphis* nor ab. *icarinus* is at all uncommon, most of the specimens however come from England and Switzerland.

The ♂ form *celina* is a southern one and does not appear to be racial anywhere. It occurs in specimens from Corsica, Turkey, Cyprus, and Palestine, and is common in some parts of Italy, e.g., Assisi, Sulmona, and the Lido, but the black spots vary very much in size and distinctness, those from Palestine look as if they showed through from the underside. The most strongly marked specimens come from the most northern locality, Faido, the only Swiss specimens I have ever seen.

A. thersites.—This species has never so far been taken so far north as England, but was for so long looked upon as *P. icarus* ab. *icarinus*, that it would be quite worth while keeping a look out for it. The simplest means of distinguishing the two is to be found on the underside of the hindwing. In *icarus* (and of course *icarinus*) the first orange spot is much further removed from the 1st of the post-discal row than in *thersites*, or to put it in another way, if lines were drawn making a triangle with the 1st orange spot and the first two of the post-discal row, it would be an acute-angled, or at the most a right-angled, one in *thersites*, whereas in *icarus* it would be definitely obtuse-angled. The specimens in this museum show how one may be deceived by those in any one collection. There are a number of specimens here from France, Switzerland, Italy (San Gimignano) and Bulgaria, and one would say that the ♀s very rarely exhibited any trace of blue, whereas both Mr Warren and Mr Temperley (*Ent. Rec.*, xxv, p. 255) have taken in the Rhone Valley specimens showing almost as much variety in this respect as *icarus* in the same district. The series here shows great variation in the matter of size; the largest is from Bourg-St-Maurice, where it is probably single brooded. In lower localities it is regularly double brooded.—Rev. G. Wheeler, M.A., F.R.E.S.

CURRENT NOTE.

Recent obituaries of well-known Entomologists include Dr Hans Rebel (born 2.ix.1861, died 19.v.40), the eminent Austrian lepidopterist; Dr Felix Santschi (born 1.xii.1872, died 20.xi.1940), the Swiss myrmecologist; and William Holland Ballett Fletcher (died 4.iii.1941, aged 88), who was the most senior Fellow of the Royal Entomological Society.

var. *intricata*, Gn. (Culot), V, 383, " Noct." Atlas, plt. 8, f. 13 (1852).

Fig.—Culot, *N. et G.*, I (2), p. 7, plt. 39, f. 2 (1914).

Orig. Descrip.—" The form *intricata* (which it is not necessary to confound with *intricata*, according to Duponchel, this latter being a variety of *vau-punctatum*), has almost no markings on the upper wings which are of a uniform reddish-brown. One can see, however, a darker subterminal series of dots."

The form considered as the type and which has been represented by Hübner under No. 176 has the markings of the forewings thinly emphasized, but clear.

Culot adds the following:—"" Perhaps one can place to *erythrocephala* a variety wholly black, of an *Orrhodia* which has been met with at Tarf, near La Balle, on the Algerian littoral. This is probable but not certain."

ab. *impunctata*, Splr., *Schm. Eur.*, I, 254 (1907).

Orig. Descrip.—" The black spots in the reniform may be wanting."

ab. *glabra-impunctata*, Splr., *Schm. Eur.*, I, 254 (1907).

Orig. Descrip.—" The black spots may be wanting in the ab. *glabra*, Hb., but very seldom."

f. *unicolor*, D. Luc., *Ann. Soc. ent. Fr.*, 482 (1910).

Orig. Descrip.—" Alis anticis supra unicoloribus nigris." Tarf, Algeria.

" Forewings above unicolorous and of a very clear black." Some examples have the stigmata distinct as well as the black line near the apex, and some examples are clouded with a reddish-brown in place of a uniform black. This is a melanic form.

r. *lucasi*, Culot, Obthr., *Lép. Comp.*, XVI, 119 (1918).

Fig.—Culot's fig., *N. et G.*, I (1), plt. 39, 5.

Orig. Descrip.—" Of a very deep and shining black-brown, with the subterminal dots and some small spots near the reniform of a dull black." Algeria.

Culot said:—" This is an extreme melanic aberration of the Algerian form. The upper wings and the thorax are of a very deep black-brown and glossy, with subterminal dots and some small spots near the reniform of a dead black. It is quite possible that *lucasi* constitutes a distinct species. Analogous melanic forms, but specifically different, have been found at Aflou in the S. Oran."

ab. *caeca*, Lempke, *Ent. Rec.*, XLVI, 89 (1934), *Onze Vlinders*, 215 (1902-3).

Orig. Descrip.—" The lower half of the reniform is usually sharply filled with black, but not always. These sub-varieties could be named *caeca*." Holland. This is a redundant name for *impunctata*.

Dasycampa, Gn. (1852), Dup., Barr. (Sth.), Culot [*Cerastis*, Hb. (1821), Frr.: *Conistra*, Hb. (1821), Meyr., Hamp., Warr.-Stz., Meyr.: *Orrhodia*, Hb. (1821), H.-S., Stdgr., Sth., Splr.: *Glaea* (Hb., 1806), Steph. (1829)] *rubiginea*, Fb. (1787).

Schiff., *Verz.*, 86, R. 8 (1775), first introduced the name *rubiginea* for a Noctua whose larva fed on the wild apple (*Pyrus malus*). Fabricius was the first to describe it and adopted the name from Schiff., who gave no description.

Also *l.c.*, S. 8, Schiff. gave the name *sulphurago* to a Noctua whose larva fed on *Betula alba*. This name was stated by Illiger, *Rev. Verz.*, I, 507 (1801), to be the *tigerina*, Esp., which latter name would fall to *sulphurago*, were there any description by Schiff. But *sulphurago* is, teste Werne., *l.c.*, I, 212, the *fulvago* of Clerck, and now held to be a good species.

Tutt, *Brit. Noct.*, III, 7 (1892): Meyr., *Hand.*, 65 (1895): Barr., *Lep. Br. Is.*, VI, 6, plt. 233, f. 2 (1900): Stdgr., *Cat.*, IIIed., 210 (1901): Hamps., *Lep. Phal.*, VI, 457 (1906): Splr., *Schm. Eur.*, I, 287, plt. 47, 1 (1907): South, *M.B.I.*, II, 26, plt. 11, f. 11-12 (1908): Warr.-Stz., *Pal. Noct.*, III, 148, plt. 36 e (1910): Culot, *N. et G.*, II, 15, plt. 40, f. 14-16 (1914): Meyr., *Rev. Hand.*, 118 (1928).

Ernst & Engr., *Pap. d'Eur.*, VII, 19, fig. 418, and p. 150, fig. 512 c (1790). The former figure is a fairly good figure of *rubiginea*; the latter is said to be a f. of *tigerina*, Esp., but it is doubtful as a *rubiginea* form.

Werneburg, *Beitr.*, II, 115 (1864), considered f. 418 as *rubiginea*, and also f. 417, but this is probably a form of *vau-punctatum*, there is no tint of *rubiginea* shown. He also considered f. 512 as the form *tigerina*, a *rubiginea* form.

Esp., *Abbild.*, IV, 330, plt. 123 (1788-?), gave two figures (3 and 4) labelled *tigerina*, which have been considered as forms of *rubiginea*, Fb. The colour in my copy is too ochraceous without any of the usual deep red-brown. Fig. 3, ♂. Fig. 4, ♀. Esp. said figs. 5 and 6 resembled the same species, and were very closely related to *vaccinii*.

In his text Esper gave the description of *rubiginea*, Fab. (1787), and thus his text and plate were published after that appeared; he gave the *Verz.*, Schiff., as a reference.

Werneb., *Beitr.*, II, 41 (1864), considered figs. 3 and 4, *tigerina*, as a form of *rubiginea*, but figs. 5 and 6, *conigera* and *trigrammica* respectively.

Bork., *Naturg.*, IV, 679 (*sulphurago*): 750 (*rubiginea*) (1792), said that the former was the *tigerina*, Esp., i.e., a form of *rubiginea*, and not a separate species.

Hb., *Samml. Noct.*, *pulverea*, Hb., 169, and *neurodes*, Hb., 568, are certainly not *rubiginea*, but probably *dolosa*, Hb., or *veronicae*, Hb. Fig. 183 is a good average of the typical form. Gn. suggested *pulverea*, Hb., was *dolosa*.

Dup., *Hist. Nat.*, VII (1), 137, plt. 109, f. 6 (1827), gave an excellent figure of a somewhat sparsely marked form of this species. He gave *sulphurago* and *tigerina* as synonyms, probably from Esper's work.

Frr., *Neu. Beitr.*, I, 84, plt. 45 (1838), gave a figure of an unusual form, a transition to the ab. *unicolor*, Tutt, in which there are very sparse markings. It is quite good.

H.-S., *Sys. Bearb.*, II, 322 (1850), said that Frr., f. 45, was recognizable; that Hb., 183, was a small and sharply black-dotted example; and that *sulphurago*, Bork., was a form of *rubiginea*, W. V.

Stdgr., *Cat.*, IIIed., 210 (1901), queried the forms *neurodes*, Hb., *pulverea*, Hb., and *rubigo*, Rmbr. (1871), also ab. *vaccinii*, Gn., var. D, V (1), 380.

Splr., *Schm. Eur.*, I, 257 (1907), 363 (1908), said that the figures on plt. 8, 4-5, in *Ann. Soc. Ent. Fr.*, could, in his opinion, only denote a form of *ligula* referred to on *l.c.*, p. 314, as *staudingeri*, Gras., and he could not see that the text on *l.c.*, pp. 318-319, referred to anything but a *rubiginea* form, therefore he substituted the name *obscura*, Splr., for the name *staudingeri*, Grasl., of the corresponding form in the species *rubiginea*, Fb., which had also been referred to the same figures, and causing confusion.

Splr., *Schm. Eur.*, I, 257, plt. 47, f. 1, gave a dark figure of the typical form but too much influenced by the dominant rich brown colour of the plate.

South, *M.B.I.*, II, 26, plt. 11, f. 11-12 (1908), gave two good figures, 11 typical, and 12 transition to *unicolor*, Tutt.

Warr.-Stz., *Pal. Noct.*, III, 148 (1910), considered *pulverea*, Hb., *neurodes*, Hb., and *rubigo*, Ramb., as representing typical forms, and only recognized the four forms *tigerina*, Esp., *unicolor*, Tutt, *modesta*, Hamps., and *completa*, Hamps. (note the error in the authors of the last two). They gave four good figures: *rubiginea* ♂ and ♀, *tigerina*, and *completa* on plt. 36 e (1910).

Culot, *N. et. G.*, II, 15, plt. 40, f. 14-18; plt. 41, f. 1-4 (1914), gave a series of excellent figures. Oberthür had in *Bull. Soc. Ent. Fr.* (1900), p. 352, etc., discussed the variation of this species and in some cases the Stdgr., *Cat.*, IIIed., 1901, is in conflict owing, no doubt, to the death of the latter author before he had finished his final revision of the *Catalog*. Culot said that Oberthür and Staudinger had been in collaboration shortly previous to the death of the latter. Culot's figures were *rubiginea*, plt. 40, f. 17; *modestina*, f. 14; *modesta*, f. 15; *ferevnicolor*, f. 16; *completa*, f. 18; *delicatula*, plt. 41, f. 1; *favrei*, f. 2; *graslini*, f. 3-4. He named one of Barrett's figures, viz., plt. 233, f. 2 b, from the collection of Sydney Webb, as ab. *barretti*.

Barrett summed the Variation as follows:—

Slightly variable in the degree of black dotting over the surface of the forewings and rather more so in the orange red dappling; sometimes this colour in a great measure suffuses the whole surface, in which case the black dots are diminished in number or almost obliterated, and in a form, well known on the Continent, the colour is smooth orange-chestnut without other markings except small black dots in the reniform stigma and along the hind margin.

He referred to "a somewhat similar, but deeper red form, almost unicolorous but having one or two white dots on the costa."

And "Another suffused with red-brown."

The Names and Forms considered are:—

rubiginea, Schiff. (1775), *Verz.*, 86, R. 8. (No description.)
rubiginea, Fab. (1787), *Mant.*, II, 142.
tigerina, Esp. (1788-?), *Abbild.*, IV, 330, plt. 123, f. 3-4.
pulverea, Hb. (1800-3), *Samml. Noct.*, 169.
neurodes, Hb. (1809-13), *l.c.*, 568.
ab. *vaccinii*, Gn. (1852), *Hist. Nat.*, V (1), 380, 387.

staudingeri, Gras. (1863), *Ann. Soc. Ent. Fr.*, 314, plt. 8, f. 4-5.
rubigo, Rmbr. (1871), *Ann. Soc. Ent. Fr.*, 317.
fornax, Btlr. (1878), *Ann. Mag. Nat. Hist.*, V (1), 168.
ab. *unicolor*, Heylearts (1889), *Tijds.*, XXXIII, 38.
ab. *unicolor*, Tutt (1892), *Brit. Noct.*, II, 7 (invalid).
ab. *graslini*, Stdgr. (1901), *Cat.*, IIIed., 210.
ab. *obscura*, Splr. (1907), *Schm. Eur.*, I, 287, plt. 47, 1.
ab. *lusitanica*, Splr. (1907), *l.c.*
ab. *modesta*, Obthr. (1904), *Et. Lepid. Comp.*, 63, plt. 4, 42.
ab. *completa*, Obthr. (1904), *l.c.*, f. 43.
ab. *modestissima*, (Obthr.) Culot (1914), *N. et G.*, II, 16, plt. 40, 14.
ab. *fereunicolor*, (Obthr.) Culot, *l.c.*, plt. 40, 16.
ab. *delicatula*, (Obthr.) (1914) Culot, *l.c.*, plt. 41, f. 1.
ab. *favrei*, (Obthr.) Culot, *l.c.*, plt. 41, f. 2.
ab. *barretti*, (Obthr.) Culot, *l.c.* (Barr., *Lep. Brit. Is.*, plt. 233, f. 2 b.)
ab. *albistigma*, Danhl. (1925-6), *Ent. Zeits.*, XXXIX, 197.
ab. *euanthes*, Schultz (1930), *Int. Ent. Zts.*, XXIV, 167.
ab. *elsa*, Schultz (1930), *l.c.*
ab. *antimarginalis*, Dnhl. (1932), *Ent. Zeits.*, XLVI, 260.
ab. *albipuncta*, Thurm. (1938), *Mitt. Inst. Sofia*, XI, 155.

Tutt dealt with (1) *rubiginea*, Fab., the deep red and black spotted form; (2) ab. *tigerina*, Esp., a dark red-brown form, much more deeply marked; (3) *unicolor*, an almost unicolorous red-brown form.

rubiginea, Hb., fig. 183 [Culot, *N. et G.*, I (2), 15 (1914)].

FIG.—*l.c.*, plt. 40, f. 17.

ORIG. DESCRIP.—" This form Guenée described as typical: it is the most common everywhere. The forewings are of a fawn-yellow with the transverse shades deeper and the dots black. The lower wings are a blackish-brown, margined by a somewhat long fringe of a rose-fawn."

ab. *fornax*, Butlr., *Ann. Mag. N.H.*, V (1), 168 (1878).

DESCRIP.—Warren in Stz., *Pal. Noct.*, III, p. 146 (1910), redescribed this under Motschulsky's name *castaneofasciata*. " Very like *rubiginea*, Fb., perhaps only the larger Japanese form. Stdgr., as usual, ignores Motschulsky and sinks *fornax*, Btlr., as a synonym of *rubiginea*, Fb."

" The ground colour warmer, more fulvous rufous, the spots forming the lines more fuscous than black; the terminal area not so dark; hindwing paler, rufous along costa and termen, before which there is a distinct grey submarginal band. In the European *rubiginea* the hindwing is uniformly dark fuscous," plt. 35 g. Japan, etc.

The figure looks like a large example of *rubiginea*.

var. *graslini*, Stdgr., *Cat.*, IIIed., 210 (1901).

FIG.—Culot, *N. et G.*, 17-18, plt. 41, f. 3-4 (1914).

ORIG. DESCRIP.—" Alis aut brunneis vel castaneis, albido vel flavescente pictis." Culot said: " This diagnosis includes several forms, those marked with white, and those which are marked with yellow, those with ground more or less light or dark."

ab. *unicolor*, Heylaerts, *Tijds. v. Ent.*, XXXIII, 38 (1889).

Orig. Descrip.—" Among a large number of specimens of this species bred *ab ovo*, I have obtained some examples without the ordinary markings and spots." ab. *unicolor*, Tutt, 1892, falls as a synonym.

ab. *obscura*, Splr., *Schm. Eur.*, I, 257 (1907). To replace *staudingeri* of Graslin.

Orig. Descrip.—" The dark blackish-brown form with bluish-grey spots, a subvar. of ab. *graslini*, Stdgr." Andalusia and E. Pyrenees.

ab. *lusitanica*, Splr., *Schm. Eur.*, I, 257 (1907).

Orig. Descrip.—" Head and neck partaking of the ochre-yellow at the base of the wing. The forewings dull dark ochreous and dark brownish mixed, only the central spotting of the base, the lower spot of the reniform, as well as the row of dots in the narrow waved band and on the margin, blackish." Portugal.

ab. *modesta*, Obthr., *Et. Lep. Comp.*, I, 63 (1904): Culot, *N. et G.*, 1 (2), plt. 40, 15 (1914).

Fig.—*l.c.*, plt. 4, 42.

Orig. Descrip.—" Alis anticis brunneis, ochraceo-flavescenti-pictis." Of ab. *modesta*, (Bng.-Hs.), Hamp., *Cat. Lep. Ph.*, VI, 458 (1906), said: " Thorax and forewing suffused with dark red-brown, having the basal area and stigmata yellow."

var. *fereunicolor*, (Obthr.) Culot, *N. et G.*, I (2), 16 (1914).

ab. *completa*, Obthr., *Et. Lep. Comp.*, I, 63 (1904).

Fig.—*l.c.*, plt. 4, 43 (1904): Culot, *N. et G.*, 1 (2), plt. 40, f. 18 (1914).

Orig. Descrip.—" It is really a transition between true *unicolor*, Tutt, to which it is united by insensible transitions, and the typical form." Stdgr. labelled the specimen " ab *unicolor*, Tutt, transitus."

ab. *completa*, Obthr., *Et. Lep. Comp.*, I, 63 (1904): Culot, *N. et G.*, I (2), plt. 40, f. 18 (1914).

Fig.—*l.c.*, plt. 4, 43.

Orig. Descrip.—" Alis anticis obscure castaneis, fere unicoloribus, nitentibus." Of ab. *completa*, (Bng.-Hs.) Hamp., *Cat. Lep. Ph.*, VI, 458 (1906), said: " Thorax and forewing entirely suffused with dark red-brown."

var. *modestissima*, (Obthr.) Culot, *N. et G.*, I (2), p. 16 (1914).

Fig.—*l.c.*, plt. 40, f. 14.

Orig. Descrip.—" Forewings of a pale yellow-ochre; the transverse shade is narrow and elbowed midway."

ab. *delicatula*, (Obthr.) Culot, *N. et G.*, 1 (2), 17 (1914).

Fig.—*l.c.*, plt. 41, f. 1.

Orig. Descrip.—" The example is in bad condition; seeing that the tint is somewhat uniform on the upper wing, it could be put near ab. *unicolor*; yet it shows a submarginal series of small markings of a bright white, which is an ornamentation quite unexpected and very delicate." Martigny.

var. *favrei*, (Obthr.) Culot, *N. et G.*, I (2), 17 (1914).

Fig.—*l.c.*, plt. 41, f. 2.

ORIG. DESCRIP.—" Is a *completa* of an obscure chestnut-brown, with a brilliant reflection; the whitish parts are beginning to appear on the forewings." Martigny.

var. *barretti*, Obthr., *Lep. Comp.*, I, 63 (1904).

FIG.—Barrett, *Lep. Brit. Is.*, plt. 233, f. 2 b.

ORIG. DESCRIP.—" Alis anticis rufo-brunneis, fere non nigro-punctatis; alis infer. late ochraceo-flavescenti marginatis."

ab. *albistigma*, Dnhl., *Ent. Zeits.*, XXXIX, 197 (1926).

ORIG. DESCRIP.—" Completely unicolorous examples, clear-yellow to black-brown and black red-brown in which the inner half of the not well defined stigma is marked by white dots on each side of the centre, and gives the insect a wholly distinct appearance." E. Tyrol.

ab. *elsa*, Schultz, *Int. Ent. Zeits.*, XXIV, 167 (1930).

ORIG. DESCRIP.—" Recognized by the extreme increase in the cream-yellow portions of the wing, so that the brick-red ground colour is confined almost entirely to the discal area. In the typical male the clear red-brown ground colour is dominant; here this is so far almost all confined to the lower half of the discal area. The fringes are of reddish to yellowish-brown colour." Bred from near Bozen.

ab. *euanthes*, Schultz, *Int. Ent. Zts.*, XXIV, 167 (1930).

ORIG. DESCRIP.—" Ground colour of forewings brick-red; marginal band and stigmata cream-yellow, a few spots in the basal part as well as the outer surround of the reniform also cream-yellow." Bred from ova, near Bozen.

ab. *antemarginalis*, Dnhl., *Ent. Zeits.*, XLVI, 260 (1933).

ORIG. DESCRIP.—" Ground colour a fresh yellow-red, without clouding, also wholly unicolorous throughout, although a sparse very uniformly spread fine puncturing is present. The reniform stigmata are not changed in appearance by the two black dots placed close to one another, often there is placed a third in the middle. In this case the white shows out clearly in the triangular dots. The most conspicuous character of this form is the clear concentration of black spots before the outer margin, which usually form a distinct band, not reaching to the costa and inner margin and joining them. The margin is spotted clear black." Hanover.

Scopelosoma, Curt. (1837), Gn., Barr., Stdgr., Splr., South, Culot: [*Orthosia*, Ochs.-Treit. (1816-25), Meyr., Meyr.: *Cerastis*, Hb. (1821), Tr., H.-S. text, Dup. text: *Orrhodia*, Hb. (1821), H.-S. cat.: *Eupsilia*, Hb. (1821), Hamp., South, Warr.-Stz., Drdt.-Stz.: *Glaea*, Steph. (1829): *Mecoptera*, Gn. (1837)] *satellitia*, L. (1767) = *transversa*, Hufn. (1766).

Up to the end of the last century our Animal Nomenclature took as its earliest date, 1767, the date of publication of the XIIed. of the *Systema Naturae* of Linn. The recognition many years after of the Xed., and the dating back to 1758 for priority of names, was the cause of never

ending correction of specific names, as little or no adjustment was attempted until quite recently. Thus it is necessary to replace the name *satellitia*, L., of the XIIed. (1767) by the name *transversa*, Hufn., in the *Berlin Mag.* (1766).

Tutt, *Brit. Noct.*, III, 7 (1892): Meyr., *Hand.*, 64 (1895): Barr., *Lep. Brit. Is.*, VI, 20, plt. 234, f. 3 (1900): Stdgr., *Cat.*, IIIed., 210 (1901): Hamp., *Lep. Ph.*, VI, 437 (1906): Splr., *Schm. Eur.*, I, 258, plt. 47, 3 (1907): South, *M.B.I.*, II, 27, plt. 12, 1-3 (1908): Warr.-Stz., *Pal. Noct.*, III, 144, plt. 35 c, d (1910): Culot, *N. et G.*, I (2), 91, plt. 56, f. 5 (1914): Draudt-Stz., *Pal. Noct. Supp.*, III, 148 (1934).

Rosel, *Ins. Belust.*, III, plt. 50, 1-4, gave a good but very dark figure (1756-60).

Esp., *Abbild.*, IV, 618, plt. 169, f. 6-7 (1790-?), gave two figures named *satellitia*, recognizable as intended for the species, but very badly executed.

Ernst & Engr., *Pap. d'Eur.*, VII, f. 511 (1790), gave three good figures and in the text recognized the *transversa*, Hufn., as this species.

Hb., *Samml. Noct.*, 182 (1800-3), gave a good banded dark brown figure with a white spot. The central band encloses the reniform spot, is wide on the costa and narrow on the inner margin, the submarginal band is uniform in width, both are more or less double lined on each side by darker lines. The bands are darker, as is the basal area although not so definitely defined.

Dup., *Hist. Nat.*, VI, 116, plt. 80, fig. 4 (1826), gave a good figure.

Splr., *Schm. Eur.*, I, 258, plt. 47, 3 (1907), gave a figure which the author claims as representing the grey-brown typical form of Linn. The figure strikes one curiously as having the forewings not in correct proportion to the hindwings, otherwise fairly good.

South, *M.B.I.*, II, 27, plt. 12, 1-3 (1908), gave three figures, fairly good in colour. Fig. 3 is suggested as the *brunnea*, Lampa, but probably not dark enough.

Warr.-Stz., *Pal. Noct.*, III, 144, plt. 35 c, d (1910), gave *transversa*, Hufn., as a synonym, and only recognized three forms; *brunnea*, Lampa, " when the three discal spots are deep reddish-yellow "; *albipuncta*, Strand; and *rufescens*, Tutt. They ignored all the " subvarieties " of Tutt. They gave six figures: *satellitia* ♂ and ♀, *brunnea* ♂ and ♀, *albipuncta* ♂ and ♀, the marking and ground colour not satisfactory.

Culot, *N. et G.*, II (2), 91, plt. 56, f. 5 (1914), gave a very good figure.

Barrett summed the Variation as follows:—

Not very variable beyond the constant alternation of the reniform stigma and its attendant dots between pure white, and deep yellow, orange, or even chestnut—in which last case these markings are very obscure—but in Yorkshire specimens are obtained which are much suffused with black-brown, or even black, and others dull brown with very little of the usual chestnut colouring. Scotch specimens are rather richly coloured.

He referred to a specimen " of a wonderful crimson-red, especially crimson towards the base."

The Names and Forms to be considered are:—
transversa, Hufn. (1766), *Berl. Mag.*, III, 418.
satellitia, L. (1767), *Syst. Nat.*, XIIed., 855.
[f. *tripuncta*, Btlr. (1878), *Ann. and M.N.H.*, 5 (1), 168], a Japanese sp. (?).
f. *brunnea*, Lampa (1885), *Ent. Tid.*, 76.
(r.) f. *rufescens*, Tutt (1892), *Brit. Noct.*, III, 8.
ab. *flavo-satellitia*, Tutt (1892), *l.c.*
ab. *rufo-satellitia*, Tutt (1892), *l.c.*
ab. *albo-rufescens*, Tutt (1892), *l.c.*
ab. *flavo-rufescens*, Tutt (1892), *l.c.*
ab. *rufo-rufescens*, Tutt (1892), *l.c.*
ab. *trabanta*, Huene (1901), *Stett. Ent. Ztng.*, LXII, 158.
ab. *albipuncta*, Strnd. (1903), *Arch. Math. Natur.*, V (25), N, 9, p. 14.
ab. *juncta*, Splr. (1907), *Schm. Eur.*, I, 258.
ab. *unicolor*, Schultz (1909), *Berg. Rebel.*, 251.
ab. *nigricans*, Schultz (1910), *Int. Ent. Zt.*, IV, 6.
ab. *brunneor*, Strnd. (1915), *Arch. f. Naturg.*, A. 12, p. 149.
ab. *olivacea*, Porritt (1923), *E.M.M.*, LIX, 87.
ab. *ochrea*, Lenz. (1927), *Osth. Schm. Sudbey.*, II (2), 331.
ab. *flavimaculata*, Lenz. (1927), *Osth. Schm. Sudbey.*, II (2), 331.

Tutt dealt with the typical form (1) the grey continental form, *satellitia*, L.; (2) the red form which he named *rufescens*, and its subvarieties; (3) *albo-rufescens*, with white reniform; (4) *flavo-rufescens*, with yellow reniform; (5) *rufo-rufescens*, with red reniform; (6) *flavo-satellitia*, the typical form with yellow reniform; (7) the typical form with red reniform, *rufo-satellitia*; (8) form *brunnea*, Lampa, probably a deeper red form than *rufescens*.

transversa, Hufn., *Berl. Mag.*, III, 418, No. 102 (1766).
Orig. Descrip.—"Red-brown, with many darker transverse markings, and a white-yellow spot in the middle of the wing, around which two other small ones stand."
Rottemb., *Naturf.*, IX, 143 (1776), called this *satellitia*.

ab. *trabanta*, Huene, *Stett. E. Ztng.* (1901), LXII, 158.
Orig. Descrip.—"With the spot at the base of the reniform pure white." This was subsequently renamed by Strand (1903) *albipuncta*.

ab. *albipuncta* Strand, *Arch. Math. Naturv.*, XXV, 9, p. 14 (1903).
Descrip.—In which the middle spot is white in place of being yellow. It occurs in both the typical form and in var. *brunnea*, Lmpa. (invalid).

ab. *juncta*, Splr., *Schm. Eur.*, I, 258 (1907).
Orig. Descrip.—"Often the group of small spots in the reniform are bound together by a curved similarly coloured marginal line inside."

ab. *unicolor*, Schultz, *Berge. Reb.* (1909), 251; *Verbt. et M.R.*, I, 391.
Orig. Descrip.—"Unicolorous grey, with very obsolescent stigmata." Elgy.

ab. *nigricans*, Schultz, *Int. Ent. Zeit.*," IV, p. 6 (1910).

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MORE FIELD NOTES FROM MACEDONIA.

By Malcolm Burr, D.Sc., F.R.E.S.

Nearly a quarter of a century ago I was writing home to *The Entomologist's Record* some Field Notes from Macedonia while the impressions were still fresh. How little did I think then that the wheel of chance would bring me back, almost to the same scenes, to meet many of the same friends, both bipeds and hexapods! In those days the war was in full swing in grim earnest. This time it was looming very near, and the tense air added a zest to travel.

It was past the middle of August 1939 when I arrived in Skoplje, and the countryside was burnt up. I was used to that, but surprised at the poverty of insect life. The valley of the Vardar here is broad and entirely given up to cultivation. Over those acres of *kukuruz*, or maize, stubble there was little hope of finding interesting Orthoptera, and no ground is more irritating or fatiguing to tramp across. In the agreeable park I met Dr Karaman, Director of the Skoplje Museum and Zoo, a distinguished ichthyologist, interested in freshwater *Amphipoda* and *Isopoda*, on which subjects he would be glad to enter into correspondence and exchange with colleagues in Britain and elsewhere. In the dried grass in the park I found but a few Stenobothrids, like *Ch. biguttulus*, a single small *Metrioptera* and the universal, irresistible *Aiolopus*, perhaps the same species that I had taken at sea, flying to light, off the Angola coast.

The next day I hurried on to Gostivar, a pleasant little township near the Albanian frontier. The only fault I had to find with the friendly little inn was that the wallpaper was brown, which is a disadvantage as it does not show them up, but, to my relief, they did not put in an appearance. As at Skoplje, the only ground near the town that looked promising was the park, where in the dried grass I picked up a few Stenobothrids, *Tetrix* sp. and a *Pachytrachelus*, an old friend I had not seen for very many years. Behind the pleasant village of Vrutok, where the Vardar rises, there are beech woods on the hills not yet entirely deforested for firewood, but the lifelessness was relieved only by a few *Oedipoda caerulescens*, a Stenobothrid or two, and a *Tylopsis*. On the far side of the river, past the hamlet of Ballin-do, through rich gardens full of magpies, chaffinches and goldfinches, out on the parched hillside, with a few stunted beech and juniper; a few small *Omocestus*, which may prove interesting, *Chorthippus* suggestive of *mollis*, and a small *Platycleis*. It was a rather depressing scene, relieved only by the plaintive pipes of the young goatherd, whose charges were responsible for much of the barrenness. As I strolled back to the town I was amused to see a big flock of jackdaws playing at being starlings; their aerial stunts are not half so effective and their chatter robs them of dignity.

The chief of the police took me for a drive and a picnic to Zubovtse, a big village with the usual gardens and vineyards on the hillside, decorated with red admirals, painted ladies and fritillaries. I added, though, but little to my meagre list, *Tylopsis* and *Phaneroptera falcata*. No stridulation audible, till my little friend *Oecanthus*, the cricket of the vines, struck up his lilting evening chorus.

The Turkish mayor of the prosperous village of Vrapchishte entertained us to coffee and water-melon while we rested. He told me that

the village pocketed three million dinars for its tobacco crop the previous season, a welcome relief after a spell of depression. In some boggy flats below I found *Conocephalus fuscus* and the S. European ssp. *bisignata* of the African *Paracinema tricolor*.

So far my wandering had brought me but little Entomology, although delights in other form, above all, that of meeting many old comrades from the last war, some showing the twenty odd years that had passed, but some seemed hardly older, which gave one a pleasant feeling of rejuvenation. So, after spending a few days in such cheerful company in the picturesque old Serbo-Turkish town of Tetovo, I mounted a white Albanian pony and rode up to the Shar Planina.

This seemed real romance. As a boy I had often gloated over the maps of this district, but in Turkish days it was remote, inaccessible and dangerous. In Skoplje I had heard that Dr Willy Ramme, of the Berlin Museum, had spent some time collecting on the mountain, and he had told Dr Karaman that he had taken an interesting new species of *Orthoptera*. It seems that we had missed each other by but a day or two, and I heard that with mixed feelings.

Half-an-hour's ride up took me out of the zone of the vine. There was an English look about the woodlands, with their chestnut, hawthorn and many familiar wild flowers; then through groves of hazel, sycamore, oak, beech, then that wretched maize stubble, to the Albanian eyrie of Lisac, perched at the edge of the plateau, picturesque, of course, but poverty-stricken, the houses built of mud and beech branches, or lumps of rock and roofed with slabs. An hour or more through sub-alpine crops, chiefly oats and rye stubble, with stunted clumps of beech, with flocks of tiny goats and tinier sheep, out on to the grassy plateau, with springy turf like our Downs, studded with woody clusters of *Juniperus nana*. A few miles further on, it was truly alpine, the peaks rising to 8000 ft., with here and there upon their flanks a patch of *Abies pectinata*.

Down below it was hot, as it can be in a Macedonian August, but up here it was cool, chilly at dusk and really cold at night. The Yugoslav Tourist Association have built a hostel here, which is thronged in the ski-ing season. Now, to my relief, it was practically deserted. The manager, a Greek, spoke defective English, but recited the speech of Henry V on the eve of Agincourt as well as Lewis Waller ever did, and every evening would read out to me a passage from some Epistle of St Paul, with a perfection of diction that was almost professional. He told me he had learnt his English at Robert College, that amazing American university on the banks of the Bosphorus.

It was a very different world up here. The hostel, under a hillock called Popova Shapka, stands about 5500 ft. above the sea. Springs burst out all around it, enlivened by dippers and yellow-bellied wagtails. In the sky the chief birds were the eagles. The peaks around drew the clouds, and during my short stay up there want of sunshine dogged me. I collected assiduously, knowing that almost every specimen would have its story to tell, buoyed up through the drizzle and mist in the hope of finding something of special geographical interest, for I knew there are boreal relicts up these little known Macedonian mountains. Among the junipers and the whortleberry by careful search I took a few handfuls of several Stenobothrids. I would not venture to name them, as they may well be critical species, but they looked like *Chorthippus*

parallelus, *Ch. bicolor*, *Ch. pullus*, *Stenobothrus stigmaticus* and *Myrmeleotettix maculatus*. And at last my patience was rewarded when I heard a squeaky chirrup from a juniper. I could hardly believe my ears. Could there be an *Ephippigera* here? I stalked it down, and caught it. It looked exactly like *Eph. vitium*. If it is, this must be its eastern, and south-eastern, limit. Or else a localised, closely related species. In any case, it was an interesting find. I hunted by the hour for more, but in vain. Like me, they were discouraged by the low, black mist looming angrily up the valley. Still, beyond, I could see the sun shining in the valley down there in Tetovo.

So I decided to stay yet another day. And I had my reward, for next morning the sun shone brightly, at least for a few hours. I walked across to a patch of whortleberry, and there was gladdened by a sight I had not seen for many years, grasshoppers in swarms, the kinds mentioned already plus one. That had those grotesque, pear-shaped, inflated fore tibiae in the male, which is only known in *Aeropus sibiricus*. The altitude at this spot must be about 6000 ft., and this truly alpine form did not occur below. I sat down to revel in the sight, when something moved, and I watched a small viper slide into its hole, with a cheeky flick of its tail as it vanished. I looked around for its mate, and a foot or two away there she was. I watched her; she did not go straight to the hole, but by a detour. The local folk tell me that vipers, which they call *sharka*, are very common up here, and I learnt afterwards that it is not the general *V. berus*, but *V. ursinii*, a species peculiar to the Shar mountains. It is reputed to be a gentle creature that does not attack man.

In a juniper bush I found a large female apterous *Poecilimon* sp., and among the whortleberries some small grey brachypterous Decticids.

But the sunshine was fleeting. In a few hours the clouds came back and did their dirty work; it remained warm on the hillsides, but a cold, damp breeze blew up the valley of the streams. By patience and luck I got a second *Ephippigera*, but never a sign of a Blattid, nor of an earwig.

The place must be interesting botanically. The sheep and goats trim down the grassy areas closely, of course, but under the shelter of the juniper bushes there is a fairly rich flora and fauna, just as there is under the stunted chermes oaks in Greek Macedonia. A common plant is *Daphnea*, with a long, woody root and a high stem crowned with bunches of long, soft, narrow leaves and a few soft scarlet berries at this late season, for it was the last week in August when I was up there. There were remains of an *Arum*, an undergrowth of *V. myrtillus*, some bramble leaves, a leaf suggestive of wild strawberry, and, to my surprise, red clover. There were hairbell, eyebright, and a few gentians, of which I have brought away specimens in the hope that they may turn out to be interesting. Grass of Parnassus enlivened a bit of bog below the hostel, where there was *V. beccabunga* and a *Silene*. Also an unfamiliar little pink flower recalling *Calluna*. Afterwards my friend, O. S. Grebenchikov, told me this is *Brouckenthalia spicuifolia*, one of that interesting group of plants peculiar to the mountains of Southern Serbia.

A group of Albanians were burning the juniper clumps to make more grazing for their flocks. I watched, hoping to see a number of interest-

ing Orthoptera come out, as they do before bush fires in Africa, but not a specimen did I catch like that. By chance, though, at that spot, I picked up a female *Arcyptera*, a most handsome creature. To me it looked like *A. fusca*, a striking, yellow, black and crimson grasshopper that I had taken in the Alps of Savoy and in the North of Siberia and the southern Pyrenees, but it is as likely as not that this will turn out to be a distinct species, or at least a localised form. It seemed numbed and sluggish.

In a sheltered dell I found a colony of *Anterastes serbicus*, a small Decticid, and a single female of *Psorodonotus fieberi*, and had the luck to chance on another female *Ephippigera* crawling on a juniper, and another, a male, of the big, plump *Poecilimon*.

Then again a pair of those little adders. On being disturbed, they hunched up, and peered at me; then, satisfied that there was a dangerous look about me, the first slunk in a roundabout way to its hole, and slithered in, with an uncanny reptilian movement. I suppose they widen out their home inside, as otherwise they must come out tail first.

On 31st August the weather looked so threatening that I decided to go down, for my time was not unlimited. As I was leaving the hostel an Albanian rode up, bringing a batch of telegrams for me and some local letters, sent up by my friends in the valley. The first cable gave me instructions impossible of execution, but that did not matter as the second cancelled it.

A forest officer, whom I met, told me that the reason the high beech forests are so stunted is not climatic, but because the inhabitants cut them down as soon as they are thick as a man's thigh.

As I rode down through the village of Lisac the folk were threshing their oats by picking up armfuls and beating them on the ground, and winnowing them with their hands. The natives of these sub-alpine villages are almost all Albanians, but as the village names are Slavonic, the Albanians are an intrusive element, who penetrated during the Turkish period. They are fine fellows, honourable, trustworthy and industrious, but very backward. This village of Lisac, on the edge of the plateau, is bright with cottage flowers and well-watered. A little further down all is arid.

A couple of days later I was back in Skoplje. The place seemed drier than ever. The hills around, the so-called Montenegro of Skoplje, Skopska Crna Gora, with its pretty villages and Serbian peasants in white costumes bordered with black braid, are dry, with scrubby, scraggy trees. The people must have firewood. The vegetation had a central European look, with oak, beech, poplar, wild pear, and walnut, but there were here and there a fig tree, and plenty of Christ Thorn, *Paliurus spina christi*. The universal, commonest wild flower around this part of the Balkans seems to be a mullein. Not many birds. No starlings, but plenty of jackdaws, and I did not see any of the characteristic birds of the south.

A week later I stopped at the alpine village of Mavrovo, high above Gostivar, and a lovely spot it is. It has great attractions for ski-lovers in winter, but I prefer it in summer. It is certainly splendid country. A local sportsman told me that the high ground between Mavrovo and the Shar is the last place in the Balkans where the lynx is still to be found. It is rigidly preserved.

The hills around Mavrovo are pleasantly wooded, but there is no big timber. Orthoptera were not numerous. The usual *Oedipoda caerulescens* and *O. germanica*, *Omocestus* (*ventralis* ?), some small *Chorthippus* and a few *Dociostaurus genei*, with *Ch. parallelus* and *Ch. pulvinatus*. In a clump of trees I heard suddenly a loud, penetrating, shrill call, somewhat like that of *Tettigonia viridissima* but with a different timbre. I worked for a long time, but all I found were two females of a big, fat, apterous Phaneropterid. I picked up a pair of *Leptophyes albovittata*, a female *Platycleis*, and *Parapleurus alliaceus* on the banks of a stream.

The next day a wonderful drive down the magnificent gorge of the Radika, stopping for refreshments at the frontier town of Debar, rich in memories of Turkish days when the local robber barons were prosperous, along the Black Drim, that admits Atlantic eels to Ohrid, and then out to the shores of that wonderful lake, that I had longed for so many years to see.

The approach is over an expanse of boggy flat, clearly but recently reclaimed, enlivened by peewits and white herons, through the once prosperous old market town of Strua, to the edge of the lake itself, fading mistily to the horizon, encircled with grey, stony mountains. The ancient town of Ohrid, with its old, oriental quarter, and the ruins of a mediaeval fort upon a small ridge dominating the place, is spreading eastwards along the shore in a more modern style. A breeze was blowing, as I found is usual, fretting the water into " white horses," to match the terns skimming over them, all standing out against the bluish haze of the distance, just as Nazaroff describes of Issyk Kul.

Feeling as though fulfilling a dream of boyhood, I dropped that night into a deep, long sleep. I dreamt about British Grenadiers. I sat bolt upright in bed, astonished. Yes, " and a tow row row row row . . . . !" and then an unmistakably English voice . . . . Yes, I was in Ohrid really, so why was this Englishman shouting at me at six o'clock in the morning?

It was a loud-speaker, giving the news from . . . . Sofia. That comes on at six, when the air is fairly clear. The war had begun by then, and the Ohrid public were deeply interested. In a couple of hundred yards along that front there were three loud-speakers, which vied with each other to proclaim the news of the progress of the invasion of Poland.

The name of Ohrid is famous throughout the Balkans for many reasons. Apart from its beauty, there is a famous ballad, how Bilyana was washing her linen white, by Ohrid's limpid springs. These burst exuberantly out of the foot of the mountains to the East of the town, and they are always called Bilyana's Spring. Alongside them is a hydrobiological station, where they breed the famous Ohrid trout of which they turn out millions annually to feed the fishing industry. For since it was Lake Lychnis, as the old Greeks knew it, Ohrid has been famous for its fish, above all for its trout. There are eighteen species of fish known in the lake, including the eels. I believe it is the only Balkan lake that has eels. They come up from the Adriatic, up the Boyana through the Lake of Skadar, up the Drim into the lake. Of the trout there are two species, *Trutta ohridana* and *T. balcanica*. The sterile form of the latter, known locally as *letnitsa*, is one of the most delicious fishes of the world, rivalling the *sig* of the Neva.

I climbed up the rocky mountain behind the station and the spring, where stands a small, isolated obelisk, with the simple inscription. "400 Martyrs." These were Serbian schoolboys, struggling to safety in Greece in the winter of 1915, but overtaken by the enemy and done to death in a common grave. Treeless, with a bit of scraggy scrub, and a few wild flowers, larkspur, mullein and succory. It all looked poverty-stricken, and so did the big village of Velesttovo, where I hoped to buy a chunk of cheese and a mug of wine, an hour's rest, and then a climb to the top. But I had reckoned without knowledge. I found an old lady, a girl and a lad beating rye on the threshing-floor. When I asked if they would sell me a chunk of bread, the old lady burst into tears. No bread had they for sale, she said, barely enough to eat themselves, and cheese was almost unknown, wine quite. But the lad shared with me his lump of dark bread, flavoured with roast hot peppers, to make it go down. And the water was cold and clear. I sat and yarned with them for an hour, grieved to learn of their poverty, when life was at least endurable at the foot, and a little further on almost prosperous. The explanation was that there was no justification for a village at that spot. It was too high, too dry, too barren.

As we sat, the boom of guns wafted over the lake. The manoeuvres. Very near the Albanian frontier. Daily a thrust was expected, from the Italians; troops, they said, were massed on the other side of the lake, which the frontier crosses, and the Greeks, too, they said, were ready.

My lunch was inadequate for high climbing, so I strolled down. The Orthopterous fauna seemed as poor as the village, an odd *Chorthippus* or so and a few *Oedipoda*. On my way down I met some of the menfolk coming up. They had been selling a few loads of firewood down in Ohrid. They asked me to explain the war in Poland to them, so I drew maps in the sand.

They told me in Ohrid that in Struga there was . . . of all improbable things . . . a zoological museum. Still, at Ohrid there is a hydrobiological station, so I jumped on to the 'bus and popped over to Struga to lunch. It was true, there *is* a zoological museum in Struga, a fine collection of stuffed animals and good collections of insects. It had been formed by a Russian refugee doctor, who was an enthusiastic naturalist, with the energy to enlist government support, and, I was told, he had made a very good job of it. Unfortunately, at the time of my visit all the collections were packed up for removal to a new building specially put up to house them.

The flats outside the town were rich lands covered with crops of maize, fruit gardens, and particularly peppers, which are an important local produce, and plenty of cattle grazing. A couple of boys told me that it was usually flooded in the winter, and that a hundred and five years ago, for they were curiously exact, it was permanently under water. The truth is that they have been clearing the channel of the Drim, which drains the lake, so that the water flows more freely and the level of the lake has been lowered a couple of feet in a year or little over. That was illustrated by the director of the hydrobiological station, who told me that on fields where I saw cattle grazing they had caught carp two years ago.

I found very little insect life on the flats, where the chief living things, apart from the cattle, were countless frogs with green stripes down their backs. No *Tetrix* or *Paracinema* to my surprise. In a moist corner, where there were some shrubs and long grass, was *Tetrix depressa*, *Conocephalus fuscus*, *Aiolopus strepens*, *Omocestus ventralis*, *Pezotettix giornae*, *Oecanthus pellucens*. The place seemed rich in tree frogs and big spiders.

Then to Bitolj and on to Skoplje, where I took a farewell walk up to a village called Vodno. On the path were the two common *Oedipodas*, *A. strepens*, and the usual Stenobothrids; *Acrida turita* low down, of which I had seen little in these parts, and *Tetrix depressa*. In the village I found a bed of nettles, somewhat unusual here, where by sweeping I got the only earwig I have seen in Serbian Macedonia. It was a female, so I cannot say if it were *Forficula auricularia* or *F. lurida*.

By that time the end of September was approaching. I went by the night train to Belgrad, still wearing whites. The next day winter set in.

From the point of view of Orthoptera, my six or seven weeks in Southern Serbia were disappointing. I was evidently too late in the season. I did not find anything like the wealth of species I had known in Greek Macedonia, on the other side of the gorge of Demir Kapu, which seems to mark a zoological boundary. Still, I can fairly hope that the few things I managed to take on the Shar may redeem the excursion.

NOTES ON NOMENCLATURE. I.

[A statement, not an argument, of the general position of the instability of our specific names and a summary of the factors which appear to have been the partially unavoidable causes of the position.]

In 1758 Linné followed up what he had already done in the Nomenclature of Botany, 1753, and applied his Binomial method of Naming to the Animal Kingdom in his famous *Systema Naturae*.

The older authors, although they readily adopted the Binomial System of Nomenclature from Linné, gave references to names, descriptions and figures of authors previous to 1767, the priority date first adopted, but did not further adopt the name of any species, or if they did they sponsored it as their own, just as did the authors immediately succeeding Linné and before 1767.

The only remarks on the specific names for many succeeding years may be summed up in the fact that workers in one country did not get to know what was going on in another and we find the same species getting a fresh name from ignorance of its recognition and name in some other country. Hence some species have obtained a string of names. Also we get a sexually dimorphic form treated as a separate species and named so. Even Linné treated *janira* and *jurtina* as two species, and the curious fact arose that although *jurtina* was the prior described and named, it was a female and hence the correct name of the species was taken to be *janira*, that of the male form, and so it remained until comparatively recently, when strict priority was adopted by the 1901 Commission.

In 1871 the 2nd edition of the famous Staudinger's List of European Lepidoptera was issued and the authors made no general change in the customary starting point for synonymy, the XIIed. of the *Systema Naturae* of Linné, which was published in 1767. The only references used of that date, besides Linné, were those of Hufnagel in the *Berlin. Magazin*, under the date presumed to be 1767, unless they clashed with a name in Linné's *Sys. Nat.*, when the latter was taken. This initial error in the reference to Hufnagel, strange to say, was not discovered until 1921. Of course, Stdgr. included many names and references like *machaon*, *rhamni*, *apollo*, *rapae*, *napi*, etc., etc., etc., not because they were in the Xed. but because they were in the XIIed. and were in general use.

In course of time, more particularly towards the end of the nineteenth century, with a deeper knowledge of the literature, it became evident that there were several important systematic works, between 1758, the date of the Xed. of the *S.N.*, and 1767, the date of the XIIed., in which the binomial nomenclature was used, and entomologists began to urge that the priority date should be that of the Tenth Edition of the *Systema Naturae*, viz., 1758, and to use works published between 1758 and 1767; some quoted names introduced in the pre 1767 period, e.g., Wocke in part II (micros) of Stdgr. 1871 List.

Kirby in his *Synonymic Catalogue of Diurnal Lepidoptera* of 1871 adopted the usual custom of recognising only as far back as the XIIed. of the *Sys. Nat.*, 1767, but in his "Supplement" of 1878 said, "I now consider the Xed. of Linné's *Sys. Nat.* and *not* the XIIed., as the only tenable starting-point," an opinion strongly renewed in his *Handbook of the Order Lepidoptera*, Vol. iii, 1896, where he expressed the absolute necessity of strict priority in specific names in a discussion of the name of *edusa* for our "clouded yellow," which he regrets that he must replace by the prior name *croceus*, Frery. Kirby was one of the first to give strong expression to the necessity of Priority in Nomenclature, which attitude, no doubt, was brought more closely to his notice by the *Catalog* of Staudinger, and he lost no opportunity in supporting his opinion and action. The late Lord Walsingham and his energetic secretary, John Hartley Durrant, also did a great deal to push forward these nomenclatorial matters in the beginning of the present century.

It was about this time that attention was gradually again being turned to the Genera of Lepidoptera. Genera stand on a different basis to that of species and their content must vary from time to time as we gain a greater detailed knowledge of the life-history and genetic relationship of the various species, coupled with the insertion of new species. Each genus must have a selected representative "type" species, around which related species are grouped, but subject to removal if compared with species of another genus and found incompatible with the first genus. The genus and its name may even disappear from use.

One of the most important publications on genera at this period was Scudder's *Historical Sketch* in 1875, which had been preceded by a limited preliminary *Systematic Revision of North American Butterflies*, 1872.

Perhaps we may be allowed to quote from a passage on Priority from the *Historical Sketch*. Scudder said, on p. 95 *et seq.*, "Butterflies

have suffered from the writings of uneducated naturalists," "more perhaps than any other class of animals." He went on to speak of the "tedious and painful" work of reducing the "mass of chaotic facts to order," and "The result reached in some cases will surprise many entomologists, as it has myself, and in not a few instances I would gladly see a logical way out of the necessity of change among names which have had long usage; but the law of priority is and would best be inexorable, and the action of those who decry it would relegate our nomenclature to an increasingly chaotic condition. I therefore hold to it as of the utmost importance in nomenclature, as the very foundation of its stability. The changes now required by its strict application are solely due to the neglect of the past."

May we point out to our readers that this neglect has gone on and on for more than half-a-century since the above was written, and when change is attempted the neglect is worse still, for the supplanted name has seldom been indicated with the prior name to give the reader a chance of understanding about what he is reading, and he is choked off by a naked unknown, which many probably have no means of finding, among their usually scanty literature, nor have the time and opportunity to work out. To quote an instance, I had a MS. submitted to me with the specific name *gnoma*, without any indication as to what species was meant. I had never met with it before; it was given as a main specific name. It occurred in no British List, nor in the various books used by the amateur such as South, Newman, Stainton. Was it a wanderer from abroad? No. At last I consulted Staudinger's *Catalog* (1901) and Seitz, both works not likely to be in the hands of many of our readers. In both I found under *dictaeoides*, "? *gnoma*, Fb." It is brutal to shirk the duty of editor in such cases. A name is used to help the reader to understand what is under discussion, to help him, and not to bewilder him and to spoil all interest in the subject he may have selected as a pleasant hobby for his hours of ease.

The amateur entomologists of this country have been always very conservative in their opposition to even necessary changes. No doubt this attitude was partly due to the dictatorial method of introducing new (i.e. old) names without reference to the name hitherto in general use.

In 1901 the 3rd edition of the *Catalog* of Staudinger was published and we find that the priority basis was in most species altered to the 10th edition of the *Systema Naturae* of Linne (1758) and that for the most part the names that were used in the 1871 *Catalog* were now, if necessary, adjusted.

It was not until 1901 that definite steps were taken to get the general adoption of strict Priority in Specific Names, when a Commission of naturalists was held, and it was adopted unanimously that this principle should come into general use. Hitherto the priority rule had been individual and sporadic in its application.

There arose considerable opposition to this principle and a "limited" Priority was advocated, that when a name had been in use for a long period, say 100 years, it should stand, but it has found small support, and the result would probably in many cases be worse than the adoption of absolute priority.

The more important works between 1758 (Linné) and 1767 (Linné) were (1) Linné, *Systema Naturae*, 1758; (2) Clerck, *Icones*, 1759-; (3) Linné, *Fauna Suecica*, 1761; (4) Poda, *Insecta Musci Graecensis*, 1761; (5) Scopoli, *Entomologia carniolica*, 1763; (6) Müll., *Fn. Ins. Fridrich.*, 1764; and (7) Hufn., *Berlinisches Magazin*, vol. ii, vol. iii, vol. iv. The dates of these volumes were, in error, taken as 1766, 1767, 1768 respectively, and not until 1921 was this error, so simple but so fruitful for error, discovered; and the dates corrected 1766 to 1765, 1767 to 1766 (Noctuae), 1768 to 1767.

This meant that where Linné described an insect in the XIIed. of the *Sys. Nat.*, 1767, and the same insect was described by Hufnagel reputedly in 1767, the former had been in use for 150 years, but the latter description was the prior with the corrected date 1766, e.g. *satellitia*, (Linné) (1767) = *transversa*, Hufn. (1766), an actual case in point.

As one instance of the effect of the adoption of the Xed. of the *Sys. Nat.* of Linné, 1758, in place of the XIIed. of 1767 was the spelling of the name of our "Kentish Glory" Moth, which had been in Linné, *Fn. S.* (1761) *versicolor*, but which should have been *versicolora* as originally in the 1758 work. I think Staudinger, in his *Catalog*, 1901, was the first to list the name with "*a*" when he adopted the Priority of 1758. J. W. Tutt followed in his *Brit. Lepidoptera*.

The influence of Seitz' works doubtless has been the greatest impetus in effecting the adoption of prior names and prior spelling. Every centre of Lepidopterological work in all countries is compelled by necessity to consult this encyclopaedia with its wonderful fitment of coloured plates. All the various authors of the sections have done their utmost to carry out the principle of Priority of specific names so that an exceedingly strong basis is afforded for further progress to follow.

The dates of publication of many works were very approximate for many years and in fact even now are a matter of indecision. Esper, Hübner, Herrich-Schaeffer are perhaps the worst. Only within the last few years, since the Royal Entomological Society obtained a mass of Hübner material, hitherto unknown to exist, from a private source, have the dates of his various publications been ascertained with all probable certainty. With the same material the dates of Herrich-Schaeffer were settled with the same certainty. With the works of Esper each volume began with the title-page and it has been customary to date each volume from that date, whereas after the first part the date does not apply to any other portion. For instance, vol. iv, in which the Noctuae are described, is dated 1786, but it is known from contemporary literature and from internal evidence in the text, that much of the matter and some plates did not appear until years later, and dates now can only be approximate.

As an example of the effect of the uncertainty of the dates take an example quoted from Hampson in his *Lepidoptera Phalaenae* in dealing with the Noctuid, *Scopelosoma satellitia*, vol. vi, p. 437 (1906). He gave the reference to the name *transversa*, Hufn., for this species, *Berl. Mag.*, iii, 418, but he dated it (1769). Why he did not quote the then accepted date (1767) we do not know.*

Reference has been made to the error in the recognition of the dates of publication of the volumes of the *Berlin. Magazin* of Natural History, to which Hufnagel contributed articles on the Lepidoptera of the neigh-

bourhood of Berlin. This magazine was issued in six parts per year. Each part was enclosed in an illustrated cover which was dated. The six parts were subsequently bound with another but quite different title page, with a different illustration and the *date of the year following that of the six parts*. For instance, the parts of vol. iii (which contain notes on the Noctuae) were published in 1766, but when bound up had the new title page dated 1767, those of each part, no doubt, having been discarded. The work is very rare, only a few copies existing, chiefly in museums. This fact of date was only discovered in 1921; the facsimiles of the covers were given with the above particulars in Oberthür's *Lepidoptera comparée* by Houlbert.

Thus it is imperative, if further progress is to be carried on at any reasonable rate, such changes as are necessary should be made, not in a dictatorial way but in an educative way. And, in addition, no further books of the pre-19th century beyond those already in use in synonymy should be brought into nomenclatorial matters to effect as far as is humanly possible what all are crying for, stability in our names.—Hy. J. T.

*In fact, he made blunder after blunder in respect to this species. In his description of the typical form he stated "reniform represented by a white lunulate or elliptical spot," "with white points beyond its upper and lower extremities." Lower on the page he gave "ab. *satellitia*. Forewing with the spots at end of cell yellow." Then his reference to the ab. *albipuncta*, Strand, form (1903) was antedated by the ab. *trabanta*, Huene (1901), which reference in the *Stett. e. Ztng.* (1901) he overlooked.

COLLECTING NOTES.

Ortholitha umbrifera, Prout, in Gloucestershire and Somerset.—I have been carefully examining a series of insects in my cabinet purporting to be *Ortholitha mucronata* and have come to the conclusion that sixteen of them are undoubtedly examples of *O. umbrifera*, Prout. These were obtained in the counties of Gloucestershire and Somerset. I was interested to find that I had not a single example of *O. mucronata* amongst the specimens I had collected some 30 years ago in the Wye Valley, so imagine that this is an instance of an isolated colony of *O. umbrifera* alone. The Somerset specimens were obtained about 25 years ago on moorland in the Minehead-Dunster district, where they were to be found in the same locality as *O. mucronata*. The earliest and latest times of capture, as shown on my labels, are as follows: *O. umbrifera*.—Gloucestershire, 13th May-5th June; Somerset, 24th May-10th June. *O. mucronata*.—Somerset, 16th June-15th July. Also odd specimens of the latter from other districts: Sussex, 25th June; Hants, 15th July, and Bucks, 4th July-19th July. From this it would appear that *umbrifera* is probably on the wing quite three to four weeks earlier than *mucronata*.—J. F. Bird, Redclyffe, Walton Park, Clevedon, Som., 17th May 1941.

Notes on Variation from the Worthing Museum Collection (*continued from p. 56*).—*A. bellargus*.—In the English specimens there is little or no difference in size between the two broods. There are several

specimens of the ab. *urania*, still quite unmistakable though the black has slightly faded. These were all taken at Gomshall on May 15th, 1929; I have never seen this form again though I have hunted the same hillside many times. There are several examples of the ab. *puncta* (also from France, Switzerland, and the Tyrol), several also of the abs. *addenda* and *obsoleta*. Specimens from abroad are nearly all larger except for some of the mountain ones, though one ♂ from Zinal is one of the largest in the collection; it is also the finest specimen of ab. *puncta*. The largest of all come from Mt. Olympus in Greece. The ♀ form, *ceronus*, only comes from Pugny on the side of Mt. Revard and from Bex, though many of the Swiss ♀s show some blue. There is a good ab. *krodeli* from Martigny. There is a good series of both broods of the *coelestis* form from Dompierre and Angoulême; the other French specimens are in no way remarkable except that those from Auzay are rather small. It is curious that ♀s from Dompierre, unless definitely of the *coelestis* form, show no blue at all. This is the case with all ♀s in Italy and the Tyrol; these, however, often show a broad band of orange on all wings on the upper side, especially those from the neighbourhood of Florence. The Algerian race *punctifera* is well represented in both broods. The ♀s of the first brood from Algiers vary greatly in the amount of blue they show, and the ♂s are very large; the ♀s of the second brood show no blue at all. The ♀s of the second brood from Morocco are small but show some blue, especially on the hindwings.

A. polonus.—There are no less than eight of this form in the collection; five of these came from Assisi, three being taken among *bellargus* some time before *coridon* came out, and the other two among *coridon* after *bellargus* was quite over. This certainly points to their being hybrids, but the other three are rather puzzling. Of these two came from Pugny (near Aix-les-Bains) and the other from Oberbozen in the Tyrol. I have never taken *coridon* in either of these localities (I am not suggesting that it does not exist there), but while the upper side in all three is nearer to *bellargus*, all the under sides are much closer to *coridon*.

A. coridon.—The English series consists of a row and a half from the N. Downs, chiefly from Guildford, a short series from Alton Barnes near Devizes, a row from the S. Downs, a short series from the Cotswolds, a longer one from the Chilterns, and a long series from Royston collected between the years 1908 and 1915. These vary much in size in the ♂s, very little in the ♀s, those from the Chilterns and Cotswolds average rather smaller than the others. There is no blue on any of the ♀s from the S. Downs and Cotswolds, and only slight traces in one ♀ from Guildford and in three from the Chilterns.

From Royston there is a fine series of *semisyngrapha*, and nearly all the forms so often mentioned elsewhere from these fields are to be found in this collection. The spotting of the under side varies much more in this species than in any other, especially in the matter of extra (or fewer) spots and in the coalescence of those on the forewing The number of basal spots on the forewing varies from 0 to 4. There is one ♀ from Guildford with lanceolated spots.

From France there is a series from Digne and one from Larche, the latter are small, the former about the size of those from the N. Downs. Also a short series from Clelles and from La Grave, the latter with small

♀s. Those from Vernet are large, on the other hand those from Cauterets and Gavarnie are rather small. Those from Dompierre and Angoulême show a short series of brown ♀s and a fine lot of *syngrapha*.

Those from Switzerland show a tendency to a broader border in the ♂s, especially from the Val Maggia, and there is one much suffused from Goldau. Mountain specimens from Bergun, Bérisal and Barmaz on the Dent du Midi, especially the latter, are small, but those from Fusio on the S. slope of the Alps are large. All, except those from the Jura, show small spots on the under side.

All the Italian specimens are inclined to show small spots on the under side. Those from the Apennines (Assisi, Mt. Oliveto) and from Mt. Meta are pale both upper and under side, those from the Mt. Abruzzi (Roccaraso and Palena) especially so; these latter correspond exactly with Zeller's description of *apennina*, though not so well with his type specimens. They are far the lightest I have seen. The most remarkable of all are those from the neighbourhood of Berlin (race *borussia*, Dadd); these are veritable giants, larger than any *arion* in the collection.

With regard to the closely related species, so long regarded as races of *coridon*, all are represented except *caerulescens*. In the case of *hispana* the second brood is rather larger than the first, though both are rather small; those from Fiesole are rather larger than from the Piano di Mugnone in the same neighbourhood; striated forms and extra spots are common, some of the former being very striking. Those from the French Riviera are larger and much darker and duller in colour than those from Italy; I feel a little doubtful whether they are really the same species (if these others are all different). *Arragonensis* are all very pale, the race *albicans* being also very large and very faintly spotted. *Coelestissima* has a bright deeply coloured upper side, with the under side very pale and with small spots. (*To be continued*).—Rev. G. Wheeler, M.A., F.R.E.S.

Captures of Insects in Ireland.—I was, of course, very interested in Dr Bryan Beirne's contribution in the *Record* for this month on the Four Years' Captures of Insects in Light Traps in Ireland. Among the so-called Macrolepidoptera I find some of the entries must be mistakes. For instance:—"*Hadena lepida* (*carpophaga*). Occasional." Should be the species *capsophila*. "*Apamea obscura* (*ravida*). Occasional." This Noctua, not recorded from Ireland, should be *A. gemina*. "*Plusia ni*. Frequent." There is something very wrong here. Was *P. interrogationis* meant?—C. Donovan, Lt.-Col., I.M.S. (Retired), Bourton-on-the-Water, Glos., 19th May 1941.

A Few Wicken Coleoptera.—On the excursion to Wicken Fen, Cambs., on the 28th of June 1936, arranged by the Society for British Entomology during their Congress at Cambridge, I obtained a number of Coleoptera. Few of these turned out to be of any interest, but three species, marked * below, are not recorded in the Wicken List (Omer-Cooper and Tottenham, Natural History of Wicken Fen, **6**, 1932, 521-537). *Cryptocephalus bilineatus*, L., was abundant together with ab. *armeniacus*, Fald., on a small patch of (?) *Galium* in Harrison's Drove. This species is once recorded in the above list. Of **C. pusillus*, F., I

took a single example by general sweeping. Similarly *Anthicus antherinus*, L., **Laria loti*, Pk., and **Baris lepidii*, Germ., were taken singly by sweeping mixed herbage probably near Sedge Fen Drove.—W. D. HINCKS, 46 Gipton Wood Avenue, Leeds, 8.

CURRENT NOTES.

RED LOCUST CONTROL ORGANISATION.—The Colonial Office announces that Mr A. P. G. Michelmore has been appointed to the new post of Locust Officer in Northern Rhodesia and that he will shortly be proceeding to Abercorn in that territory to take up his duties, which are concerned with the carrying out of a scheme for the control of the Red Locust. Mr Michelmore, who has been serving with the Forces, has already devoted some years to the study of the Red Locust and in view of the importance of locust control, the military authorities have released him for this work. The desirability of establishing Control Organisations in breeding areas of certain species of locusts was considered by the Fifth International Locust Conference, which was held in Brussels in 1938, and subsequently proposals for establishing these Control Organisations were put forward. It became evident that in present circumstances the Red Locust, the known breeding areas of which were in Northern Rhodesia and Southern Tanganyika, was the only species for which it was practicable to establish a control scheme and that the original international scope of the scheme must for the present be disregarded. Hence it has been decided to proceed on the lines which were laid down by the Economic Advisory Council and to establish a Control Organisation on the lines agreed by the Belgian and United Kingdom Delegations at the International Conference, slightly modified in view of present circumstances . . . .—COLONIAL OFFICE.

AN ERROR.—Owing to postal delay in not receiving corrected proof returned from Dublin, an unfortunate error of identification crept into the very fine record of Lepidoptera recorded by our correspondent, Dr Bryan P. Beirne, on page 48 as occurring at light. "*Plusia ni*" would have been either queried, or deleted editorially, had not the following record been consulted in Lt.-Col. C. Donovan's recent *Catalogue of the Macrolepidoptera of Ireland*, where it is stated that:—

"Eleven specimens taken by Miss B. Donovan, at Ummera, Co. Cork, at flowers of *Silene inflata* and *Centranthus ruber*. Four worn individuals in June and seven perfect in September 1931. The earlier lot undoubtedly immigrants, the latter assumed to be local bred. The identity of the species was verified by Mr Hamm, of the Hope Department, Oxford."

The present record should be *Plusia iota*.

NOTE.—Will all those contributors who have proofs kindly send them as near "return" as possible, otherwise delay in issue is caused or some annoying error creeps in uncorrected. The post takes nearly 48 hours to reach the publishers and may be longer. Normally one likes to pass for "press" nearly a week before issue on the 15th of the month. The week-end often takes its toll of time.

The South London Entomological and N.H. Society had a very good meeting on May 8th in the Chapter House, Southwark. Some thirty members were present and a paper was read on "Hibernation." The ensuing discussion was very informative. The Bright bequest of *Polyommatus coridon* has been added to by the purchase of the second cabinet containing the remainder of the collection; thus it now comprises nearly a hundred drawers Both cabinets are safely housed in the Hope Museum at Oxford for the duration, and can be seen by application to the Museum custodians. On 11th May the first Field Meeting of the year took place at Slough in Berkshire. These meetings have been much curtailed this year.

REVIEWS.

We have just received Vol. v of the *Amateur Entomologist*, the Journal of the Amateur Entomologists' Society. The enthusiastic Secretary, Mr B. A. Cooper, is largely responsible for a fine attempt to hold his scattered flock together. A small volume; but 64 pages with 4 plates (56 figures) and about 90 text figures with appropriate text have resulted in a very useful volume, which all, Lepidopterists at least, should possess for reference; Coleopterists, too, are not forgotten; useful matter for them is included.

The two main articles deal with what has elsewhere been termed "twin" or "multiple" species, that is species of such extreme similarity of facies that it is practically impossible to separate without a more detailed and anatomical investigation.

Recognizing that many collectors are without the facilities for making preparations such as those of Mr F. N. Pierce, Mr W. H. T. Tams has shown how, by a simple method of brushing the scales from the extremity of the abdomens and then making comparisons of structure, in many cases a satisfactory differentiation can be obtained. There are nearly 70 figures of such comparisons with reference to species of a dozen genera, e.g., *L. testacea* and *L. nickerlii*, the *Procus* group *strigilis*, etc., the *Hydraecia* group *nictitans* (*oculea*), the *Heliothis* group *dipsacea*, etc., the *Thera* group *variata*, etc., and so on.

Dr E. A. Cockayne, in the "Habits of some British Moths," gives life-history details of practically the same species with that of some species recently worked out like *Oria musculosa*, *Parascotia fuliginaria*, *Aegeria flaviventris*, the *Dysstroma truncata*, *D. citrata*, etc., group. The four plates relate to the species in this paper and 48 of the 56 figures are of imagines. Mr A. F. O'Farrell gives a page of 8 diagrams and text explaining the various technical terms used in the study of the genitalic structures of the Lepidoptera, with text describing the "Functions of the Organs," and the methods of mounting and examining them. This forms a very useful article which has long been wanted by the student. Unfortunately the figures are much too crowded to consult easily. The Secretary fills more than 8 pp. in his description of and suggestions on the setting of Lepidoptera, and includes useful diagrams. Mr W. J. Finnigan, so well known locally for his photography of natural history objects, gives a series of notes on "The Photography

of Insects,'' and Mr G. B. Walsh in two short articles treats of the Collecting of the Coleoptera, and the killing, setting and dissection of them. A summary of the so-called '' Migration '' of Insects in the past year is contributed by Mr B. A. Cooper. Mr H. M. Edelsten has compiled an account of the '' Large Copper '' in Britain, and '' Suggestions to the Lepidopterist for his garden in Wartime '' are by Mr R. C. Dyson; both articles are quite interesting. Short Notes on various subjects are for the most part practical and useful. With such application to our study of Entomology, we older followers of the net and pin need have no fear of the future for our Science, Societies, and Museums and the furtherance of the economic side, which last will become a necessity more and more as time goes on.—Hy. J. T.

'' Sawflies of the Berkhamsted District, with a List of the Sawflies of Hertfordshire and Buckinghamshire and a Survey of the British Species (Hymenoptera Symphyta).'' *Trans. Herts. Nat. Hist. Soc. and Fld. Club*, **21**, 177-231 (1940). By Robert B. Benson, M.A., F.R.E.S.

This is a very useful paper and deals with a very large local fauna. Mr Benson has done for the Sawflies of the Berkhamsted district what we have done for the Beetles of the Windsor Forest area. Of the 456 British sawflies he enumerates no less than 313 from his area, which is equal to 72% of the whole list. The food-plants of all the larvae are given, and some five pages are devoted to the Ecological aspects of the subject. The earlier lists and records of British sawflies are referred to. Furthermore, a survey of all the known British species is given, which should prove to be of great use to the student of the fauna of our country.

Two pages of references are appended. This publication is essential not only to the student of British sawflies, but to anyone interested in our Hymenoptera in general. It can be obtained from Miss Gibbs, Houndspath, St Albans, for the moderate sum of 5/-.

Just to mention one or two species:—

Neurotoma mandibularis, Zadd., is only known from two specimens captured in the New Forest. It was first recorded as British on the specimen we took in the New Forest on 28th May 1910 (not 1916 as stated by Benson).

Periclista pubescens, Zadd., is recorded from Bricket Wood, and is said to be only known now from two other counties elsewhere, i.e., Devon and Surrey. The first British specimen was taken by us at Porlock, Somersetshire, on 28th April 1911.

Gilpinia polytoma, Htg. Only one specimen is known from Benson's district, which he bred from a larva taken in Whippendell Wood, Herts., in June 1940.

We beat the third British specimen off spruce in Windsor Forest on 6th May 1934. Fortunately, no further specimens have been found, for it might easily become a serious pest. In Canada, where it has been introduced from Europe, immense damage has been caused to the spruce forests. [*Ent. Record*, **46**, 94 (1934); Windsor List, p. 8 (1939)].

It is almost a pity that the Sawflies of Berkshire are not also included in Benson's publication, for then the numerous species from Windsor Forest would be incorporated.—Horace Donisthorpe, Entomological Department, British Museum (Nat. Hist.), 4.v.41.

P. (253) Add to the List of Forms of *C. haworthii*, Curtis, ssp. *sachalinensis*, Mats., after line 15 from the bottom.

P. (254) Add the Descrip. of this form after line 16 from the top.

ssp. *sachalinensis*, Mats., *Jr. Coll. Agri.*, XV, 140 (1925).

Descrip.—Stz., *Pal. Noct. Supp.*, III, 160 (1934)—" Much larger reniform stigma, which is extended along veins 3 and 4 in long dentations, a wide oblique black-brown spot is situated outwardly thereof. Between veins 3 and 5 are two black-brown spots on margin. Marginal band is wide and blackish. The yellowish fringes have a dark dividing line." S. Sagahalin.

P. (261) Add to the List of Forms of *M. sordida*, Bork., f. *engelhartii*, Duurloo.

P. (263) Add the Orig. Descrip. of this form after line 14 from the top.

f. *engelhartii*, Duurloo. (Warnecke, *Int. Ent. Zts.*, XXVII, 370 (1933)).

Fig.—*l.c.*, plt., fig. 8.

Orig. Descrip.—A " pale yellow-grey " sandhill form is figured on the plate; from the West-Coast of Jutland.

P. (276) Add to the List of Forms of *C. exulis*, ab. *obscura*, Wehrli.

P. (280) Add the Descrip. of the above form after line 16 from the top.

ab. *obscura*, Wehrli, *Mitt. Ent. Ver. Basel*, XI, 2 (1919).

Descrip.—Stz., *Pal. Noct. Supp.*, III, 161 (1934)—" are completely grey-black specimens without any brownish hue, and scarcely visible paler transverse lines."

P. (282) Add to the List of Forms of *P. leucophaea*, View., ssp. *melanophaea*, Zerny.

P. (284) Add the Orig. Descrip. of the above form after line 14 from the bottom.

ssp. *melanophaea*, Zerny, *Zeits. Oester. Ent. Ver.*, XIX, 45 (1934).

Fig.—*l.c.*, plt. V, 9, 10.

Orig. Descrip.—" Noted by its striking size [forewing length, ♂ to 22, ♀ to 24 mm.: expanse, ♂ to 48, ♀ to 51 mm. (only one ♂ is conspicuously small, expanse 33 mm.)], dark grey-brown ground colour and the conspicuous size of the stigmata, of which the reniform is deep white. The transverse lines remain distinct, and the arrow spots are developed before the subterminal line. On the underside of the hindwing the costal portion remains strongly dark suffused and the discal spot is very large and round (in the typical race mostly lunular)." Morocco, Tachdirt.

P. (290) Add to the List of Forms of *N. popularis*, Fab., ab. *pallida*, Cockayne.

P. (292) Add the Orig. Descrip. of ab. *pallida*, after line 12 from the top.

ab. *pallida*, Cockayne, *Ent.*, LXX, 193 (1937).

Fig.—*l.c.*, plt. IV, f. 3-4.

Orig. Descrip.—" Forewings very light brown, almost concolorous with the nervures. Anti- and post-median lines dark brown; 3 stigmata outlined with brown; the row of wedge-shaped marks parallel with the termen dark brown, but lighter than in normal specimens and showing very clearly in the pale submarginal band; marginal band light brown; fringes like ground colour but with slightly darker edge. Hindwings greyish-white with a faint grey submarginal band and a line of the same colour internal to it." Lizard, Cornwall.

P. (298) Add to the List of Forms of *C. graminis*, L., ab. *friesica*, Bryk., and ab. *radiata*, Bryk.

P. (300) Add the Orig. Descrip. of these two forms after line 16 from the bottom.

ab. *radiata*, Bryk., *Ent. Rund.*, LIII, 160 (1936).

Fig.—*l.c.*, fig. 4, good.

Orig. Descrip.—" which is an extreme form of ab. *albineura*, Bdv. The markings of the forewings are quite re-arranged. The central and terminal cell-spot have disappeared and together with the extended outer portion of the discal area form a large and long ray of light coloration." Berlin Museum.

ssp. *friesica*, Bryk., *Ent. Rund.*, LIII, 159, fig. 1-2 (1936).

l.c., 188. Dr Heydemann discussed this form and showed that to name it is an error, and, at considerable length, that the forms named by Bryk. were already included in other named forms although they were perhaps extreme forms. He based his remarks upon a very large series of Northern forms from Sweden, Lapland, Iceland, Schleswig-Holstein, and those from all parts of Germany, in addition to the very numerous examples from the North Friesian Islands. Thus both the above names fall.

Drdt. in Stz., *Pal. Noct. Supp.*, III, 255 (1937), says this name is a synonym to the type name.

P. (311) Add to the List of Forms of *L. cespitis*, Schiff., r. *carboniosa*, Trti.

P. (312) Add the Descrip. of the above form after line 24 from the top.

r. *carboniosa*, Trti., *Nat. Sic.*, XXIII (1919), Sep., p. 102.

Fig.—*l.c.*, plt. IV, 22, b. and w. excellent.

Descrip.—Stz., *Pal. Noct. Supp.*, III (1934), 109—" is a deeply black-brown race, the velvety black transverse lines stand out from the dusky ground colour of forewings and only the subterminal line and surrounds to the stigmata are finely yellowish white." Monte Rosa area, Macugnaga.

P. (313) Add to the Comments on Authors, a note on figures in C. G. Barrett's *Lep.*

Barrett, *l.c.*, plt. 173, gives eleven figures, three of which are labelled *gueneei*, but which do not represent the delicate colour of that species, and were probably only the lighter forms of true *testacea*, as all but one (1g) of the other forms depicted are more or less dark, including two very dark examples from Ireland, West Coast and Dublin Coast.

P. (320) Add to the List of Forms of *G. trigrammica*, Hufn., ab. *nigropunctata*, Krom.

P. (322) Add the Orig. Descrip. of this form at the bottom of the page.

ab. *nigropunctata*, Krom., *Int. Ent. Zt.*, XIII, 180 (1920).

Orig. Descrip.—" Reniform and orbicular forming a black spot."

P. (28) To the List of Forms of *A. diluta* add ab. *asemata*, Dnhl.

P. (29) Add the Orig. Descrip. of the form, 11 lines from the bottom.

ab. *asemata*, Dnhl., *Ent. Zeits.*, XXXIX, 12 (1925).

Orig. Descrip.—" Dark grey specimens without markings. Rare among other forms."

P. (44) To the List of Forms of *D. caeruleocephala* add ab. *infumata*, Schwing.

P. (350) Add the Orig. Descrip. of the above form, line 18 from the top.

ab. *infumata*, Schwing., *Verh. z.-b. Wien*, LXVIII (150), 1918.

Orig. Descrip.—" A ♀ of *D. caeruleocephala* was taken by me in Wien-Gersthof with the fore and hindwings, thorax and abdomen darkened black-brown, and the usual grey-white spots on the forewings yellow."

P. (60) Add to the List of Forms of *A. strigosa*, ab. *destrigata*, Latt.

P. (61) Add the Orig. Descrip. of the above form after line 20 from the top.

f. *destrigata*, Latt., *Zeits. Wien Ent. Ver.* (*Zts. Oestr. Ent. Ver.*), XXV, 17 (1940).

Orig. Descrip.—" This form differs from the typical forms in the first place by the complete absence of the black longitudinal streak over the inner margin of the discal area. Moreover the space over the arrow streak is much extended." ♀ Regensburg.

P. (69) Add to the List of Forms of *A. menyanthidis*, ssp. *fennica*, Latt.

P. (70) Add the Orig. Descrip. of the above form, line 14 from the bottom.

ssp. *fennica*, Latt., *Zts. Wn. Ent. Ver.* (*Zts. Oestr. Ent. Ver.*), XXV, 17 (1940).

ORIG. DESCRIP.—" A short series from Finland, obtained from Staudinger, shows a constant difference from the mid-European specimens. It is characterized by the dark bluish-ashy-grey ground tone of the forewings and the similarly strong black-grey much darkened ground colour of the hindwings. All forewing markings are clear and the white covered distal transverse line contrasts strongly with the darkened ground; the stigmata are distinctly marked out in black. The underside is strongly blackish-suffused especially in the costal half of the wing. Forewing fringes chequered, even those of the apical third of the hindwing, were distinctly obvious on the underside. Head and thorax of the same colour as the forewings." Seinupoki, Finland.

P. (75) Add to the List of Forms of *A. rumicis*, ab. *nigerrima*, Latt.
P. (353) Add the Orig. Descrip. of the above form, 4 lines from the bottom, p. (87).

f. *nigerrima*, Latt., *Zts. Wien Ent. Ver.* (*Zts. Oestr. Ent. Ver.*), XXV, 17 (1940).

ORIG. DESCRIP.—" A true melanic form comparable with the blackish form of *salicis*, Curt., in which the light white end of the inner marginal spot of the whole forewing has become entirely black; all marking are absorbed. On the hindwings the dark marginal band is somewhat widened." ♀ Machnow, near Berlin.

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THE ROYAL ENTOMOLOGICAL SOCIETY OF LONDON: 41 Queen's Gate, S.W.7. (Nearest stations: S. Kensington and Gloucester Road.) General Meetings at 5 p.m., on the first Wednesdays of the month, February-June; October-December. Annual Meeting, third Wednesday in January.

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SOCIETY FOR BRITISH ENTOMOLOGY.—All meetings suspended till further notice. *Hon. Sec., E. Rivenhall Goffe*, 102 High Street, Southampton.

Communications have been received from or have been promised by T. Bainbrigge Fletcher, A. J. Wightman, W. P. Curtis, H. Willoughby-Ellis, E. Ernest Green, H. Donisthorpe, Rev. G. Wheeler, H. W. Andrews, S. G. Castle Russell, Dr E. A. Cockayne, Prof. J. W. Heslop Harrison, Thos. Greer, Dr Malcolm Burr, Abdul Talhouk (plate), E. P. Wiltshire (?), Rev. D. P. Murray (plate).

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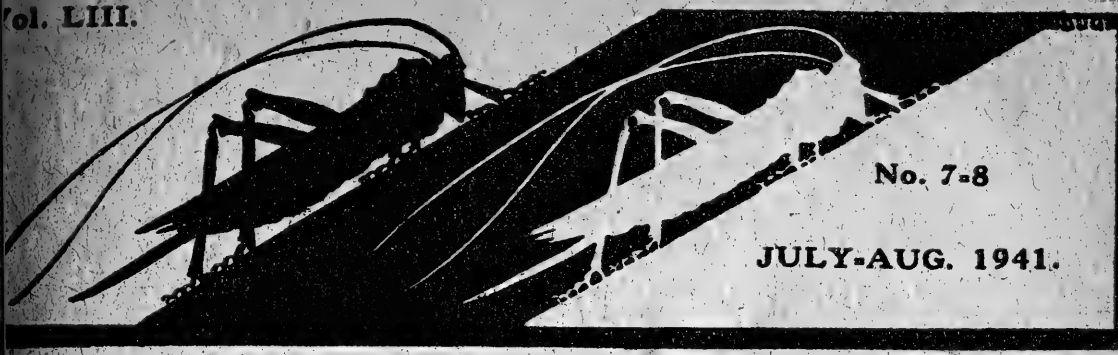
Printed by T. Buncle & Co. Ltd., Arbroath.

Vol. LIII.



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ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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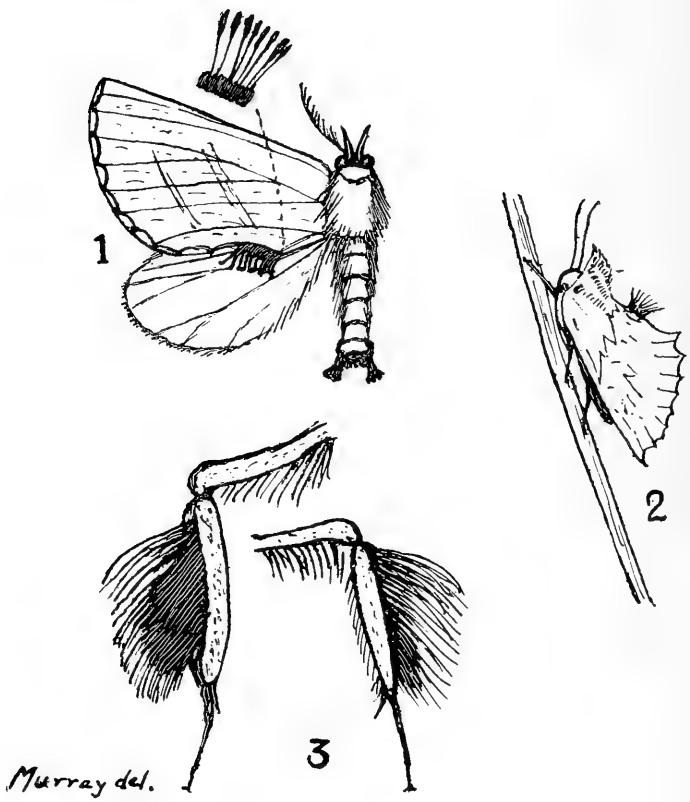
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Murray del.

SECONDARY SEXUAL CHARACTERS IN BRITISH MOTHS.

By Desmond Murray.

Plate II.

That many moths as well as butterflies possess special organs for the diffusion of scent, specialised scales, hair-brushes, plumes on the wings and in some cases on the legs or other parts of the body, has been known for a number of years. As far back as the year 1876, Fritz Müller made some valuable observations with tropical species.

His papers, translated into English, are given as an appendix (with some fine plates) by Longstaffe in *Butterfly Hunting in Many Lands*, 1912.

Though, no doubt, there have been other contributions to this interesting subject, these are scattered in various journals and are not easy to find. Two small books by Eltringham, *Butterfly Lore* and *The Senses of Insects*, are a good introduction to the subject. Tutt gave us a paper on the subject in 1892, which helps us further.

It is true to say, however, that the subject has not received the close attention it deserves. With our own native species, very few observations have been made, as far as one can ascertain.

The Notodonts have many peculiar features not found in other groups. With most of them the hind claspers of the larva are wanting, the body being held up in a peculiar fashion. Sometimes the end of the body is adorned with long whip-like processes, as in *vinula*, *furcula* and *bifida*. In others the larva takes on a most extraordinary form, as in *fagi*. There is a species in S. Africa, *Rigema ornata*, Wlkr., in which the larva is covered with clubbed spines down each side of the body. If you had seen it trying to change its skin, a seemingly impossible task, you would say it was well worthy of a cinema picture. The amazing contortions which it is obliged to go through to accomplish its object are truly extraordinary.

In the larval state some are also found to have an organ between the prolegs, which ejects a liquid—" formic acid "—as a deterrant to enemies. This organ has been noticed in the case of *vinula*, *plumigera*, *nubeculosa* and *crenata* (vide Buckler's *Larvae*, Vol. ii, p. 156).

Even in the pupa state this group is peculiar, though this particular habit is not confined to them. The empty cocoons of *bifida* and allied species may sometimes (perhaps) be found, as they can be seen more easily by their lighter colour, the change being caused by some form of caustic potash, ejected to soften the hard cocoon, before the moth emerges.

In all its early stages therefore, this family appears singular. In the perfect state the peculiar shape of the forewing is found to be, on closer examination, not just a curve in the wing, but some form of sense-organ, either for the diffusion or for the reception of scent.

This organ is noticeably present in *palpina*, *trepida* and *dromedarius*, and of the same formation in *camelina* and *ziczac*. In *cuculla*, *carmelita* and *bicoloria* it is present, but smaller. Even in *plumigera*, the organ of specialised scales is present, though the male insect is adorned with such wonderfully plumed antennae.

When the patch on the forewing is magnified, it is seen to consist of a mass of clubbed setae, which stand up prominently when the wings

are closed over the body. The name " Prominent " was no doubt given on account of the humps possessed by many of the larvae, but it is equally appropriate with regard to the perfect insect.

What function then does this organ fulfil? It has yet to be realised how perfectly adapted and how well equipped many of these tiny insects are in the various stages of their peculiar economy and how very little we know about them.

The organ is either for the diffusion of scent to attract the partner or it is a receptive organ of scent, which helps in finding the whereabouts of the other sex.

In many instances, notably in certain tropical butterflies, a similar organ is found on the wing of the male insect. In most of the species mentioned in the present instance the female also seems to possess the organ, though it is less prominent and generally smaller. If the scales give forth a scent in both sexes this mutual inter-communication would most probably be received by the antennae.

If, on the other hand, it be a receptive organ it could function for the same purpose, i.e., as a means of communication. When the wings are closed, the specialised scales stand up straight over the body, like a cluster of so many tiny pylons, to give forth or to receive the waves of scent through the ether. The organ is directly connected with the nervures of the wing and therefore with the thorax and the antennae, so that stimulus and direction would thus be given.

Certainly the organ must have some such function, acting as a secondary sexual character.

Many butterflies are furnished with scent-brushes, of which Muller says:—" These are usually sheltered from exposure to the air, enclosed between the fore and hindwings or in some other manner, or at least while at rest enclosed between the closed upright wings. The scent is not diffused at the wrong time and so wasted but collects between the densely packed scales among the hairs, brushes and manes. One could hardly find a more effective method of employing any oderiferous substance than that of saturating with it the hairs of a brush and then suddenly opening them out, in all directions, so as to provide an enormous surface for evaporation."

This is not exactly the same case with these moths, as the organ on account of its position is always exposed to the air, but the function must in some way be similar.

A problem that also arises, even though we know the real function of these sense-organs, is why some species possess them, in one form or another, and yet they are entirely absent in other species. Why should some need them and not others? One cannot venture to answer the question, but it is a subject that would repay closer attention and investigation.

Other genera of moths have scent-bags on the hindwings or plume-brushes on the legs of the male; in some cases the tibiae have been found to emit a peculiar perfume.

" These hairs (on the legs) are capable of being erected, forming a kind of very dense brush, and it is in the state of erection that their scent can be perceived " (Müller).

This points to the same need being fulfilled in another way. Look, for instance, at the male *derasa*, the " Buff Arches," and you will be

surprised that the wonderful plume-brush on the second or middle pair of legs does not seem to have been noticed before. It is not only a fine plume of fawn-coloured hairs but it has a silk-like case or purse attached to the tibia, into which it can be neatly packed away. For this reason perhaps it has escaped notice, and it is also hidden away under the forewing close to the body. The male of *Leucania litoralis* has a similar scent-brush on the under hind-part of the body. Other common native species as *P. gamma* and *P. meticulosa* have prominent hair-tufts, either on the body or on the thorax.

Amongst the Geometrae the male of the two small moths, *Lobophora sexalata* and *L. halterata* (the Seraphim), have a large, oblong, fringed, snowy-white lobe or pocket at the base of the hindwing (covered in repose), giving the appearance of an extra wing.

Scotosia vetulata and *S. rhamnata* (Brown Scaliop and Dark Umber) have an extraordinary large trifid tuft, terminating the body of the male, to which Haworth drew special attention. The two species of the *Hepialidae*, *humuli* and *hectus* have the hind leg of the male aborted, forming a scent gland. In some of these cases we do not know the function of these special organs and when they are for the diffusion of scent why are they present in these particular cases?

When closely allied species from abroad are examined it is found that similar yet more elaborate organs are present.

There is then a wide field here for investigation. " As yet an unexplored and promising harvest of new and interesting facts," Müller said over sixty years ago.

EXPLANATION OF FIGURES ON PLATE.

1. Wing of *Pterostoma palpina* showing sense-organ and section enlarged.
2. *Lophopteryx camelina* at rest, showing position of sense-organ, natural size.
3. Middle leg of male *Habrosyne derasa* with scent brush and silk-like container × 5, back and front.

THE GENETICS OF RHYACIA RUBI, VIEW., AB. OCHRACEA, WALKER, AND AB. FLAVA, WALKER.

By E. A. Cockayne, D.M., F.R.C.P., F.R.E.S.

Walker's notes on the breeding of these rare forms published in the *Entomologist's Record*, 1902, 14, 171, and 1903, 15, 55, are scanty, but sufficient to make it almost certain that the yellow forms are recessive to the red. The results may be condensed as follows:—

(1) Unknown male (? DR) × *ochracea* female (RR)—Progeny *ochracea* 25 per cent., *flava* 14 per cent. All yellow forms 39 per cent. Red forms, *quadratum*, Hb. and typical, in approximately equal numbers, 61 per cent.

(2) From this brood a male *flava* × a female *ochracea* gave 9 yellow offspring in the same year, 3 *flava* and 6 *ochracea*. The rest of the brood, which passed the winter as larvae, produced yellow forms

only, but neither the numbers nor the proportion of *flava* to *ochracea* are given.

(3) Unknown male (? DD) × yellow female—Progeny all red forms. Numbers not given.

The results are best explained by assuming that red forms are dominant to yellow, the former being DD, homozygous red, and DR, heterozygous red, and the latter RR, homozygous yellow forms. If so, the three most important pairings were obtained, that between two heterozygotes being the only one lacking.

(1) DR × RR. This should give equal numbers of red and yellow forms. Unless 14 is a misprint for 24 per cent., there is an excess of red forms and a deficiency of yellow ones, the deficiency being in ab. *flava*. Unfortunately the numbers are not given.

If my supposition is correct and the unknown male was heterozygous for yellow, it was extremely fortunate that it paired with the yellow female which Mr Walker captured and bred from.

(2) RR × RR. The expectation is that all the offspring will be yellow, and agrees with the actual result.

(3) DD × RR. The offspring will be all DR, apparently normal red forms, and this result was obtained.

Walker claims that there are two distinct yellow forma, *flava* and *ochracea*, but it is probable that the yellow coloration is determined by a single gene and that *flava* and *ochracea* differ because of the action of one or more independent genes. Possibly *flava* is the yellow form of ab. *quadratum*, Hb. and *ochracea* of the typical red form. That equal numbers of *quadratum* and typical red specimens occurred in brood (1) is in favour of this explanation.

Noctua (*Rhyacia*) *castanea*, Esp., ab. *xanthe*, Woodforde, appears to be a parallel aberration. Like the yellow forms of *R. rubi*, which have only been recorded from Askham Bog near York, it is very local and, according to Barrett, is only known from the neighbourhood of Market Drayton. Although it is dangerous to assume that its relationship to the typical form is similar to that of the yellow forms of *R. rubi*, this is probably the case.

MORE NOTES* ON ERIOGASTER PHILIPPSI, BART.

By Abdul Mon'im S. Talhouk
(Assistant, Plant Protection Service, Government of Lebanon).

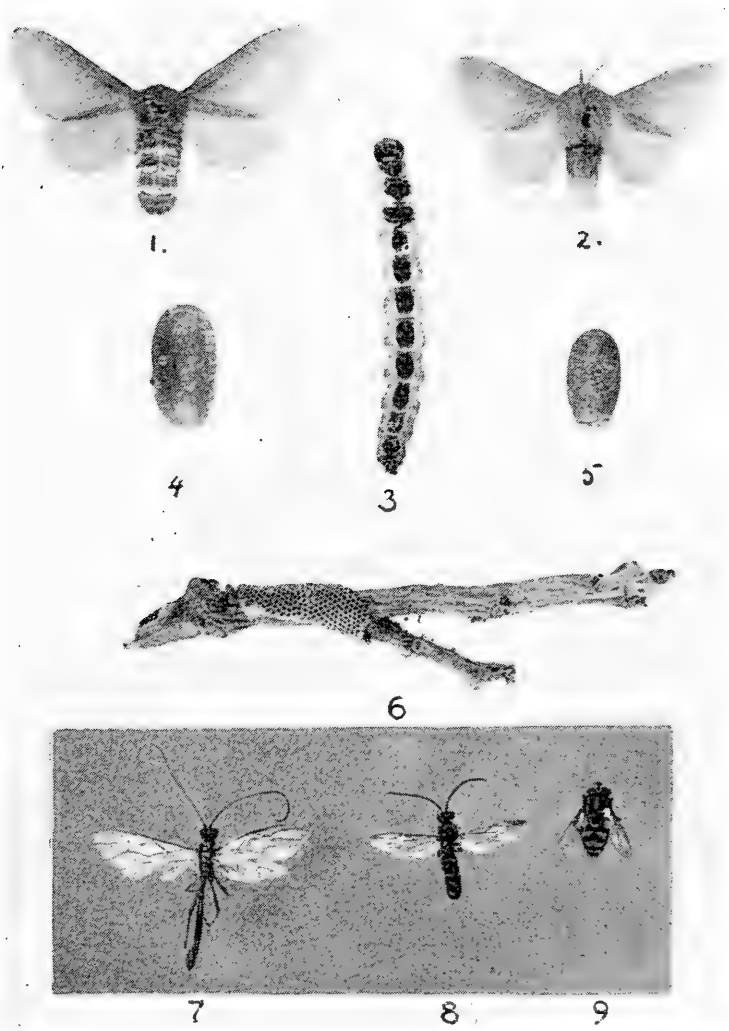
Plate III.

PART I. ADDENDA AND CORRIGENDA.

The Egg.—The eggs are not necessarily deposited in a ring, and extended observations may eventually prove that the ring of ova belongs to some moth other than *E. philippsi*.

The Larva.—The larvae of this moth bear on their bodies hairs capable of causing irritation upon contact with the skin. And even the manipulation of the cast skins and the dry powdered excreta in the

*Previous notes on this insect appeared in *Ent. Rec.*, Vol. lii, June-July 1940.



1. E. philippsi, Bart., ♀.
2. E. philippsi, Bart., ♂.
3. E. philippsi, Bart., larva.
4. E. philippsi, Bart., ♀ cocoon.
5. E. philippsi, Bart., ♂ cocoon.
6. E. philippsi, Bart., ova.
7. Ophion luteus, L.
8. Sturmia inconspicua, Mg.
9. Metopius fulvicornis, Hoes.

" tents," causes a more or less severe itching, especially in the interdigital area of the hand.

PART II. HABITS.

I think that Mr Wiltshire is quite correct in suggesting that this moth may prove to be much scarcer (see previous notes) in years to come. Two factors at least are responsible:

1. Normally, *E. philippsi* moths emerge six months after pupation. But a number of their cocoons remain for years; producing moths " in échelon " over a long period of time, thereby making the " tents " that appear every year in April contain, each, larvae of different ages: great grand uncles and aunts, nephews, cousins, etc., feeding together at the same time and on the same tree.

Possibly, biological and other ecological factors affect this insect and others having this same habit of extended torpidity (either here or in the original habitat of their ancestors) in a peculiar manner so as to adversely influence the number or even endanger the existence of the whole species. Therefore, as a counter measure, Nature, by inducing the insect to pupate in this manner, provides for the continuation of the race, by accumulating a store of cocoons, thus causing an irregular profusion, in certain years, in the number of moths.

2. Even where Oak trees are comparatively scarce, the distribution of " tents " is obviously uneven. In one instance, a comparatively small Oak tree (secluded) was infested, in the Spring of 1940, with 37 " tents," while only 50 yards away some 100 large and medium-sized Oaks of the same species contained only from 3 to 7 " tents " per tree.

I think in this case that the only cause for this uneven distribution is the slight mobility of the turgid female.

LAUXANIIDAE = SAPROMYZIDAE [DIPT.] TAKEN IN SURREY.

By L. Parmenter, F.R.E.S.

These flies, which are mostly pale yellow in colour, though *Minettia* are grey and *Halidayella* and *Lauxania* are black, seem to require shade conditions. They are said to breed in dead and living vegetable matter. In the county they occur from May to October. The following is a list of specimens which I have taken during the past few years together with details of specimens in the British Museum (Nat. Hist.) [marked †] and those listed by E. E. Austen in the *Victoria County History of Surrey*, vol. 1, 1902 [marked *]. It will be seen that whereas in 1902, 7 species were listed, no fewer than 23 are now known in the county. I have paid no special attention to the family when collecting, so that further hunting, especially over the more wooded areas away from London, should increase the list. Furthermore, more attention given to the noting of habitats when collecting might show whether species are conservative in their requirements or not.

In the absence of an up-to-date British List of Diptera I have followed Czerny in Lindner *Die Fliegen der Palaearktischen Region: Lauxaniidae*, giving synonyms where specific names might be unusual to British collectors.

Homoneura tesquae, Beck. Denmark Hill, 1.viii.1867 (G. H. Verrall as *S. biumbrata*, Lw.). See Collin, *E.M.M.*, 1910, p. 170.

H. interstincta, Fln. Limpsfield Common, on leaves of beech, 12.vi.1938 (det. by and in Coll. J. E. Collin).

H. notata, Fln. Weybridge, 24.vii.1907 (A. Beaumont†).

Minettia fasciata, Fln. Bookham Common, 1.ix.35, 11.vi.39; Byfleet, by canal-side, 14.vii.35; Horsley, 20.viii.39; Limpsfield Common, 25.vii.37, on grass 4.vii.37, on bracken 3.vii.38, 30.vii.39; Little Bookham, 23.vi.35; Mitcham Common, 21.vii.40; Staffhurst Wood, near Limpsfield, 16.vii.39; Thornton Heath, in my garden, 17.vii.36.

M. longipennis, F. Bookham Common, 1.ix.35; Limpsfield Common, on bramble leaves 13.vi.38, 4.vi.39, on nettles 20.v.39, on rowan leaves 13.vi.38.

M. lupulina, F. Denmark Hill, 15.viii.67 (G.H.V.†); Bookham Common, 1.ix.35; Byfleet, by canal-side, 14.vii.35; Limpsfield Common, on bracken 25.vii.37, 3.vii.38, 25.vi.39, 30.vii.39, on flowering broom 6.vi.37, on grass 11.viii.40.

M. plumicornis, Fln. Chobham, 28.vii.94 (A.B.†*).

Prorhaphochaeta inusta, Mg. Denmark Hill, —.vii.67 (G.H.V.†); Horsley, 20.viii.39; Limpsfield Common, on bracken 4.vii.37, on bramble leaves 25.vii.37, 25.vi.39; Oxshott, 7.viii.94 (A.B.†*).

Tricholauxania praeusta, Fln. Beddington sewage farm, on shaded Umbellifers, 21.vi.35; Bookham Common, 1.ix.35, 11.vi.39; Byfleet, 19.ix.29 (R. L. Coe†), 22.v.38, 9.vii.39; Cheam, 31.viii.29 (R.L.C.†); Clandon, 6.viii.1900 (E. Saunders*); Limpsfield Common, on bracken 25.vii.37, 6.ix.37, 13.vi.38, 4.vi.39, 2.vi.40, 7.vii.40, 11.viii.40, on bramble leaves 2.vi.40, on lime leaves 11.viii.40, long grass 20.v.39, 11.viii.40, nettles 3.vii 38; Oxshott, on bracken under pines 11.vii.36, 9.vi.40; Richmond Park, on bracken 25.v.35; West End Common near Esher, 9.vi.40.

Meiosimyza platycephala, Lw. [= *Sapromyza difformis*, Lw.] Bookham Common, 11.vi.39; Gomshall, 14.v.39; Horsley, 20.viii.39; Limpsfield Common, 6.vi.37, on beech leaves 20.v.39, on oak leaves 12.vi.38, 4.vi.39.

Aulogastromyia anisodactyla, Lw. [= *Sapromyza fuscicornis*, Macq.] Limpsfield Common, on birch leaves 30.vii.39, on bracken 4.vii.37, on oak leaves 12 and 13.vi.38.

Peplomyza litura, Mg. [=*P. wiedemanni*, Lw.] Clandon, 6.viii.1900 (E.S.†*); Limpsfield Common, on bracken 25.vii.37, on grass 6.ix.37, ♀ on mud patch in path through oak wood 8.viii.37; Moorhouse Bank near Limpsfield, 25.vi.39; Putney, 7.vi.96 (B. G. Rye†*).

Lycia decempunctata, Fln. Compton, no date (D. Aubertin†); Limpsfield Common, 4.vi.39.

L. illota, Lw. Bookham Common, 1.ix.35; Limpsfield Common, 8.ix.35, 20.v.39, on bracken 4.vii.37; Moorhouse Bank, 25.vi.39; Thornton Heath, in my garden, 19.viii.39.

L. pallidiventris, Fln. Byfleet, 22.v.38; Chobham, 29.vii.93 (A.B.*); Limpsfield Common, on grass 11.viii.40, on oak leaves 12 and 17.vi.38; Worms Heath, 21.v.39.

L. rorida, Fln. Ashtead, 1.vi.30 (R.L.C.†); Bookham Common, 11.vi.39; Boxhill, 2.viii.83 (G.H.V.†); Caterham, 6.ix.36; Horsley, 20.viii.39; Limpsfield Common, 7.vi.36, 6.vi.37, on bracken 4 and 25.vii.37, 6.ix.37, 17.vi.38, 4 and 25.vi.39, 11.viii.40, on bramble leaves

4.vii.37, on grass 20.v.39, on hogweed 31.x.37; Selsdon, 24.ix.29 (R.L.C.†).

L. sordida, Hal. [= *Sapromyza decipiens*, Lw.] Beddington sewage farm, on shaded Umbellifers 21.vi.35; Limpsfield Common, 8.ix.35, on grass and lime leaves 11.viii.40; Thornton Heath, in my garden, 13.vii.35, 14.vi.39, 23.vii.40.

Sapromyza hyalinata, Mg. Limpsfield Common, in oakwood, 17.vi.38.

S. obsoleta, Fln. Beddington sewage farm, 19.v.35, 2.vi.35, 22.v.37.

Halidayella aenea, Fln. Beddington sewage farm, 8 and 27.vi.35; Clandon, 6.viii.1900 (E.S.†*); near Leith Hill, 25.vi.68 (G.H.V.†); Limpsfield Common, 8.ix.35, on bracken 25.vii.37; Mitcham Common, 29.v.37, on sallow leaves 1.vi.40; New Malden, 2.ix.29, 25.vi.31 (R.L.C.†); Staffhurst Wood, 16.vii.39.

H. simillima, Collin. Bookham Common, 11.vi.39; Box Hill, 11.ix.34 (det. J. E. Collin); Limpsfield Common, 6.vi.37, on bracken 25.vii.37, 13.vi.38, 4.vi.39.

H. geniculata, F. Woking, no date (G.C.C.†).

Lauxania cylindricornis, F. Limpsfield Common, on flowering broom, 6.vi.37.

94 Fairlands Avenue, Thornton Heath, Surrey, 10.vi.41.

COLLECTING NOTES.

Notes on British Lepidoptera. (Geometrinae).—*Pseudoterpna pruinata*.—Larvae can be beaten from the common Broom throughout May and early June. The moths are abundant in July, when they may be disturbed from grassland on the Camberley commons and many other parts of the country. They vary in colour from blue-green to grass-green, with either one or two dark cross lines. I have occasionally taken quite fresh specimens of a buff colour.

Hipparchus (*Geometra*) *papilionaria*.—I have found half to full-grown larvae on Birch and Alder from April to June, and have beaten young larvae from the same trees in September. Moths have been taken in my moth-trap towards the end of June and throughout July.

Hemistola chrysoprasaria (*Geometra vernaria*).—Not common in Camberley; but I have taken full-fed larvae, in Kent, as late as 11th July, and moths (at light) as early as 27th June.

Comibaena (*Euchloris*) *pustulata*.—Moths have been taken at light in June and July. They are also to be beaten out from Oak trees and are common in the Camberley district. I have found the larvae in September.

Euchloris smaragdaria.—On a visit to Canvey Island (Essex) larvae were taken in September, on *Artemisia maritima*, and Mr Hugh Main has sent me others from the same plant. They were hibernated successfully and moths emerged at the end of July.

Chlorissa (*Nemoria*) *viridata*.—I have taken the moth, rarely, at Shillinglee (Sussex); in the New Forest, and at Bere Regis (Dorset).

Iodis lactearia.—The moths are observed, commonly in my garden,

flying at dusk, throughout May and June. A single moth emerged (in my cages) on the 31st of March.

Hemithea aestivaria (*strigata*).—I took a larva on hawthorn in May, from which a moth emerged on 10th July. Moths have been taken, at light, from mid-June to mid-July.

Sterrha (*Hyria*) *muricata*.—I have taken this species, on the wing in July, in a bog near Camberley.

Acidalia serlata (*virgularia*).—Moths were abundant in my garden, flying at dusk, throughout mid-June to early September.

Acidalia sylvestraria (*straminata*).—Not common at Camberley; but one moth came to light on 30th June, and another was netted at dusk, amongst heather, on 28th July.

Acidalia fuscovenosa (*interjectaria*).—Abundant at light and, at dusk in my garden, in July.

Acidalia subsericiata.—I take this species, mostly at light in my moth-trap, throughout June and early July.

Acidalia inornata.—Taken at light, but not commonly. in July and early August.

Acidalia aversata.—Both greyish, ochreous and banded forms are equally abundant at light in July and August. I find the ochreous form more commonly in the latter month.

Ortholitha mucronata (*palumbaria*).—Taken very commonly on the wing amongst heather, at Camberley, from June to July. On one occasion I caught a moth on 16th August. (*To be continued*).—E. ERNEST GREEN, F.R.E.S., Camberley, Surrey.

PLUSIA MONETA, F., IN PERTHSHIRE.—On 10th August 1939 I found a worn male resting on a wall of the Loch Rannoch Hotel not far from the Delphinium in the garden. There is a record that several were taken at Aviemore, Inverness-shire, in July 1936, by S. C. Scarsdale Brown (*Journ. Soc. Brit. Ent.*, 1937, **1** (7), 191), and J. W. Heslop Harrison has recorded it from the Isles of Coll and Rhum in the Inner Hebrides (*Ent. Record*, 1940, **52**, 138.—E. A. COCKAYNE, Tindal House Emergency Hospital, Aylesbury.

DATES OF APPEARANCE AT EASTBOURNE.—We saw the first *Pieris brassicae* on 19th April, and on 13th April we saw well on the Downs a *Vanessa atalanta* sunning itself, but we had previously seen one in the garden.—G. T. B.-B.

MONIMA (TAENIOCAMPA) OPIMA, HB., IN WILTSHIRE.—In 1939 and again this year I have taken it in this district. Although considered a northern species it occurs in several Midland and Western Counties and commonly in Cheshire. With a more careful search I shall hope to ascertain whether, as seems quite likely, it is definitely established in this locality.—Rev. WALTER L. FREER, Chute, Wilts.

CAPTURES OF INSECTS IN IRELAND.—With regard to Lieut.-Col. Donovan's comments in the June *Record*:—*P. ni*: This, as corrected in the June *Record*, should have been *P. iota;* the " *P. ni* " was a *lapsus calami* and I certainly did not mean this species. This was corrected in the proofs but, probably owing to censorship delays, they did not reach the editor in time for it to be included in the published paper.

" *Apamea obscura* (*ravida*) " : In my manuscript I had this as " *Apamea obscura*" meaning, of course, the Dusky Brocade of South, p. 272, the *A. gemina* of Donovan's Catalogue. The " (*ravida*) " is an editorial addition for which I am not responsible and which led Col. Donovan to suppose that *Agrotis ravida* (*obscura*) was the species meant, which was not the case. " *Hadena lepida* (*carpohaga*) " : The " (*carpohaga*) " is another editorial addition in which I had no say and certainly gives the impression that the English race of the species was referred to. The specimens captured were, of course, the ordinary Irish form *capsophila*. Incidentally, Col. Donovan regards this as a distinct species and not as a local race of *lepida* but with this I do not agree and am of the opinion that *capsophila*, which is the mountain form, is interglacial in time of its arrival in the British Isles while the ordinary English form is postglacial. As Donovan states (Catalogue, p. 48), the genitalia of *capsophila* and *lepida* are identical, and intermediates between the two occur in some localities.—Bryan P. Beirne, 4 Tobernea Terrace, Monkstown, Co. Dublin, Eire, 23rd May 1941.

CURRENT NOTES.

The April number of the *Entomological News* of Philadelphia has a most interesting account of the " Take-Offs " by Prey-laden Wasps (*Pompilidae*, *Sphecidae*). In one case the laden predator climbed up the shoe, trouser leg, shoulder, to the top of the head of the observer, and " promptly zoomed away among the trees with her load."

Two Queries.—1. It is often stated that if successfully reared larvae have been over-fed with luscious fresh food the resultant imagines will be largely female. What evidence have we to support and substantiate this statement? 2. It is stated, possibly with reason, that if larvae be parasitized, they feed up more slowly and that this delayed action is the actual first result of the attack. What is the evidence of this general statement?

Recently we have received a number of separates of economic importance, which have been published in the *Indian Journal of Agricultural Science*. All of these are in much detail and mostly illustrated by diagrams, elucidating the life-histories and structure, in most of them giving an illustration of the stages and perfect imago of the species dealt with.

1. The Anatomy, Life and Seasonal Histories of the Striped-Moth Borers of Sugar-cane in Behar and W. United Provinces. The species dealt with here are *Argyria sticticraspis*, *Diatraea auricilia*, *D. venosata* and *Chilo zonellus*, of which the full life-histories are given as well as details of their morphology and figures of the larvae (the destructive stage). A very useful preliminary to the essential economic investigation. The author, B. D. Gupta. Our colleague, Mr T. Bainbrigge Fletcher, is responsible for the identification.

2. *Chilo trypetes*, a new Pyralid pest of sugar-cane from the Punjab. Its Life-history is given with notes on its suggested control.

The plate accompanying it gives figures of the four stages and of its depredations. A. Rahman and D. N. Tandon are the authors.

3. *Eupelmella pedatoria*, a Parasite of the Cotton-stem Weevil, *Pempheres affinis*, from S. India, with a plate showing all four stages with details of its Life-history, and incidents of its attacks.

4. Investigation on *Spathus critolans*, an important Braconid Parasite of the same weevil as in the above pamphlet, with a plate of the two active stages.

5. The Rôle of Food and its Constituents on the Productivity and Longevity of the same weevil. All these last three are by P. N. Krishna Ayyar.

6. Studies on the Cotton Jassid, *Empoasca devastans*, in the Punjab, by P. M. Verna and M. Afzal.

7. Studies on the Desert Locust, *Schistocerca gregaria*, by M. Afzal T. Ahmad and C. B. Mather.

8. Bionomics and Control of the Fig-tree Borer, *Batocera rufomaculata* (Col.), with plate showing details and all four stages, by M. Afzal and A. Wahid.

Readers of *The Entomologist's Record* will be glad indeed to hear that the Bolivars have settled down in Mexico. That grand old man, Don Ignacio, entered his ninety-first year on 9th November last. Naturally, he feels his years, yet he is keeping well, in spite of failing eyesight. Don Candido writes cheerful letters, saying that he has already made a quite important collection of Orthoptera in that wonderful country, including a large series of the Eumastacid genus *Teicophrys*. —M. B.

" Heterocerous Moths " is rather a curious expression. It is used in the title of a paper published by the Smithsonian Institute of the United States National Museum. The paper contains the descriptions of various hitherto undescribed species from S. America. No less than twenty-nine of these are " ad hoc " descriptions without the slightest indication as to what other species each is related in the genus in which it is placed. Points of difference and similarity must have been noted in the recognition of a new species and should invariably be stated as a guidance to the next student who meets with the species. Such descriptions are practically useless and the whole process of discrimination must be gone over again by the next fellow to make progress. Five species only have slight indication of relationship to another species, viz.:— (1) " more intensely marked than "; (2) " larger than," " spot on hind wing different "; (3) " closely allied to "; (4) " Allied to —— in shape, but spot on the underside quite different, consisting of small clusters of black spots instead of the distinct black spots of "; and (5) " Possibly a variation of." All we can say is " Poor stuff."

In 1936 our colleague, Mr T. Bainbrigge Fletcher, in the *Ent. Record*, xlviii, 105-106, described a method for " tagging " butterflies for migrant registration. In the February number of the *Canadian Entomologist*, p. 21, F. A. Urquart, of the Royal Ontario Museum of Zoology, Toronto, describes his adoption of this plan with the *Danaus* butterfly so-called *plexippus*, L., and the results obtained during the

late summer of 1940, and urges entomologists to follow up this investigation during the present year, 1941.

The usual Annual Report of the Entomological Society of Ontario (the 71st) has just come in. It consists of 64 pp. of the routine business matters of the Society and the fourteen papers presented to the Annual Meeting. All these deal with economic entomological matters under the auspices of the Ontario Department of Agriculture.

The London Naturalist: the Journal of the London Natural History Society for 1940 has just appeared. Of course it is much curtailed in size as were its multiple activities in the absence of many of the younger members. However, nearly one quarter of the Journal is devoted to Entomology. An annotated List of the *Andrena* and *Nomada* (Hymenoptera) of Hampstead Heath, by J. H. H. Yarrow, occupies four pages. Records of British Butterflies and of Plant Galls by H. J. Burkill occupy over three pages. Several general notes make up the work of the section of which those on Diptera by L. Parmenter are interesting.

Volume xv of *Eos*, the Spanish Journal of Entomology for 1939, has recently been received. It consists of over 100 pp., small quarto, and is largely taken up with a Monograph of the genus *Cerceris* (Hym. Spheg.) as represented in Spain. This takes up 90 pp., two plain plates and many text figures. The author is J. Giner Mari. The rest of the Journal contains particulars of the *Apidae* collected in S.-East Africa from 1889 to 1920 by the Missionary, Rev. H. A. Junod. It is mainly a List with a few new species described by H. Friere.

Volume xvi for 1940 was received at the same time. It consists of about 150 pp., and is mainly a bio-geographical study of the genus *Pimelia* (Col.) as distributed in Morocco. This article is illustrated by three plates of imagines, and a number of sketch maps of the distribution of the various species. Prof. C. Koch of Munich is the author. A further paper is published on the *Coccidae* of the Republic of Dominica by J. G.-M. Ortola, with several illustrations. These two volumes are well printed and produced and have now brought the issue of the Journal up to date, and are a credit to the Entomological Section of the National Museum of Natural Sciences, Madrid.

REVIEW.

"The Male Genitalia of Hymenoptera." Smithsonian Misc. Coll. Vol. 99, No. 14 (1941), by R. E. Snodgrass.

This is a very comprehensive work dealing with the male genitalia of all the Hymenoptera, but, of course, we are competent to criticize only the part concerning the Formicoidea (Sec. viii, pp. 40-42, Pl. 11-13). The subject has been thoroughly dealt with by Emery, Wheeler and the writer. We personally do not approve of, or see the object in, giving new names to the different parts when, as for the ants, the terminology is already fixed, being used and understood by all myrmecologists. At a meeting of the Royal Entomological Society of London

in 1915, we read a paper on the " Genital Armature of the Male Ant " (*Proc. Ent. Soc. Lond.*, 1915, l-liii, chart), and exhibited a chart showing what all the different parts had been called by various authors, and pointing out what was accepted as the most correct, and useful terminology to use. Furthermore, in " British Ants," pp. 13-15, figs. 26-30 (1915); 2nd Edtn. (1927), the matter is succinctly, but comprehensively explained. The best thing appears to be to reproduce the same here, pointing out in brackets what the parts in question are called by Snodgrass. First of all, however, we will explain that the use of the names *Poneridae* (as used by Smith, 1851, Mayr, 1862), etc., is incorrect and obsolete; putting the sub-family *Ponerinae*, etc., on the same footing as the whole family *Formicidae*.

" The genital armature of the male consists of the following parts: The *Annular Lamina* (Basal Ring, S.) is a ring which forms the base of the whole apparatus. The *External Paramera* consist of the outer and intermediate pairs of appendages; the outer pair are the *stipites* (Paramere, S.) which act as claspers, and are often furnished with hairs. In some genera the basal parts of the stipites consist of more or less elongate, triangular, oval or semicircular lobes which are called the *Squamulae* (Lamina parameralis. S.). These sometimes look as if they were separate plates applied to the stipites, but this is not the case as they are actually part of them.

The median pair are known as the *Volsellae* (Digitus. S.); these are sometimes more or less divided into two pairs, one of which is then called the *Laciniae* (Cuspis. S.) and the other the *Volsellae*. The volsellae and laciniae also probably act as claspers.

The *Internal Paramera* consists of the innermost pair of appendages, the *Sagittae* (Penis valve; lamina aedeagalis. S.), which are connected together by a membrane, the *Spatha* (Aedeagus. S.), and the sagittae + the spatha function as a penis.* The sagittae often have serrated edges which probably serve to hold them in position during copulation.

Of these three pairs of appendages the stipites enclose the volsellae, and the latter enclose the sagittae and spatha.

The *Subgenital Lamina* (IX Sernum. S.) is a plate situated beneath the genitalia, and forming in fact the ninth ventral segment of the abdomen. It is sometimes pointed, forked or rounded, and presents valuable aid for classification purposes in some genera. Finally, there is a small pair of hairy appendages, the *Penicilli* (Pygostyle. S.) which are attached to the tenth dorsal segment of the abdomen. They are not present in some genera such as *Anergates*, *Dorylus*, etc.; and in *Prenolepis* they are present in some species and wanting in others, and are consequently valuable for classification purposes. They are stated to represent the Cerci in *Blatta* (the ' Cockroach '), etc., but this does not seem to be absolutely certain."—HORACE DONISTHORPE, Department of Entomology, British Museum (Nat. Hist.).

*Snodgrass uses the word *Phallus* for the whole apparatus of the male genital armature. This appears to us to be an incorrect use of the term. Greek *phallos* = penis, the male intromittent organ only.

Orig. Descrip.—" Forewing grey-brown, powdered with black, all the wavy lines sharp and distinctly black. Space between the waved lines and the fringes, as well as the ground between the outer transverse band and the median shade blackish. The spot shining white. Between the basal transverse streak and the inner transverse band is a blackish band between two paler streaks up to the middle of the wing. Fringes blackish."

" Hindwing grey, the paler fringes powdered with blackish."

Taken near Berlin at Hohenneuendorf on October 3rd, 1909.

ab. *brunneor*, Strand, *Arch. f. Naturg.* (1915), A. 12, p. 149.

Orig. Descrip.—" A European form which is of a browner tint than the typical one."

ab. *olivacea*, Porr., *E.M.M.*, LIX, 87 (1923).

Orig. Descrip.—" Differs from the type in that the usual reddish-brown colour is replaced by dark olivaceous-green, the reniform stigma remaining white or orange as in the type." " Common in the Doncaster district."

" The figure of the Japanese *S. tripunctata*, Btlr., in Seitz, plt. 35 d, is very like this Yorkshire form of *satellitia*, more than the description of it on p. 144." (This figure is not " olivaceous-green.")

ab. *ochrea*, Lenz., *Osth. Schm. Sudbey.*, II (2), 331 (1927).

Orig. Descrip.—" Brightened with ochre-yellowish, especially in the marginal area."

ab. *flavimaculata*, Lenz., *Osth. Schm. Sudbey.*, II (2), 331 (1927).

Orig. Descrip.—" With yellow reniform stigma."

Hoporina, Bdv. (1840), Gn., H.-S., Barr., Sth., Culot [*Xanthia*, Ochs. & Tr. (1816-25) (Dup.), Sth.: *Orthosia*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Xantholeuca*, Steph. (1831), Hamp.: *Oporina*, Splr. (1907)] *croceago*, Schiff., Fab. (1775), 1787.

Schiff., *Verz.*, 86, S. (1775), was the first author to introduce the name for a Noctua, whose larva fed on the bush oak. There was no further description.

Tutt, *Brit. Noct.*, III, 8 (1892): Meyr., *Hand.*, 60 (1895): Barr., *Lep. Br. Is.*, VI, 3, plt. 233 (1900): Stdgr., *Cat.*, IIIed., 208 (1901): Hamp., *Lep. Phal.*, VI, 441, f. (1906): Splr., *Schm. Eur.*, I, 253, plt. 46, 26 (1907): South, *M.B.I.*, II, 22, plt. 10, 12 (1907): Warr.-Stz., *Pal. Noct.*, III, 145, plt. 35f. (1910): Culot, *N. et G.*, I (2), 90, plt. 56, f. 3-4 (1914): Meyr., *Rev. Hand.*, 120 (1928): Drdt.-Stz., *Supp.*, III, 148, plt. 181. (1934).

Ernst & Engr., *Pap. d'Eur.*, VII, 159, fig. 518 (1790), gave two figures, one much darker than the other, both were quite good. They were referred to as *croceago*, Schiff.

Hb., *Beitr.*, I (1), 12, plt. 1, fig. F. (1786), figured and described this species under the name *fulvago*. In the appendix at the end of the volume, p. 104, he corrected the name to *croceago*.

The figure of *aurantiago* of Don., *N.H. Brit. Ins.*, V, plt. 150 (1796), if it be *croceago*, is very divergent from the typical form. It has the

striking feature of the hindwings with a wide deep black marginal band with the rest of the wing of a medium fulvous brown, and a large jet black discoidal spot. The ground of the forewing is the same fulvous brown, darker between the submarginal black line and the outer margin. Reniform and orbicular outlined as well as the two transverse discal lines in very dark brown. The figure does not suggest *croceago* to me.

Illiger, *Verz. Neu. Ausg.*, I, 303 (1801), said that the descriptions of Fabricius, *E.S.*, III, and of Hübner, *Beitr.*, agreed well with this species, which was numerous around Vienna.

Esp., *Abbild.*, IV, 672, plt. 176, 3-4 (1790-?), described and figured *fulvago* = *croceago*, and in IV (2), p. 26, plt. 186, figs. 5, 6, 7, as *croceago*, dealing with larva and pupa. The figures 3 and 4 are fairly recognizable.

Hb., *Samml. Noct.*, 189 (1800-3), gave a very good figure of the usual form of the insect he had called *fulvago* in his *Beitrage* in 1786, now corrected to *croceago*.

Dup., *Hist. Nat.*, VII, 447, plt. 128, 1 (1827), gave a fairly good figure but hardly caught the beauty of its appearance.

Freyer, *Neu. Beitr.*, VI, plt. 586 (1848), gave a poor figure as regards colour, it being of a pure yellow without any admixture of red.

Hamps., *Lep. Phal.*, VI, 441, f. 156 (1906), gave Schiff. as the prior authority. The Japanese *sericea*, Butler, often taken as an Eastern form of *croceago*, Hampson treated as a good species. He figured it plt. 107, 29.

Splr., *Schm. Eur.*, I, 253, plt. 46, fig. 26 (1907), gave only one named form, ab. or r. *corsica*, Mab. He gave a very poor figure. Ground colour too deep and too dull. The costal white dots practically absent, and the markings blurred in the ground.

South, *M.B.I.*, II, 22, plt. 10, 12 (1907), gave a good figure, perhaps hardly brilliant enough for this beautiful species. The author called the figure ab. *latericolor*, Rayn., a dull reddish brown form.

Warr.-Stz., *Pal. Noct.*, III, 145, plt. 35f. (1910), took *aurantiago*, Don., as a synonym; gave *fulvago*, Esp. (nec L.), as a form deeper in colour, and ssp. *corsica*, Mab., a pale biscuit colour; and gave four excellent figures—typical, ab. *fulvago* and ssp. *corsica*. The last is figured with pure white stigmata. Also a figure of *sericea*, Btlr., which they considered to be a good species. The figure of ab. *fulvago* agreed neither with their description nor with Hübner's figure of it.

Culot, *N. et G.*, I (2), 90, plt. 56, f. 3-4 (1914), gave two figures. No. 3 a very good normal form. No. 4, in which the colour is a very pale sulphur almost white, with obsolescent marking. It is labelled *nivea*. Presumably this is an error, as in the text it is called *niveata*, Obthr. This was described in 1912.

Drdt.-Seitz., *Pal. Noct. Supp.*, III, 148, plt. 18l. (1934), added the two forms by Obthr., viz., *niveata* and *intermedia*, and gave a figure of the latter form, plt. 18f., also they included the *luridago*, Dhl., from the S. Tyrol.

Barrett noted of the Variation:—

Very constant in colour, or only occasionally a little paler, but there is some little variation in the distinctness of the stigmata and the central shade.

He spoke of individuals from Suffolk "of a very unusual reddish-orange colour."

The Forms and Names to be considered are:—
croceago, Schiff. (1775), *Verz.*, 86, S.
croceago, Fab. (1787), *Mant.*, II, 159.
fulvago, Esp. (nec L.) (1789-?), IV, 674, plt. 176, f. 3-4 = *croceago*.
fulvago, Hb. (1786), *Beitr.*, I (1), 12, plt. 1, f. F. (invalid).
f. *aurantiago*, Don. (1796), *N.H. Brit. Ins.*, V.
f. *corsica*, Mab. (1867), *Ann. Soc. Ent. Fr.*, 641.
ssp. *sericea*, Btlr. (1878), *Ann. and Mag. N.H.*, Ser. 5, I, 168.
ab. *latericolor*, Rayn. [See South, *M.B.I.*, II, 148, plt. 10, f. 12 (1909)].
ab. *niveata*, Obthr. (1912), *Lep. Comp.*, XVI, 122.
ab. *intermedia*, Obthr. (1912), *l.c.*
ab. *luridago*, Dnhl. (1926), *Ent. Zts.*, XXXIX, 196.

Tutt dealt with the (1) type form of Fab.; (2) the form *corsica*, well marked with very pale under side; (3) the much darker form called *fulvago* by Hb.

Hb., *Beitr.*, I (1), 12, plt. 1, fig. F. (1786), *fulvago* (invalid and changed to *croceago*). Description of the curious figure:—

The figure is of a lighter ground colour than the usual form with a much darkened costal area commencing from a point near the apex and widening to half the base. The curious marking is the presence of five black dots with a ring of clear light ground, two dots with the rings touching form the reniform, another dot and ring is the orbicular, and below this latter two more dot and ring characters a short distance nearer the base and quite separate, represent the claviform.

ab. *aurantiago*, Don., *N.H. Brit. Ins.*, V (1796).

Fig.—*l.c.*, plt. 150.

Descrip.—Roughly this figure may represent a *croceago* form as well as have the name correct. But the shape is incorrect, the ground is dominated by brown, there is a deep black, wide marginal band and a black discoidal to the hindwing which is a brown-yellow instead of almost pure white. The bands of the forewings and the two stigmata are approximately correct in shape and appearance, except that the discal transverse line is the wrong side of the reniform. It is certainly not a synonym to the typical name.

ssp. *sericea*, Btlr., *Ann. and Mag. N.H.*, Ser. 5, I, 168 (1878): Ill., *B.M.*, II, 31.

Fig.—*l.c.*, plt. 30, 10.

Orig. Descrip.—"Coloration of *H. croceago* (of Europe), but the primaries more elongated (the form of *X. gilvago*); the grey markings on the primaries less distinct than in *H. croceago*, excepting the three angulated transverse lines; primaries below rather redder, the markings better defined; secondaries with the markings less (strongly) defined." 1 in. 8 lns. Yokohama.

This species chiefly differs from *croceago* in form. It, however, differs in its more sericeous wings, the secondaries having quite a pearly appearance by the side of the typical species.

var. *niveata*, Obthr., *Lep. Comp.*, XVI, 122 (1912).

Fig.—Culot, *N. et G.*, I (2), plt. 56, 4 (1914).

Orig. Descrip.—" The upper side of the forewings is often of a creamy white, slightly greenish, sometimes uniform and without markings." Algeria.

ab. *intermedia*, Obthr., *l.c.*

Fig.—Stz., *Pal. Noct. Supp.*, III, plt. 18l. (1934).

Descrip.—A transitional form between the above and the typical form. " Paler, pinkish with fainter markings." Drdt.-Stz., *l.c.*, p. 148, gave the genus *Chionaxantha* on p. 278 (Addenda).

r. *luridago*, Dnhl., *Ent. Zeits.*, XXXIX, 196 (1926).

Orig. Descrip.—" It is necessary to distinguish this conspicuous race from the Corsican race. It varies between distinct yellow and dull red-orange in ground colour, by the lines being only wisp-like, and in which the whole of the blue-grey powdering is extraordinarily cloudy and appears washed out." S. Tyrol to the Mendel.

Xanthia, Ochs. & Treit. (1816-25), Dup., Gn., Barr., Splr., (Sth.), Culot [*Cirrhia*, Hb. (*Tent.*) (1806), Sth.: *Orthosia*, Ochs. & Treit. (1816-25), Meyr., Meyr.: *Cosmia*, Ochs. & Tr. (1816-25), Hamps., Warr.-Stz., Drdt.-Stz.: *Hydroecia*, Gn. (1841), H.-S.] *citrago*, L. (1758).

Tutt, *Brit. Noct.*, III, 9 (1892): Meyr., *Hand.*, 60 (1895): Barr., *Lep. Br. Is.*, V, 361, plt. 230, 1 (1900): Hamps., *Lep. Phal.*, VI, 508 (1906): Splr., *Schm. Eur.*, I, 251, plt. 46, 19 (1907): South, *M.B.I.*, II, 17, plt. 10, 1 (1907): Warr.-Stz., *Pal. Noct.*, III, 155, plt. 28 i (1910): Culot, *N. et G.*, I (2), 84, plt. 54, f. 17-18 (1914): Meyr., *Rev. Hand.*, 121 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 154, 19 e (1934).

Ernst & Engram, *Pap. d'Eur.*, VII, 171, f. 527 a, b, c (1790), gave three very good figures, including an under side. They dispelled the suggestion of Rottemburg that the *umbra*, Hufn., was the *citrago*, L., who, had he seen *umbra*, would have at once seen they were different species (cf. f. 527 and f. 480).

Esp., *Abbild. Noct.*, IV, 2 (2), p. 667, plt. 175, 5-6 (1790-?), gave two figures, ♂ and ♀, of a very pale straw colour with clear thin transverse lines and ill-formed stigmata. On plt., *l.c.*, 177, f. 1, he gave a small figure he named *ochrago*, which has been taken for a form of *citrago*, but it s doubtless a form of *fulvago*.

Bork., *Naturg.*, IV, 668 (1792), doubted whether Fab. (*Sp. Insect.*, II, 226) had this species before him since he (Fab.) said (1) that the markings on the forewing were subfasciate, (2) that the larvae were brown with yellow sides, and (3) that it fed on *Prunus* and sallow, all of which characteristics did not fit *citrago*.

He also considered the *ochrago*, Hb. (*Beitr.*, II (1,) p. 10, plt. 1, D.) as this species.

Hb., *Samml. Noct.*, 188 (1800-3), gave an excellent figure of a lighter form.

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Communications have been received from or have been promised by T. Bainbrigge Fletcher, A. J. Wightman, W. P. Curtis, H. Willoughby-Ellis, E. Ernest Green, H. Donisthorpe, Rev. G. Wheeler, H. W. Andrews, S. G. Castle Russell, Dr E. A. Cockayne, Prof. J. W. Heslop Harrison, Thos. Greer, Dr Malcolm Burr, Abdul Talhouk (plate), E. P. Wiltshire (?), Rev. D. P. Murray (plate), Capt. C. Q. Parsons, P. B. M. Allan, T. F. Marriner.

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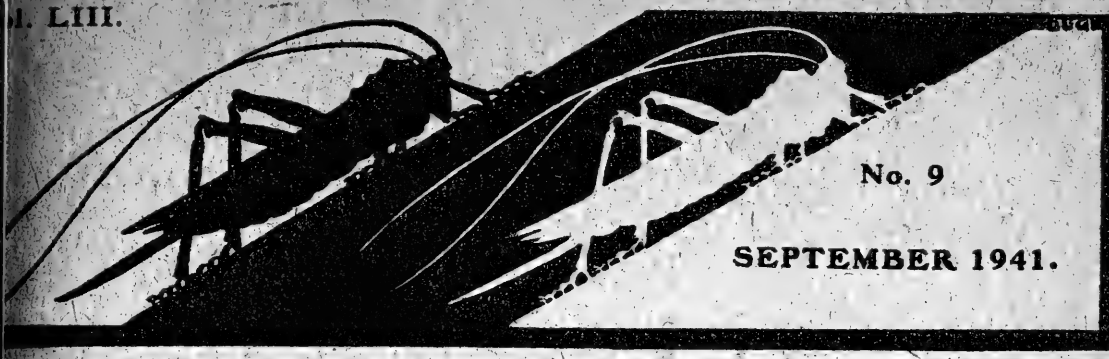
Vol. LIII.



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SEPTEMBER 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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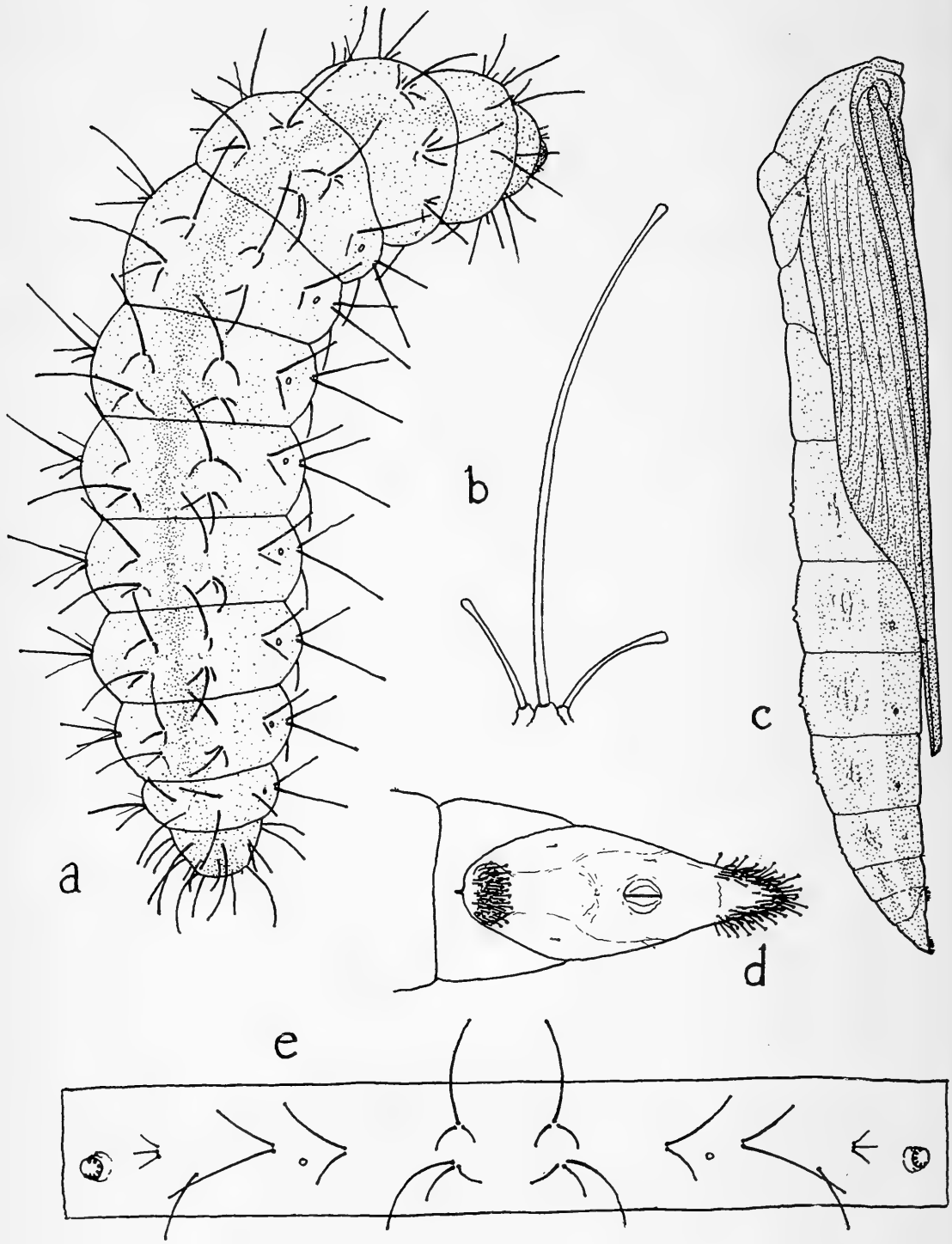


STENOPTILIA SAXIFRAGAE, FLETCHER.

THE LIFE-HISTORY OF STENOPTILIA SAXIFRAGAE, FLETCHER.

By Bryan P. Beirne, Ph.D., F.R.E.S., F.L.S.

(Plate IV.)

In a previous article (*Ent. Rec.*, lii, p. 61, 1940) I gave some notes on the habits of the young larva of this species and since then I have had the opportunity of observing the life-history in greater detail. The eggs are laid singly on the undersides of the leaves of mossy Saxifrage towards the middle or end of July. The egg is ovoid and flattened, the head end being rather blunter than the tail end, the surface is somewhat wrinkled and has a pearly lustre; when first laid the egg is yellowish but it becomes greenish later. It hatches in about ten days and the young larva makes its way to the base of a leaf and burrows into it. During the next six weeks or so the larva mines several leaves and during September burrows into the stem of a shoot near the tip of which it forms a cocoon-like hibernaculum; this usually results in the death of the shoot-tip.

In the Spring the larva resumes feeding and continues to mine the leaves and stems until it grows too large for this; it particularly prefers the young buds. The larvae may be obtained by collecting the mined shoots and keeping them until they emerge to feed in the open as they are very difficult to discern in the mined shoots. Towards the end of May they leave their burrows in the shoots and live externally on the leaves. They are very sluggish in their movements and, owing to their closely resembling the food plant in colour, they are not easy to find; they apparently feed at night. The description of the mature larva (Fig. *a*) is as follows:—10 mm. long; rather stout and tapering somewhat posteriorly, the segmental divisions well marked. Setae long and numerous, usually in groups of three, each arising from a small tubercle and clubbed at their apices (Fig. *b*); dark reddish-brown in colour, except for the three just above the legs which are whitish. Head pale brown with darker brown markings; body yellowish-green, matt, with a pale yellowish band on either side below the spiracles, often with a reddish dorsal band down the back, and the anterior segments marked with reddish, or with two pale yellowish dorsal bands, or with both.

When full-grown the larva spins a small silken mat on the food plant on which it pupates, the pupa being attached, usually head downwards, to this mat by two sets of hooks, one at the cremaster and the other just anterior to the genital openings (Fig. *d*). The pupae show considerable protective resemblance to the food plant, those on the dead leaves usually being dark brownish with reddish markings and those on the green shoots being yellowish-brown with pale markings. The description of the pupa (Fig. *c*) is as follows:—8-9 mm. Thoracic and anterior abdominal segments with two dorsal ridges, converging slightly anteriorly; the ridges continued on the middle and posterior abdominal segments as two pairs of short spines on each segment. Pale yellowish-brown to dark brown in colour, the legs, antennae and wing-cases darker; a yellowish band on either side of the abdomen and usually also another just lateral to the dorsal ridges; in paler specimens there is often a reddish dorsal stripe.

The pupal stage is comparatively short, lasting a fortnight or three weeks and the adults emerge mainly during July. They are abundant

where they occur, that is, in gardens around Dublin, and may be most easily captured when at rest on the Saxifrages and neighbouring plants during the evening. During the day they hide amongst the plants and fly at and after dusk and are attracted by light.

EXPLANATION OF PLATE.

Immature stages of *Stenoptilia saxifragae*: *a*, Mature larva, dorsal view; *b*, Setae of larva; *c*, Pupa, lateral view; *d*, Terminal abdominal segments of (? female) pupa, ventral view; *e*, Setal map of seventh segment of mature larva.

THE DISTRIBUTION AND HABITS OF CALLOPHRYS RUBI, L., IN THE ISLE OF RHUM.

By J. W. Heslop Harrison, D.Sc., F.R.S.

In my original paper dealing with the Lepidoptera of the Small Isles Parish of Inverness-shire (*Proc. Univ. Durham Phil. Soc.*, xi, Pt. I, pp. 10-23) I was compelled to report that all attempts to sweep larvae of *Callophrys rubi* from various moorland plants in the Isle of Rhum had entirely failed. However, in 1939, when we made a prolonged stay on the Island, the presence of the insect was definitely proved in the Askival-Hallival area, for our sweeping operations on the moorlands there ended in the capture of larvae in some numbers. This discovery, nevertheless, left the exact range of the insect on Rhum a matter of complete uncertainty. Hence, when we visited the island during May and June of this year for the purpose of carrying out certain essential work, advantage was taken of the opportunity to remedy the deficiency.

In view of the necessity for spreading our forces over as wide an area as possible, my first journey was undertaken alone, when I penetrated the upper gorges of the Allt Mor na h-Uamha and other dry ravines close by. These, of course, are simply extensions of the original Hallival localities. Throughout these areas the insect abounded, in general frequenting *Vaccinium* areas, but sometimes restricting its attentions to heather (*Calluna vulgaris*) and *Empetrum*.

Although I kept a sharp lookout, I rarely saw it visiting flowers; its feeding activities seemed to be concentrated on honeydew on birches from which it was beaten quite unexpectedly. As I reached the sea near the Bagh na h-Uamha, *Callophrys rubi* thinned out, to increase again steadily as I passed Rudha Port na Caranean and skirted the southern shore of Loch Scresort.

A few days later my work took me toward the deserted village (also on south shore of the Loch) where a small wood exists. Here, between the wood and the rocky moorland slopes, bilberry abounds, and consequently clouds of *C. rubi* were encountered revelling in the hot sun. Obviously, they were attached to the *Vaccinium*, but, despite careful examination, only one insect was observed to approach that plant. Most of them were haunting the patches of bluebells (*Scilla non-scripta*). As this seemed an unusual circumstance, I sat down on a rock and watched their gyrations when I made the surprising discovery that they were settling on the outsides of the flowers, and sucking an exudation, or secretion, formed at the base of the perianth segments. A few, however, preferred the Rhododendrons, and simply plunged headlong into

the flowers in search of their sweets. Others, again, flitted around the mountain ashes, mostly visiting the flowers, but often, almost certainly, ovipositing on the umbels.

The following day, likewise a day of sweltering heat, saw us make a long and, for me, a somewhat disastrous journey to the limestone areas between the mouth of Glen Shellesder and Kilmory, now both mere names, for their inhabitants have gone, fortunately for them, or rather their descendants, long ago. Throughout our tramp along Kinloch Glen, *C. rubi* flew freely enough, but its numbers fell off as we climbed Sgaorishal and approached the Monadh Dubh. Near Loch Sgaorishal, we rested for lunch under a limestone cliff covered with the Mountain Avens, *Dryas octopetala*, which was occasionally visited by *C. rubi*. Here I made a fatal error for, leaving my companions, I undertook what on the map looked a reasonable and easy journey to Kilmory. It is quite true I saw plenty to interest the entomologist, but the trek involved climbing into and out of innumerable ravines and making detours to avoid endless sea gorges which stretched far inland. Still, I can report that, wherever these sheltered hollows supported *Vaccinium*, there *C. rubi* colonies were located.

When I reached Kilmory I found myself a hopeless cripple with the prospect of an eight mile walk in the heat over Rhum roads (?). Hobbling along, I beguiled the way by calculating the sex ratio at present existing amongst the Rhum deer, by taking statistics concerning the relative abundance of *Bombus smithianus* at various points, by watching the flight of the Golden Eagle, by noting how, occasionally, low-flying *Cicindela campestris* could be mistaken for *C. rubi*, and how quickly local conditions could modify the numbers of the ubiquitous *Pieris napi*.

The next day, still blazing hot, was hopeless from my standpoint. The rest of my party climbed Askival (2659 feet) via Barkeval, and they reported the occurrence of *C. rubi* to roughly the 2000 foot level. My activities were confined to working the woods around Kinloch. Here once more the "Green Hair Streak" was the commonest butterfly, often visiting Rhododendron flowers, but not rarely probing the glands at the base of the leaves of the Portugal Laurel. Occasionally, it favoured dandelion, buttercup and similar flowers. This visit to the Kinloch Woods yielded a rather curious fact. Between 10-11 a.m. (G.M.T.) the insect was present in great numbers; at noon not a single one was visible although I did knock a few out of larch, birch and sallow.

Next day, I felt I could go further afield, so I visited Rudha na Roinne along the north shore of Loch Scresort. Once again in wood and on moorland alike *C. rubi* attracted attention by its numbers. In particular, it swarmed around belated *Salix aurita* bushes which were still in flower, and seemed to enjoy thoroughly the nectar the sallow catkins provided.

On the moorlands, where *Libellula quadrimaculata* was emerging in numbers, more than once I observed a pugnacious *C. rubi* battling for some time with teneral specimens of the dragon fly, and sometimes with *Coenonympha pamphilus*.

The last journey we made, which contributed to our knowledge of the distribution of *C. rubi*, was to the southernmost mountain Ruinsival.

This involves what is practically the longest walk one can make on Rhum, along Kinloch Glen to the west, then south-west between Mam Tuath and Minishal, and, finally, more nearly southward, past Ard Nev and Ard Mheall to Harris, from which one ascends Ruinsival. Tedious as this journey is, still it is quite interesting; its insect population is never humdrum and at all stages, from Kinloch sea-level to 1000 ft. on Ard Nev and on to Harris, once again at sea-level, *C. rubi* never failed.

From these few notes it will be clear that this striking little butterfly is one of the most abundant and most widely distributed insects on the Isle of Rhum. Moreover, I feel that, had one the opportunities for the necessary examination, it will prove equally widespread on the neighbouring islands of Canna, Eigg and Muck. Further, I am convinced that its detection in the Outer Hebrides, especially in South Uist, depends simply upon a visit to the Coire Dubh on Beinn Mhor, and to similar localities, at the correct time.

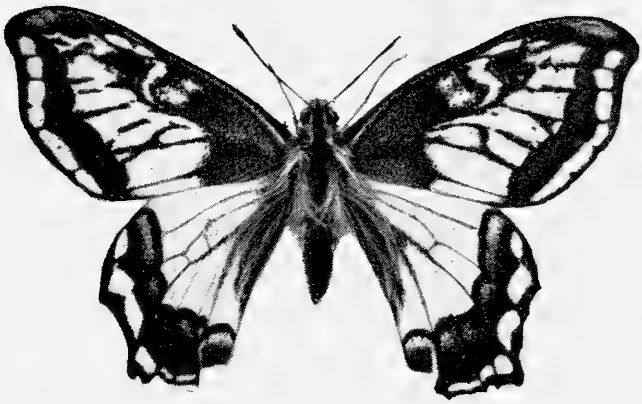
AN ABNORMALITY OF NEURATION IN PAPILIO MACHAON, L.

(Plate V.)

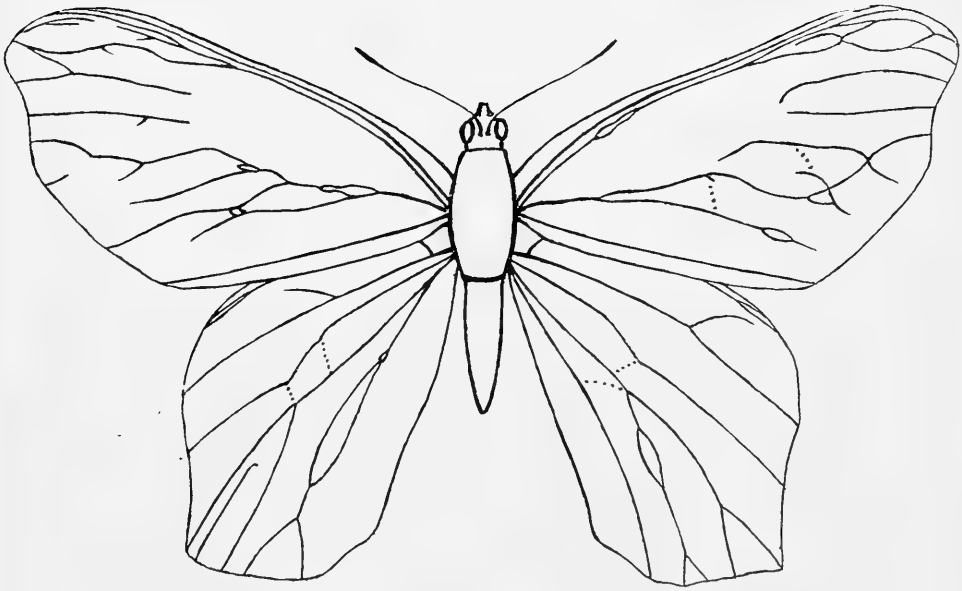
By E. A. Cockayne, D.M., F.R.C.P.

The specimen was bred by L. W. Newman in December 1935 from an inbred strain originating in Wicken Fen and was the only abnormal one bred from this stock. The abnormality of neuration is associated with a great alteration in shape and pattern. The forewings are shortened, the costa is slightly incurved about the middle, and the tip of the forewing ends in a blunt hook. The termen is concave near the apex and then convex. There is no tail on either hindwing.

The neuration is very abnormal and though it differs on the two sides there is some approach to symmetry in its arrangement. In the forewing on both sides 1 (submedian) is normal; on the right side 2 (M2) fails to reach the termen and is duplicated for a short distance; on the left side 2 arises from a duplicated part of the median and is united to 3 by ill-formed chitin about its middle, but fails to reach the termen. On the right side 3 (M1) is represented by a short spur; on the left side 3 is curved towards the inner margin and then away from it, but reaches the termen. On the right side the neuration is difficult to interpret, 4 (R3) apparently divides, but the first part of the outer or anterior branch is not present; where it reunites with the other branch there is a triangular piece of membrane enclosed by chitin and the nervure divides again; the inner branch fails to reach the termen and the outer unites with 5, but separates at once and fails to reach the termen. On the left side 4 arises from a duplicated bit of the median and fails to reach the termen. On the right side 5 (R2) reaches the termen after curving to touch 4 and curving away again. On the left side 5 divides twice, the inner branch of the first division fails to reach the termen and there is a breach of continuity in the inner branch of the second division, but the outer branch reaches the termen. On the right side 6 (R1) is normal, but on the left side there is a short spur, which if continued would unite with 5 where it divides for the



PAPILIO MACHAON, L.



PAPILIO MACHAON, L. ($\times 1\frac{1}{2}$).

second time. On the right side 7 (SC5) is normal, but on the left side it divides, the external or anterior branch uniting with 8. On both sides 8, 9, and 10 (SC4, SC3, and SC2) form a complicated anastomosis, the arrangement of which is shown in the diagram. In the normal *P. machaon* 8 arises from 7 and 9 is connate with 7. The costal nervure is normal on both sides, but the right subcostal is duplicated for a short distance.

In the right hindwing 2 (M2) is normal; in the left it divides into two branches for about three-quarters of its course and after reuniting it soon divides again, both branches reaching the margin. As in the normal *P. machaon* 1 (SM) is absent. On the right side 3 (M1) is duplicated for about a quarter of its course and divides again near the margin, and 4 (R3) arising at the same point as 3 divides into two branches, both of which reach the margin. On the left side 3 and 4 arise at the same point and there is a nervure lying between them, which is probably a branch of 3 with a breach of continuity in the first part of its course. On both sides 5 and 6 (R2 and R1) run to the margin, but 7 (SC2) arises from 6, nearer to the base on the left side, and fails to reach the margin on either side. On both sides 8 (C) divides near the margin, but on the left side the two branches are contiguous. In both fore and hindwings the cells are not closed by discocellular nervures.

The erratic course of many nervures makes the crescentic markings along the border very irregular. In the normal insect black scales follow the course of the nervures, but in this specimen they only follow a part of some nervures and differ on the two surfaces of the same wing. On the under surface of the hindwings most of the nervures are outlined in this way, but on the upper surface there are no black scales along some of them.

The dotted lines in the diagram indicate black markings present on one or other surface, which do not follow the course of a nervure.

The specimen closely resembles *P. machaon*, ab. *elunata*, Spengel, which was bred 20.iii.1887 from a larva found at Länggons, Hesse, 16.ix.1886. Spengel gives a coloured plate showing both surfaces and a camera lucida drawing of the neuration. The shape of the forewings with concave termen is like that of the Wicken specimen, but the tails of the hindwings are normal. There is a narrow marginal yellow band not broken up into lunules and mere traces of the usual black markings along the nervures are present. The neuration is very abnormal; some nervures are duplicated for a short distance, others are vestigial, and almost all end at the submarginal band.

Two *P. machaon*, male and female, almost exactly like Spengel's, but with a broader marginal band, were bred by W. Zimmermann with normal ones, v.1927, from a brood of larvae from Honnef on the Rhine. Frings figures both the upper and undersides and describes the neuration, which was similar to that of Spengel's specimen, but even more deficient. Another example, captured in the Duchy of Brunswick, is figured by A. Ahrens. The shape and pattern of both under and upper surfaces resembles those of the other specimens of ab. *elunata*, and like them it has fully developed tails.

The same kind of aberrant neuration with a similar alteration of the pattern occurs in *Thais* and has been named ab. *neurochola* by Bryk. He gives a coloured plate of an example in *Thais polyxena*, Schiff., and

a description of the abnormal neuration. A similar specimen is figured in Seitz Macrolepidoptera of the World, and another by Härting. Frings records the same abnormality in *Thais rumina*, f. *medesicaste*, Ill. An *Argynnis aglaia*, L., taken 15.vii.1871 at Beachy Head by M. N. Inman and figured in the *Entomologist*, 1871, **5**, 447, is another example of this defect. The specimen, very much damaged, is in the British Museum, Tring. The shape, position, and number of spots on the underside and the neuration are incorrectly portrayed. Few nervures reach the margin and the pearly marginal band on the underside of both hindwings is almost unbroken. Unless my memory is at fault, two similar specimens of *Brenthis selene*, Schiff., were taken near Market Rasen by Captain Crocker some years ago. A female *Gastropacha populifolia* referred to by Frings belongs to this category.

It is most remarkable that with so gross a deficiency of nervures the wings are so perfectly expanded and so symmetrical in shape and size. Spengel calls this kind of abnormality peroneural from the Greek peros = mutilated.

Ahrens, A. *Fauna Insectorum Europae*. E. F. Germar. 1812. Fasc. 4, Tab. 15.
Bryk, F. *Ent. Rundschau*. 1929. **46**, 1, 5, figs. *Mitt. Münch. Ent. Ges.* 1914. **5**, 26, Taf. 1, Fig. 1.
Frings, C. F. *Soc. Ent.* 1911. **26**, 10.
Härting, M. *Ent. Zeitschr.* 1912. **26**, 111, Text Fig.
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AN ARTIST'S NOTE.

To those who have tried their hand with pencil and brush (not too successfully perhaps) to depict the exquisite beauty of some newly found larva or some tiny egg, accidentally come upon—for every entomologist must perforce dabble in drawing and in microscopy—the remarks of the late Rev. C. R. N. Burrows, in a recent number of the *Record* (Vol. liii, p. 36) will perhaps revive some memories.

"Working as I have done for months," he says, "with objectives of small enlargement, has more or less unfitted me for minute investigations."

Yet the delicacy of his line, in those beautiful drawings of the eggs and larva of the "Emeralds" which he has left us, make one envy the powers he possessed.

You may have found out also that what you might have attempted twenty or more years ago, the eye and hand cannot accomplish to-day. If you have the first three or four volumes of the *Record* at hand, look at the coloured plates by Horace Knight, drawings of eggs, larvae and pupae of the genus *Acronicta*. They are masterpieces of beauty: their delicacy and accuracy of line and colour, could not I think be surpassed —they are more perfect than Academy pictures. How is it we cannot produce such things to-day?

The material for reproduction is still at hand, but modern conditions have killed both the initiative and the appreciation. Chromo-

lithography seems also to be a lost art, the passing into oblivion of which no one, unfortunately, seems to have deplored.

The substitution by the colour-photographic process has no doubt been the cause of this loss, but it certainly has not improved our plates nor lessened the expense of reproduction. Coloured plates, even before the war, were prohibitively expensive.

In this way both the artist and the entomologist, who could call upon his fine powers, seem to have been relegated to the oblivion of forgotten things.

In every way we are the losers. There is a glimmer of hope that the new colour-photography (a process we are occasionally told is in course of being perfected) will really be brought into use and will not demand more than a reasonable figure from the ordinary, already overtaxed individual.

Perhaps some specialist in this branch of reproduction would enlighten us.

The problem will have to be faced squarely for it is a most important one to the entomologist and vital to every scientific journal trying to carry out its difficult part.

In some recently published black and white reproductions of the genitalia, which of all subjects ought to be most accurately and delicately reproduced, we seem to have reached the bed-rock of commercial reproduction. They are unsightly and crude, all their beauty and fineness lost, sacrificed for cheapness.

We want to be told of some means by which coloured-drawings (and line-drawings as well) can be reproduced accurately and at a reasonable figure.

The fact remains, there is a very real need to get back to Horace Knight's standard, both in drawing and reproduction. The artists, and there have been many excellent ones in the past, who have tackled the most difficult branch of all—entomological work; artists whose fine powers have been taxed to the very utmost by reason of the extreme delicacy and beauty of their subjects, more minute than miniature painting, have not so far been sufficiently appreciated or had their praises sung.

Cannot we do something about it for the coming generation, I mean, find some way to reproduce our subjects more perfectly in line and in colour?

D. M.

THE UNFORGIVABLE SIN

(A NON-ENTOMOLOGICAL CONFESSION).

By Malcolm Burr, D.Sc., F.R.E.S.

I might have locked my guilty secret in my breast and taken it with me to the grave, for there were no witnesses and the body is safely buried in a corner of wild moorland in Eastern Thrace. But the pangs of remorse would never have given me rest and, so strongly do I feel, that even this confession only partly soothes my heart.

My sin is that in one unguarded moment I allowed my primitive human instincts to overcome my life-long training as an entomologist.

A naturalist may kill, virtually without limit, for the sake of Science, but no naturalist may kill for the mere sake of killing, from mere lust, from revenge, or what is even worse, from fear. And I, when I might have brought safely home a creature of real interest, incontinently killed.

It was on the rolling moorland west of Istanbul. I saw a most inviting stone and, though for some forty week-ends I had without result turned over stones till I was stale, yet I felt attracted to this one, it was so big and flat. With an effort I turned it over.

In one corner there lurked a monstrous, brown centipede, tinged with a greenish lustre, that I had known many years ago in Macedonia. In another was a small centipede enjoying a dinner off a pile of ant pupae. In yet another was a smooth, black ball, about the size of a cherry. Sideways across it ran a crimson stripe.

This unusual coloration was clearly aposematic. Then I remembered that one of the poisonous spiders of Australia is black with a red cross on the abdomen, as too, I believe, the Arabian species. The American Black Widow is, I believe, all black, and so too the Central Asian kind which the Tartars call *karakurt*, the Black Wolf. Nazaroff told me they dread it like the plague. They say the bite is desperately painful, leaves chronic disorder, and is often fatal. The Black Widow is known to be a killer, and in recent years several deaths have been attributed to the Australian species.

So there could be little doubt about this creature. An unreasoning feeling of anger swept over me, and with my thick stick I struck—and crushed it. I flung back the tombstone and at the same instant felt the gush of remorse.

For I had been worse than a criminal. I had been a fool. I could easily have bottled it, and it is a great pity that I did not, for the spiders seem, fortunately, to be rare and few people care to collect them.

I asked a Turk who had lived thirty years in Turkestan. He had never heard of the *karakurt*, and said I must mean scorpion. But he was a townsman. I asked an intelligent Crimean Tartar, but he did not know either, for in his beloved Crimea, he said, there are no venomous creatures.

So the *karakurt* is not a familiar brute like the scorpion, and the chance of making amends seems remote.

JULY IN THE NEW FOREST.

The season has been notable for the number of extreme aberrations of *Argynnis paphia*, L. and *Limenitis camilla*, L., taken in the Forest. The species are far from plentiful generally, and in many of the enclosures were practically absent, in others fair numbers were on the wing. Not since 1923 have I seen or heard of so many aberrations being taken, but 1923 did not compare with the wonderful seasons of 1918 and 1919, when both species were in the greatest profusion all over the Forest, and, in fact, all species were in abundance and all showed considerable aberration.

It seems probable that the cause of the variation this year was the very cold and protracted early summer, when the worst of weather and

cloud occurred well into June. On the other hand *Argynnis cydippe* and *Argynnis euphrosyne* showed very little departure from the normal forms. *Brenthis selene* was practically absent from its heather habitats in the Forest, as so much of the ground has been burnt out by incendiary bombs. From other districts, however, I heard of aberrations being taken.

Plebejus argus was not common generally, but in its best known habitat considerable numbers were in evidence, this notwithstanding the fact that the ground had been well burnt out and some seven large bomb craters were in the area. Certain patches of heather were left unburnt and the species which the previous year were extremely abundant doubtless survived in these. On the burnt ground numbers were seen emerging and these no doubt were from larvae that had pupated there from the unburnt patches of heather. We were very much surprised to find that so many had survived the fires. Working in conjunction with Colonel V. R. Burkhardt we secured the following aberrations: —

B. = Burkhardt. C.-R. = Castle-Russell.

Brenthis (*Argynnis*) *euphrosyne*, L.—A very pale yellow form (B.); a specimen heavily suffused with black, an extreme form (C.-R.).

Plebejus aegon, Schiff. (*argus*, L.).—Well marked ♂♂ *striata* (B. and C.-R.); a very pale blue ♂; a similar one with patches of typical blue (B.); an irregular gynandromorph (B.); various forms of *infrastriata*, *sagittata* and unusual colour forms were obtained.

Argynnis cydippe, L.—A ♂ example of ab. *charlotta* with large silver spots in basal areas of hindwings (B.); three undersides with additional silver spotting (B.); a ♂ with two black bars on upperside (C.-R.).

Argynnis paphia, L.—An extreme form of ab. *melaina*, Daldin. (B.) and (C.-R.); a melanic ♂ of extreme *confluens*, Splr. (the normal spotting being connected and forming bars); two heavily suffused ab. *melaina* ♂♂ (B.); a similar example ♀ (C.-R.); about seventeen ab. *confluens* were obtained varying in the intensity of the markings. The heavily suffused ♂ and ♀ ab. *melaina* are of similar type to the figure 10 in Frohawk's smaller work on British Butterflies. One is referable to ab. *melaina-ocellata*, Frings.

Limenitis camilla, L.—Seven *nigrina* and six *semi-nigrina* (ab. *obscura*, Shipp.) were taken.

Remarks.—I also saw five melanic ♂♂ and ♀♀ of *A. paphia* taken by Mr Clark of Brockenhurst, and the Rev. J. N. Marcon and I heard of others being taken in various parts of the Forest together with many examples of aberrant *L. camilla*. No doubt a list of aberrations taken will be ascertained in due course. I should like to add that Colonel Burkhardt has very generously presented me with the insects taken by him. We saw one beautiful ♂ example with spotless upperwings and suffused hindwings but he managed to evade us on the two occasions we each saw it.—S. G. Castle-Russell.

COLLECTING NOTES.

A Note on Larvae observed near Newton Abbot, 1940-41.—In this period larvae have again been abundant on oak. I have taken those of *Drymonia chaonia*, *Asteroscopus sphinx*, *Taeniocampa miniosa*, *T. incerta* (*instabilis*), *Anchoscelis helvola* (*rufina*), *Xantholeuca croceago*, many *Xylina socia*, *Hylophila bicolorana*, *T. pulverulenta* (*cruda*), and *Calymnia trapezina*. The last species mentioned was not content with *Operophtera brumata* on an apple tree in my garden but had eaten half an apple about the size of an oak-apple gall. A friend tells me that the larvae of *Nygmia phaeorrhoea* (*auriflua*) do the same in his garden. *Biston strataria* and *Phigalia pedaria* have both been plentiful around Newton Abbot. The latter I did not take or possibly there may have been larvae of *Apocheima hispidaria* which I forgot to look for. In the spring of 1940 *Polyploca ridens* was plentiful but I have not seen it this year. *D. chaonia* was at least three weeks earlier. Hibernating larvae must have suffered much from the cold last winter. *Noctua xanthographa* almost absent this Spring in my garden.—(Capt.) C. Q. Parsons, Torquay, 1.vii.41.

Dear Sir,—Whilst shelling peas from the garden this morning I found enclosed pod. As I can find no reference in Scorer's *Ent. Log-Book* or elsewhere to one of the larger moths feeding inside pea-pods I send it along in case it may be of interest. I see there is a small mark of entry at the base on one side, so that the caterpillar has spent its whole life inside the pod. [This was a half-fed larva of *Mamestra brassicae*. I was not aware that this larva was an " internal feeder."—Hy. J. T.] [The larva is normally more or less an " internal feeder " in cabbage heads. The eggs of *M. brassicae* have been recorded on Pea plants. —T. B. F.]—Robert D. R. Troup, " Hountwell," Henley, Alton Pancras, Dorchester, 4.viii.41.

Unpublished Records of Dragonfly Migrations Wanted.—Will entomologists who have witnessed large scale migrations of Dragon-flies in any part of the world, not hitherto recorded in the entomological magazines, and for which the species, actual date, direction of flight in any locality are known, please supply the details to the Chief Entomologist at Rothamstead Experimental Station, Harpenden, Herts.

Dr C. B. Williams has already card-indexed some hundreds of mass migrations of Anisoptera but they are spread over more than a century with very few outside the European zone, and many on so large a scale as to appear in the public press, do not mention the species.

In the Baltic region it is evident that *Libellula quadrimaculata*, L., is the most important migrant and its westerly migrations appear to reach millions about once in every ten years and more often in many thousands.

The latest Continental reports came from K. L. Henriksen of Copenhagen Museum who recorded the species flying west in millions on 7th May 1934 at Bornholm in the Baltic and again in millions continuously between 20th and 26th May 1937, though these migrations appear to peter out before reaching the British Isles. Since hostilities began we have had no information from the Continent but *L. quadrimaculata* has been recorded in dozens west of Ramsey for the first time in the Isle of Man,

on 19th and 21st June 1941 (W. S. Cowin of Manx Museum) and it is perhaps significant that on 9th July this species was "extraordinarily abundant along a stretch of the Grand Canal roughly twelve miles inland from Dublin" (A. W. Stelfox of National Museum of Ireland). Phenological observers are asked to record dates of emergence and observers to report any locality where it becomes very common (i.e., seen in hundreds) to help trace the end points of migratory movements from the Baltic. In this area *L. depressa* is also a well recognized migrant; in North America *Anax junius*, Drury, and *Sympetrum rubicundulum*, Say., and in Africa and China *Pantala flavescens*, Fab.; but there is a dearth of records from tropical regions.

The Insect Immigration Committee, in Bulletin No. lxxvi, issued in June by the South-Eastern Union of Scientific Societies, printed a "Preliminary Note on Dragonfly Migration," of which copies can be obtained on application to the Hon. Secretary, Capt. T. Dannreuther, R.N., "Windycroft," Hastings, Sussex.

[There is an early article on the so-called "Migration" of Insects in a Dutch Society Publication of the year 1857, *Handelingen Nederlandsche Entomologische Vereeniging*, Vol. i, pt. iv, pp. 79-103, by Heer Van Bemmelen. Much of the matter deals with the mass-movements of *Libellulidae* and particularly with *Libellula quadrimaculata*, dating from 1681 to the date of publication.—Ed.]

Phigalia pedaria, L., ab. melanaria, Bretschneider, an example of Y-chromosome inheritance.—Bretschneider (*Ent. Zeitschr.*, 1939, **53**, 59) bred a melanic female in 1937 from a wild larva. The upper surface was deep black, but there was a little white on the head, the vestiges of the wings, and the tip of the abdomen. Pairing it with a typical male from another locality he bred 25 typical males and 28 melanic females in 1938, and pairing these *inter se* he bred 15 typical males and 14 melanic females in 1939. All the males in both generations were typical and all the females were melanic.

He compares this melanic *pedaria* with the dominant sex-limited female forms, such as *Argynnis paphia*, L., ab. *valesina*, Esp., but it is obvious that this form of inheritance would have given either a ratio of 3 : 1 or 1 : 1 of melanic to typical females. For all the females to have been melanic the gene must have been in the Y-chromosome. It is, as far as I know, the first example of this form of inheritance in the Lepidoptera.—(Dr) E. A. Cockayne, 16 Westbourne Street, W.2.

Butterflies, Etc., in Kirkcudbrightshire.—Although most of my collecting is on the English side of the Solway Firth an occasional visit over the border into Galloway is a pleasant and invariably a worth-while change. Both Dumfries and Kirkcudbright are productive counties possessing as they do very varied physiographical features. The marshes at the mouth of the River Nith I have found very good for Coleoptera. Many years ago the late Dr David Sharp recorded many interesting species from there as did the local collector W. Lennon, while the list of water-beetles, thanks to Prof. Balfour-Browne, is a most interesting one. Last Whitsuntide I had the opportunity of spending a week at Kippford, at the mouth of the little tidal River Urr in Kirkcudbright. The district is a forward one for insects, being sheltered from the North and east by low hills. I found several species of Lepidoptera on the

wing, which had not then appeared in Cumberland. My activities, however, were mainly with the Coleoptera, Hemiptera, Hymenoptera, and Diptera (of which I collected about 300 specimens, not yet worked out), but I could not help noticing the abundance of various butterflies and moths. Ten species of butterflies were observed. On my arrival in the district on 31st May a walk over the high ground at the back of the village—rough rocky ground with scattered bushes of thorn and sallow and scanty herbage—revealed the presence of *Brenthis* (*Argynnis*) *euphrosyne*, L., in great numbers, and its abundance continued throughout the week. I have never before seen this butterfly in such force, even in the South of England. In Cumberland, although widely distributed, it is always a much scarcer insect than *B.* (*A.*) *selene*, Schiff. The two " Whites," *Pieris rapae*, L., and *P. napi*, L., were, of course, common, but I did not see *P. brassicae*, L., nor *Euchloë cardamines*, L. Hybernated *Aglais urticae*, L., were common enough also, with a fair number of *Nymphalis io*, L. Next to *A. euphrosyne*, *Coenonympha pamphilus*, L., was the commonest butterfly, especially in glades in the extensive plantations of young conifers on the hills. *Callophrys rubi*, L., appeared to be over, as only one was seen, and that well worn. *Heodes phlaeas*, L., appeared to be just coming out. The few seen were in beautiful condition. *Pararge megera*, L., was well out, basking on low walls and rock faces on the rough road between Kippford and Rockcliffe, while *Erynnis tages*, L., in fair numbers, favoured the open grassy pathways through the hillside plantations. A good many day-flying moths were about, such as *Ino statices*, L., in a marsh by the river; *Phragmatobia* (*Spilosoma*) *fuliginosa*, L., sitting on low herbage; *Euclidia mi*, Clerck, and *Heliaca tenebrata*, Scop., on the hillsides; *Ematurga atomaria*, L., and *Lithina* (*Panagra*) *chlorosata*, Scop. (*petraria*, Hb.), both common on heathy ground. The most noticeable Geometrid, however, was *Pseudopanthera* (*Venilia*) *macularia*, L., which flitted about everywhere. Strange to say, this pretty moth is not often seen in Cumberland. I have never met with it near Carlisle. Our few county records are from the Lake District.—F. H. DAY, 26 Currock Road, Carlisle, 4th August 1941.

RECORDS FROM RODBOROUGH.—On 30th June and 8th July I took two *Helicthis peltigera* on Valerian. On 24th July *Polyommatus coridon* and *Lycaenopsis argiolus* 2nd brood appeared and on 22nd July I found in the garden one *Thecla w-album*, the first I have seen for three or four years, and two *Platyptilia pallidactyla*.—T. BAINBRIGGE FLETCHER, Rodborough.

ELACHISTA SUBALBIDELLA, SCHLÄG.—I found the larvae of this species in some numbers on a Moss near Whitbarrow Scar, feeding in the leaves of *Molinia caerulea*, *Arrhenatherum elatius* and other broad-leaf grasses, but mainly on *M. caerulea*. As seems to be usual with the *Elachista*, the larvae are more often found in sheltered situations, e.g. the clumps of grass growing close to small birches and under trees.

The larva makes a broad mine about mid-way between the rootstock and tip of the leaf and is full fed towards the end of September. It hibernates in the mine which it leaves in April to spin up on a dried grass leaf. The moth emerges about a fortnight after pupation.

The full fed larva is about 6½ mm. in length, tapering from the head and very constricted between segments, giving each segment a rounded appearance. It is dark olive-green in colour, head dark brown, plate of 2 and anal plate black; a whitish spot on the outer edge of either side of 2.

The pupa is 4 to 5 mm. in length, chestnut coloured; dorsum darker, nearly black, on either side of a paler dorsal line.

The larva is not described in Meyrick's *Revised Handbook of British Lepidoptera*; being "evacuated" to Morecambe I have not been able to ascertain whether it has since been described.

Mr A. J. Wilmott of the British Museum (Natural History) kindly identified the above-named grasses.—Leonard T. Ford.

Does Colias edusa, Fb., taste with its feet.—On 24th June I caught a female "Clouded Yellow," and although not a "butterfly" man I thought I would try my hand at obtaining eggs. On the principle "Feed a Moth and have Eggs" I put, at nine o'clock next morning, a drop of sugar-water on a piece of white cardboard, held the butterfly, with her feet on the card, in front of the drop, and with a pin unrolled her proboscis until the tip of it was in the drop. She fed for about fifteen minutes. In recognition of my courtesy she laid me, during the day, ten eggs.

Next morning, 26th June, I proceeded to feed her again. But this time she herself unrolled her proboscis the moment her front tarsi touched a spot where the previous day's sugar-water had dried. She laid no eggs, although it was a sunny day. The 27th was heavily overcast, so I did not feed her and she rested all day. On the 28th (sunshiny) when I prepared to feed her, again she extended her proboscis the instant her front tarsi touched the sugared card. On the 29th and 30th she did the same; but on the 1st July she made no attempt to feed herself and I was again obliged to unrol her proboscis with a pin.

Can any of your readers tell me if *C. edusa*, Fb., like some of the *Vanessidae*, tastes with the tarsi of its front legs? I ruled out the possibility of scent reaching her antennae and palps by blowing while she approached the card and until her proboscis was extended. It struck me as being odd that she should feed herself on four days, with the scent of the sugar-water being blown away from her, and make no attempt to do so on two.

I may add that on 30th June she went berserk and, after flying wildly about the cage for half an hour, laid eggs to the number of about a hundred on almost every leaf of clover (*Trifolium repens*, L.) in the cage, withered as well as fresh, and on the flowers too. There were seven eggs on one leaf alone.—P. B. M. Allan.

A Butterfly Year.—So far this year has been a real Butterfly Year here in North Cumberland. The three "Whites" came in numbers with the first fine warm days, and the "Small Tortoiseshell" came from hibernation. Early in June the "Orange-tip" appeared in greater numbers than has been usual for some years. A brilliant "Peacock" was seen in my garden on 30th April, an unusually early date here. On 24th June the "Red Admiral" was flying. It has never been seen here before late July and August. The "Large Heath" appeared in scores where it had only been seen twice before in eight years. Another

"Peacock" and "Painted Lady" were seen near Carlisle on 14th June, and a " Brimstone " was seen and chased but not caught by a Carlisle collector near Hawick on 16th June. I have not heard of it being recorded for Scotland before. The " Small Copper " and the " Wall " are common just now (early August). 1941 may thus be called here a Butterfly Year.—F. MARRINER.

NOTES ON MELITAEA (EUPHYDRYAS) AURINIA.—With reference to Messrs Thompson's & Greer's " Notes " on this species and the elevation at which it flies I took a specimen of it at 10,000 ft. in the Elburz Mountains in June 1939. It is surely optimistic to expect to find any species of insect not endemic at a record height in the British Isles.—E. P. WILTSHIRE, British Consulate, Shiraz, Iran, 12.iv.41. [See October and December numbers of the *Ent. Record*, 1940.]

NOTES ON VARIATION FROM THE WORTHING MUSEUM COLLECTION. (*Continued from p. 69*).—*N. semiargus*.—There are no English specimens of this species in the collection, though I feel no more certain that it is really extinct in England than I did in 1911 when I wrote at some length on the matter (*Ent. Rec.*, xxiii, p. 211). With regard to the foreign specimens I can find very little difference in size; the mountain specimens are slightly smaller, but I have never come across any that deserve the racial name *montana* except, possibly, one ♂ from the Alp Arpitetta at Zinal, taken August 16th, 1904; two out of three from Salonica are equally small, while those from Faido and Roccaraso in the Abruzzi (both mountain localities) as well as from the Sarnthal are rather large. There is one nearly spotless under side from Palena in the Abruzzi and one *striata* from S. Georges in the Swiss Jura. Those from Finland are dull in colour with small spots on the under side.

A. medon.—There are about 120 English specimens of this species from localities as far apart as the S. Downs and the coast of Durham. Those from the N. and S. Downs are well spotted on the upper side, especially ♀s from the latter, as are also those from Royston, the Chilterns, and the one example from the Cotswolds. Those on the other hand from Witherslack show no orange on the forewing in the case of the ♂s and only small spots in the ♀s. The under sides of these rarely show a tendency to small size in the black spots, but the *albiannulata* form of the upper side is frequent. On the Durham coast on the other hand the tendency towards the *artaxerxes* form is very marked, especially in ♂s with the white discoidal on the upper side. Most of the forms named by Harrison are represented. There are four very good ab. *vedrae* (one of the extreme form), half-a-dozen *semivedrae*, one beautiful little ab. *inclara*, and, of course, ab. *albiannulata*. These northern single-brooded specimens are generally much larger than those from areas where the species is double-brooded. There are five specimens of the race *artaxerxes* from Fife; these are not large. In Switzerland the first brood from the Rhone Valley and Caux and even from Faido are mostly of the *allous* form, and though slightly larger are hardly distinguishable from those of the high mountains; the second brood from the Rhone Valley are larger, especially the ♀s, but even these have only small orange spots on the upper side on all the wings. Those from Aix in Savoie are small but well spotted; much the same are those from Greece; from Bolsano come specimens of about the same

size but slightly spotted. By far the most remarkable are those of the race *gallica* from Brittany: both broods are large with broad and full borders of orange spots on the upper side, the largest and best spotted to be found anywhere north of Italy. There are no specimens of the first brood from Italy, the second brood are of the *aestiva* form, with broad orange spots, forming a band in the ♀s, both on upper and under sides; the finest are from Assisi. From Corsica also there are no first brood specimens, the second brood are strongly marked *aestiva*; there is a well-marked *calida* from Algiers and a very fine ab. *vedrae* from La Grave. It is probably single-brooded in the mountains of the Abruzzi and certainly in the high Alps. It is also single-brooded in Finland where the specimens are large, especially the ♀s. (*To be continued*).—Rev. G. Wheeler, M.A., F.R.E.S.

CURRENT NOTES.

The Query No. 2 on Page 81.—I collected 6 or 7 larvae of *Cosmotriche potatoria* in the Spring from a locality which often produces a pale sandy form of the female. These larvae fed up and the last imago emerged on 7th July. One larva went on feeding but got slowly smaller, and to-day, 21st July, a crop of *Apanteles* cocoons appeared. The same thing has happened with larvae of *C. trapezina* and *T. incerta* after the rest of their companions had pupated, single parasites emerging.—G. V. Bull, Sandhurst, Kent.

As a paper on the Distribution of Butterflies in the Malay Peninsula was announced for the Meeting of the Royal Entomological Society of London, to be held on 4th June, it was an inducement to attend and to see the exhibits one naturally expected. The possession of many of the commoner species of the area was a further inducement to attend. But not a butterfly was shown, only an address illustrated by lantern slides of diagrams which were very difficult to see in the somewhat poor light. Surely it would have been better to illustrate with specimens from the different areas of the "Sundaland continent." To have such papers will doubtless have an effect on the attendance as they could far better be in print and better understood than when read aloud without adequate illustration.

OBITUARY.

Dr Felix Santschi.

With the death of Santschi the last of, what one might call, the "Great Four Myrmecologists" passed away—Wheeler, Emery, Forel, Santschi.

Felix Santschi was born at Bex in Switzerland on 1st December 1872, and died in North Africa on 20th November 1940.

On account of the war the news of his death has only fairly recently reached his myrmecological colleagues.

His father was an upholsterer and it was intended that he should follow in his father's footsteps. His bent, however, never turned that way.

As a boy he always took the greatest interest in Natural History, and he collected beetles, butterflies, fish, etc.

His family, soon after he was born, went to Méntone, and subsequently to Buenos Aires, where he spent most of his time in the Zoological Gardens, and the Natural History Museum. On their return to Switzerland he applied for and obtained a post as a preparator in the Natural History Museum at Lausanne.

Shortly after that he became acquainted with Prof. Bugnion, who did much to encourage him in his natural history studies. At that time also he started to study medicine.

In 1896 he made an expedition to Colombia and Venezuela in company with the Comte de Dalmas, and Forel.

There is little doubt that this early association with the latter turned his attention to the study of ants.

Having finished his studies at Lausanne he became a doctor of medicine, and in 1911 he obtained a medical appointment at Tunis.

A year later he went to Kairouan, where the greater part of the rest of his life was spent. Here he devoted all his spare time to his work on the *Formicidae*.

He also kept a number of live animals, birds, reptiles, etc. Quite recently he bought a small chalet at Monthey, which he called "La Fourmi;" just as Forel called his house at Yvorne "La Fourmilière."

Here no doubt he intended to settle down when he retired. He was there in 1939, but returned to Kairouan.

We last heard from him in March 1940, when he told us he was going to Switzerland.

He was a teetotaller and a "Bon Templar," also due without doubt to Forel's influence.

He was fond of music and poetry; and was also quite a good artist. During his life he described over 2000 species of new ants. About our only criticism of him is that he was too fond of creating new subspecies and varieties. This is inclined to encumber the literature; and, moreover, as in the case of the African species of ants of the genus *Camponotus*, renders it almost impossible to name many of these forms with any certainty. Occasionally, either through forgetfulness or perhaps deliberately, he would describe an ant as a new species with the same name in different publications in the same year; or, in some cases, two and even three years later. This, of course, is rather confusing. He was chiefly a systematist, but some of his earlier work dealt with the orientation of ants; the habits of *Bothriomyrmex* (publishing several papers on both of these subjects); and the veins of the wings, etc. Santschi published very many papers on ants; his first publication, as far as we are aware, was in 1906, on the colony founding of *Bothriomyrmex* (sub-family *Dolichoderinae*).

Further details concerning his life may be found in an obituary notice by Dr H. Kutter, *Mitt. schweiz. ent. Ges.*, **18**, 286-289 (1941).—HORACE DONISTHORPE, Entomological Department, British Museum (Nat. Hist.), 27.v.41.

APPENDIX TO VOL. II, 1935-1940.

P. (12) II. Add to the List of Forms of *A. ipsilon* (*suffusa*), ab. *clara*, Lempke, ab. *rufa*, Lempke, ab. *obscurata*, Lempke, ab. *inversa*, Lempke, ab. *striata*, Lempke, and ab. *semiconfluens*, Lempke.

P. (14) II. Add the Orig. Descrip. of the above six forms after line 16 from the top.

ab. *clara*, Lempke, *Tijds.* (1939), 219.

Orig. Descrip.—" Ground colour of the forewings of a very pale grey-brown." Holland.

ab. *rufa*, Lempke, *Tijds.* (1939), 219.

Orig. Descrip.—" Ground colour of the forewings of a red-brown." Holland.

ab. *obscurata*, Lempke, *Tijds.* (1939), 219.

Orig. Descrip.—" ♂ ground colour of the forewings almost as deep as in the females." Holland.

ab. *inversa*, Lempke, *Tijds.* (1939), 219.

Orig. Descrip.—" ♀ ground colour of the forewings of a greyish-brown, very like that of the males." Holland.

ab. *striata*, Lempke, *Tijds.* (1939), 220.

Orig. Descrip.—" The black line arising from the reniform stigma is joined to the sagittate spot opposite to it." Holland.

ab. *semiconfluens*, Lempke, *Tijds.* (1939), 220.

Orig. Descrip.—" The two stigmata are united by a double line, the encirclement being broken at the union." Holland.

P. (29) Add to the List of Forms of *A. vestigialis*, Hufn., ab. *juncta*, Lempke, and ab. *confluens*, Lempke.

P. (31) Add the Orig. Descriptions of these two forms after line 6 from the top.

ab. *juncta*, Lempke, *Tijds.* (1939), 225.

Orig. Descrip.—" The two stigmata touch but retain their shape and encirclement." Holland.

ab. *confluens*, Lempke, *Tijds.* (1939), 225.

Orig. Descrip.—" The two stigmata are united, the encirclement being broken at the union." Holland.

P. (34) Add to the List of Forms of *A. obelisca*, Schiff., ssp. *salioclitana*, Bours., ab. *unicolor*, Lempke, and ab. *juncta*, Lempke.

P. (36) Add the Orig. Descrip. of the above three forms after line 11 from the bottom.

ssp. *salioclitana*, Bours., *Rev. Fr. d'Ent.*, I, 59 (1934).

Figs.—*l.c.*, plt. 1, 5-6 (7-8). Good black and white figures.

Orig. Descrip.—" This is distinguished from other known races by its lighter colour and by the pectinations of the antennae of the ♂, which are shorter than in the typical forms from Switzerland and Aus-

tria (figs. 7-8). The shaft of the antenna in the ♂ is also thinner than in the other races and notably so than in the typical form or in examples larger and more robust." They also differ appreciably from the races met with in the Pyrenees and from those of the Alpes Maritimes, which last are blackish. The Pyrenean form is almost like that of North Germany named *stephensii* by Dr Heydemann. [*Int. Ent. Zts.*, XXVII, 246-248 (1933)]. Saclas, près d'Etampes.

ab. *unicolor*, Lempke, *Tijds.* (1939), 214.

ORIG. DESCRIP.—" The forewings are unicolorous with complete absence of marking (including the filling up of the median cell in black). Only the two stigmata are fully encircled in black and thus scarcely visible." Holland.

ab. *juncta*, Lempke, Tijds. (1939), 214.

ORIG. DESCRIP.—" The reniform and orbicular touching but remaining complete." Holland.

P. (51) Add to the List of Forms of *A. tritici*, L., ab. *juncta*, Lempke, ab. *semiconfluens*, Lempke, and ab. *confluens*, Lempke.

P. (57) Add the Orig. Descrip. of the above three forms 13 lines from the bottom.

ab. *juncta*, Lempke, *Tijds.* (1939), 217.

ORIG. DESCRIP.—" The reniform and orbicular touching but remaining complete." Holland.

ab. *semiconfluens*, Lempke, *Tijds.* (1939), 217.

ORIG. DESCRIP.—" Instead of uniting, the reniform and orbicular are joined by a double line and the encirclement of each is broken."

ab. *confluens*, Lempke, *Tijds.* (1939), 217.

ORIG. DESCRIP.—" The reniform and orbicular are united in one stigma, the encirclement is wanting at the point of union." Holland.

P. (64) Add to the List of Forms of *A. corticea* (*clava*), Schiff., ab. *semiconfluens*, Lempke.

P. (67) Add the Orig. Descrip. of the above form after line 4 from the top.

ab. *semiconfluens*, Lempke, *Tijds.* (1939), 223.

ORIG. DESCRIP.—The two stigmata are united by a double line, the encirclement being broken at the union." Holland.

P. (72) Add to the List of Forms of *A. exclamationis*, L., ssp. *nigriorbis*, Zerny.

P. (74) Add the Orig. Descrip. of the above form after line 5 from the top.

ssp. *nigriorbis*, Zerny., *Zts. Oestr. Ent. Ver.*, XIX, 45 (1934).

FIG.—plt. 5, 7-8.

ORIG. DESCRIP.—" Characterized for the most part by the deep black-filled stigmata, particularly the orbicular, which otherwise in this species is separated from the ground colour of the wing by only fine black. The cone-shaped stigma is for the most part longer and thicker than

usual, also the reniform in many specimens is noticeably large. The transverse lines are mostly more distinct than in typical examples. In colour the upper side of the forewing is very variable, clearer or darker yellowish, brownish, or violet-grey; many specimens with the costa part powdery with lilac-whitish. On the underside the post-median on both fore and hindwings are considerably more distinct than in the typical race." Morocco.

P. (77) Add to the List of Forms of *Agrotis ripae*, Hb , ab. *obsoleta*, Lempke, and ab. *bivirga*, Lempke.

P. (79) Add the Original Descriptions of the above two forms 9 lines from the bottom.

ab. *obsoleta*, Lempke, *Tijds.* (1939), 228.

Orig. Descrip.—" Forewings grey-brown with markings obsolescent." Holland.

ab. *bivirga*, Lempke, *Tijds.* (1939), 228.

Orig. Descrip.—" Basal and marginal areas blackish, median area light." Holland.

P. (94) Add to the List of Forms of *A. cinerea*, Schiff., ab. *obsoleta*, Lempke.

P. (97) Add the Original Description of the above form 24 lines from the top.

ab. *obsoleta*, Lempke, *Tijds.* (1939), 225.

Orig. Descrip.—" The markings of the forewings obsolescent or completely absent." Holland.

P. (102) Add to the List of Forms of *Agrotis lucernea*, L., ssp. *bureschi*, Sules.

P. (104) Add the Orig. Descrip. of the above form 8 lines from the bottom.

subsp. *bureschi*, Suleschkow, *Bull. Soc. Ent. Bulgaria*, VII, 114 (1932).

Fig.—*l.c.*

Orig. Descrip.—" Upperside dark grey, with black-grey suffusion. Fringes of the same colour as the wings, on the hindwings somewhat paler. The whole marginal area of all the wings up to the outer transverse lines almost unicolorous black-grey. The middle shading wide, dark grey, with no appreciable traces of the reniform stigmata; the orbicular similarly obsolete in development. Underside also very dark ashy-grey, grey-black in the marginal area, paler towards the base up to dusky-white. The central shaded line wide and on all the wings well expressed; as were the discal points of the hindwings."

P. (116) Add the following Note 10 lines from the bottom to *Agrotis strigula*, Thnbg.

Barrett, *l.c.*, on plt. 134, gave four figures, all very good; show degrees in the obsolescence of some of the white markings, especially 1 b, and degrees of ground shade.

P. (117) Add to the List of Forms of *A. strigula*, Thunbg., ab. *juncta*, Lempke, ab. *ferruginea*, Lempke, ab. *flavescens*, Lempke, ab. *grisea*, Lempke, and ab. *reducta*, Lempke.

P. (118) Add the Original Descriptions of the above five forms 6 lines from the bottom.

ab. *juncta*, Lempke, *Tijds.* (1939), 238.

ORIG. DESCRIP.—" The two stigmata touch, but retain their encirclement intact." Holland.

ab. *ferruginea*, Lempke, *Tijds.* (1939), 238.

ORIG. DESCRIP.—" Ground of forewings red-brown." Holland.

ab. *flavescens*, Lempke, *Tijds.* (1939), 238.

ORIG. DESCRIP.—" Ground of forewings yellowish, design clear." Holland.

ab. *grisea*, Lempke, *Tijds.* (1939), 238.

ORIG. DESCRIP.—" Ground of forewings pure grey, without red or brown." Holland.

ab. *reducta*, Lempke, *Tijds.* (1939), 238.

ORIG. DESCRIP.—" The orbicular wanting."

P. (123) Add to the List of Forms of *T. janthina*, Schiff., ab. *pallida*, Lempke, ab. *alba*, Lempke, and ab. *juncta*, Lempke.

P. (125) Add the Orig. Descriptions of the above three forms, line 26 from the bottom.

ab. *pallida*, Lempke, *Tijds.* (1939), 256.

ORIG. DESCRIP.—" Ground of the hindwings pale yellow." Holland.

ab. *alba*, Lempke, *Tijds.* (1939), 256.

ORIG. DESCRIP.—" Ground of the hindwings white." Holland.

ab. *juncta*, Lempke, *Tijds.* (1939), 256.

ORIG. DESCRIP.—" The two stigmata unite into one, with only one encirclement." Holland.

P. (127) Add to the List of Forms of *T. fimbria*, L., ab. *flava*, Lempke, ab. *juncta*, Lempke, ab. *confluens*, Lempke, and ab. *immaculata*, Lempke.

P. (128) Add the Orig. Descriptions of the above four forms 11 lines from the bottom.

ab. *flava*, Lempke, *Tijds.* (1939), 262.

ORIG. DESCRIP.—" Hind wings of clear yellow instead of orange." Holland.

ab. *juncta*, Lempke, *Tijds.* (1939), 262.

ORIG. DESCRIP.—" The two stigmata touch, but the encirclement intact." Holland.

ab. *confluens*, Lempke, *Tijds.* (1939), 262.

ORIG. DESCRIP.—" The two stigmata unite under one encirclement." Holland.

ab. *immaculata*, Lempke, *Tijds.* (1939), 262.

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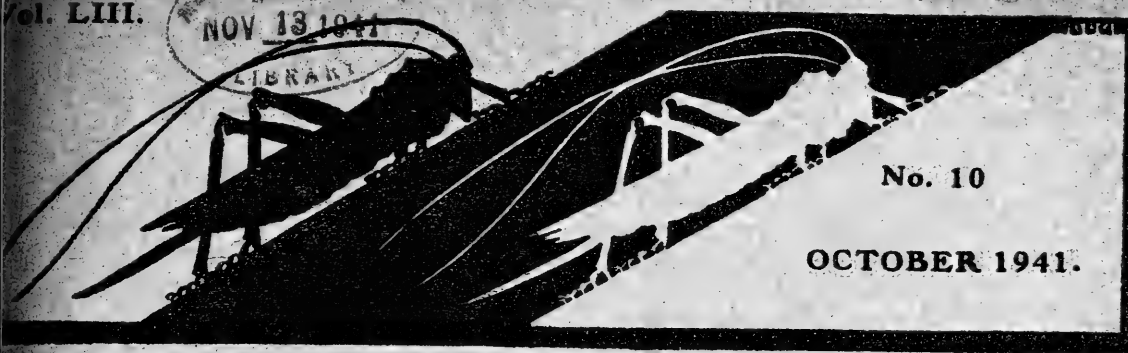
Printed by T. Buncle & Co. Ltd., Arbroath.

Vol. LIII.



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OCTOBER 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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THE PHENOLOGICAL CLASSIFICATION OF PALAEARCTIC LEPIDOPTERA.

A PRELIMINARY ESSAY.

By E. P. Wiltshire, F.R.E.S.

My previous articles[1] on the phenology[2] of single-brooded lepidoptera used terms, such as " vernal," " autumnal," " very vernal," etc., which presupposed a phenological classification such as has not yet, to my knowledge, been made. In the present paper a preliminary sketch of such a classification is presented, concluding with the consideration of what use, if any, such a classification may have.

A. Continuously-brooded species.

Types: *Utetheisa pulchella*, L., *Melitaea trivia*, Schiff., *Pieris rapae*, L.

B. Two-brooded species.

1. With two consecutive generations. Type: *Euchloë charlonia*, Donz.
2. With a vernal and an autumnal generation. Type: *Oeneria poenitens*, Stgr.
3. With a partial second generation. Type: *Notodonta ziczac*, L.

C. Single-brooded species.

1. Vernal, with an early tendency. Type: *Dichonia areola*, Esp. (=winter flight in mild climates).
2. Vernal, with little deviation. Type: *Cucullia verbasci*, L.
3. Vernal, with a late tendency. Type: *Malacosoma castrensis*, L. (=summer flight in colder climates).
4. Midsummer. Type: *Pachypasa otus*, Drury.
5. Midsummer, with deviation in both directions: " normally autumnal." Type: *Catocala puerpera*, Giorn. (=summer flight in hot climates, autumnal flight in colder climates).
6. Autumnal, with an early tendency. Type: *Volgarctia spectabilis*, Tausch. (=summer flight in colder climates).
7. Autumnal, with little deviation. Type: *Chondrostega aurivillii*, Pungl.
8. Autumnal, with a late tendency. Type: *Amathes lychnidis*, F. (=winter flight in mild climates).
9. Midwinter. None.

I shall now give further names, to illustrate more completely how a number of well-known species are to be attributed to the above categories and classes, together with some necessary comments. It is not merely considerations of space that prevent me from here trying to classify all the British (or Palaearctic) species; it is that I have neither the time for such a study nor the complete reference library necessary

[1] " Notes on the winter flight, in mild climates, of vernal and autumnal moths," *Ent. Rec.*, 15.xi.38; " The summer flight, in cold climates, of vernal and autumnal lepidoptera," *Ent. Rec.*, 15.i.41.

[2] " Phenological " here refers rather to season than hour.

for it. Readers may, if they please, amuse themselves by fitting into these classes the species not here named.

Category A. (*Continuously-brooded species.*)

Papilio demoleus, L., *Leptidia sinapis*, L., *Colias croceus*, Fourc., *Pyrameis cardui*, L., *Celerio lineata* f. *livornica*, Esp., *U. pulchella*, L., *Agrotis segetum*, Schiff., *Agrotis ypsilon*, L., *Rhyacia saucia*, Hbn., *Tathorhynchus exsiccata*,[3] Led., *Laphygma exigua*, Hbn., *Plusia gamma*, L., *Clytie* genus, *Pandesma anysa*, Guen., *Rhodometra sacraria*, L., *Gymnoscelis pumilata*, Hbn., *Macaria syriacaria*, Stgr.; *Melitaea trivia*, Schiff.; *Papilio machaon*, L., *P. rapae*, L.

In a cold climate it may not be apparent that a species belongs to this category; for instance, judging by its biology in England, one would classify *machaon* under Category B, class 3.

The continuously-brooded category A is largely tropical or subtropical in origin, and many of its species are well-known migrants, migration being the alternative to a diapause as a means of surviving climatic extremes. There seem, however, to be two, or even three classes in the category: (1) purely migratory, to which most belong; (2) capable of aestivating, e.g. *trivia*; and (3) capable of hibernating, e.g. *rapae* and *machaon*; of course, if the climate of the habitat does not require it, none of these modes will be employed. I have, however, hesitated to erect these three classes in my scheme of Category A because we do not know enough yet about the biology of many Category A species in subtropical climates. While it is true that a general tendency to one of the alternatives (migration or diapause) to the exclusion of the other can be remarked, we cannot be sure yet that these alternatives are in all cases mutually exclusive. For instance, a consideration of the biology of *machaon* in Iraq (see also Peile[4]) makes it likely that in this and other cases local migration replaces the summer diapause, the unrelieved desert being recolonized by immigrants from oases each spring when the fresh desert food plant reappears. This may also explain how *ypsilon* and *segetum* survive in Iraq; or they may behave like *trivia* there, and aestivate in an early stage; or perhaps again their subterranean larval habits may even permit a continuous, if retarded, summer development, without an actual summer diapause. Until more is known I prefer to delay the erection of these tentative classes, but observe that the second of them (type: *trivia*) can be distinguished from B 2 by the occurrence of at least two broods before the summer diapause and from B 1 by the possession of an autumnal brood (often, however, less numerous), and that the third of them (type: *rapae*) can be distinguished from Category B by its continuous succession of broods on oasis biotopes in a subtropical climate. Perhaps *sinapis* should accompany *trivia*. The habit of migration in the first class is very probably a comparatively recent development in its evolution.

C. Q. Parsons' interesting record of a *saucia* pupa in winter in Devon (*Ent. Rec.*, January 1941, p. 11) suggests that the reason why many migratory species fail to survive English winters is the inadapt-

[3]In the previous articles I regarded *exsiccata* as a single-brooded species, but this year in Shiraz took it not only in spring but, on marshy ground, again in June; I, therefore, tentatively classify it as shown above.

[4]H. D. Peile: "The Butterflies of Mesopotamia," *Journ. Bomb. N.H.S.*, 1921-22.

ibly short pupal stage which either produces an imago in midwinter, killing it or its progeny above ground, or kills the pupa, which cannot survive a delay induced by cold.

Category B. (*Two-brooded species.*)

1. With two consecutive generations: *Euchloë charlonia*, Donz., *Cerura* genus,[5] *Earias irakana*, Wilts.

2. With a vernal and an autumnal generation: *Lymantria amabilis*, Chr., *Ocneria poenitens*, Stgr., *Acronicta megacephala*, F.[6] *Euxoa conspicua*, Hbn., *Discestra arenaria*, Hamps., *Elaphria bodenheimeri*, Drdt., *Pseudathetis fixseni*, Chr., *Catocala lesbia*, Christ.,[10] *Cidaria salicata*, Hbn., *Dyscia plebejaria*, Ob., *Cornifrons ulceratalis*, Led.

3. With a partial second generation: *N. ziczac*, L., and *Harmodia bicruris*, Hufn.

In cold climates, where the summer diapause is not marked, it may be difficult to distinguish class 1 from class 2 of this category. In milder climates the autumnal brood of class 2 tends to run into the vernal. According to South, *salicata*'s second brood is partial in England; this shows that a colder climate can slow down a species belonging to this category, causing it to omit completely or partially the second generation; we shall observe, in due course, an analogous retarding of the life cycle of some Category C species.

I have bred in captivity a partial second (summer) brood of *bodenheimeri* and *arenaria*; this suggests that the two-broodedness of these, and perhaps other species of the category, is not so fixed specifically as the single-broodedness of Category C, but has been comparatively recently evolved, from Category A, in response to climatic influences (heat and aridity).

Category C. (*Single-brooded species.*)

1. Vernal, with an early tendency: *Cucullia wredowi-judaeorum*, Strand., *Dichonia areola*, Esp., *Antitype chosroes*, Brdt., *Spudaea ruticilla*, Esp., *Theria rupicapraria*, Schiff., *Dasycorsa modesta*, Stgr., *Zamacra flabellaria*, Heeger.

2. Vernal, with little deviation: *Papilio alexanor*, Esp., *Zegris eupheme*, Esp., *Saturnia* genus, *Simyra dentinosa*, Frr., *Monima stabilis*, View., *Cucullia* verbascum- and scrophularia-feeding group, *Lithostege dissocyma*, Prt., *Lithostege palaestinensis*, Ams.

3. Vernal, with a late tendency: *Aporia crataegi*, L., *Melitaea cinxia*, L., *Malacosoma castrenis*, L., *Lacydes semiramis*, Stgr., *Procris* genus, *Phragmataecia castaneae*, *Agrotis elbursica*, Drdt., *Rhyacia nyctimerina*, Stgr.

4. Midsummer: *Leucoma salicis*, L., *Leucoma wiltshirei*, Coll., *Callimorpha quadripunctaria*, Poda, *Pachypasa otus*, Drury., *Stygia saharae*, Luc.

5. Midsummer, with deviations in both directions: "normally autumnal": *Apopestes spectrum*, Esp., *Phragmitiphila typhae*, Thnbg., *Archanara sparganii*, Esp., *A. algae*, Esp.,[7] *A. geminipuncta*,

[5]Seitz, "Die Grossschmetterlinge der Erde," II, p. 283.

[6]I classify two-brooded *Acronicta* under B2 rather than B1 because the Bagdad *Acronicta* (=*aceris*??) clearly belongs there.

[7]I took *A. algae* (=*cannae*) near Shiraz together with *typhae* in mid-June 1941.

Haw., *Mormonia neonympha*, Esp., *Catocala puerpera*, Giorn., *C. promissa*, Esp., *C. optima*, Stgr., and many *C. congener*.

6. Autumnal, with an early tendency: *Volgarctia spectabilis*, Tausch., *Thaumetopoea pityocampa*, Schiff., *Phragmataecia territa*, Stgr., *Agrotis ripae*, Hbn.

7. Autumnal, with little deviation: *Eriogaster* genus, *Lasiocampa*[8] genus, *Chondrostega aurivillii*, Pngl.

8. Autumnal, with a late tendency: *Ocnogyna loewii*, Z., *Rhyacia xanthographa*, Schiff., *Blepharita trisignata*, Men., *Aporophyla australis*, Bsd., *Meganephria oxyacanthae*, L., *Dryobota furva*, Esp., *Dryobotodes roboris*, H.G., *Antitype rufocincta*, Hbn., *A. canescens*, Dup., *Amathes* genus, *Lithostege buxtoni*, Prt, *Larentia clavaria*, Haw., *Cheomatobia brumata*, L., *Itame beryaria*, Stgr., and *Crocallis* genus.

9. Midwinter.

The only difference between classes 1 and 3 of this category is that class 1 is earlier in all climates; similarly, with classes 6 and 8. These four classes thus form a series of similarly-reacting classes spread over the year.

As far as I know, no single-brooded "winter-moth" occurs both before and after the coldest weather in cold climates as *clavaria* does in mild climates; all tend to fly either definitely before or after mid-January. (*Cidaria basochesiata*, Dup., which flies in winter in Mediterranean countries, probably has two broods, and if so can be classed with *salicata* (B 2), which also appears to fly all winter in mild climates.) For this reason, and because cold is a more absolute stopper of insect-life than extreme heat, I think that there can be no true midwinter moth to put in C 9.

In cold climates some species of this category take more than one year over their life-cycle. This may occur in two ways: (a) retarded larval growth; regularly in any given climate (e.g., *Cossus cossus*, L., *P. castaneae*, *L. quercus*, *callunae*); (b) retarded pupal development; irregularly, or individually (e.g. *Eriogaster lanestris*, *T. pityocampa*, etc.). Presumably these two types are due to different causes: type (a) can be explained as simply due to retardment by cold, but one can be less sure of the cause of type (b's) behaviour: since Talhouk's breeding of *Eriogaster philippsi*, Bart.,[9] and my own observations of *Thaumetopoea wilkinsoni*, Tams, and *Eriogaster amygdali*, Wilts., seem to show that in subtropical climates this phenomenon does not occur, I incline to think the phenomenon of irregular pupal delay in type (b) may represent a survival of an ingrained generic habit of pupal aestivation, formed in a subtropical climate and persisting in a distorted form in a cool temperate climate.

My inclusion of the marsh species *typhae*, etc., in class 5 might be taken to indicate that I have changed the view expressed in previous papers that these were "normally autumnal." Phenologically I cannot separate them from the majority of the *Catocala* species, many of

[8]For the remarkable record of a *Lasiocampa* in May at Amara, Iraq, see my paper, "Mesopotamian Desert Lepidoptera," which is being published this year by the *Journal of the Bombay N.H.S.*; the classification of this species (*grandis*, Rog.) may have to be reconsidered when more is known of this phenomenon.

[9]*Ent. Rec.*, 15.vii.40

which are attached to oasis trees. This class is peculiar in not shirking a summer flight in hot climates, though autumnal in colder ones. The seeming paradox can be explained by the availability of its foodplants (tree-foliage or water-plants) even in mid-summer in hot climates, so that acceleration in response to heat is not fatal. On the other hand the absence of a second brood in this class in hot climates, when the foodplant is still available for one, points to the life-cycles having been "fixed" in a cool climate, where, as we see, the class is autumnal. My previously expressed view still seems to hold good.

If some of the above classifications seem arbitrary to any reader, who has not read the previous papers quoted above, I must refer him to them and remind him of the importance of considering the habits of a species over its whole range. Since a cold climate frequently does not give scope to a species' full potentialities, the species must be considered by its behaviour in a more favourable environment.

It may be useful here to define the various types of classification other than phenological, in order to avoid any confusion of thought:— 1. Systematic, by structure. 2. Zoogeographical, by range. 3. Visual, by pattern. 4. Ecological, (a) by foodplant, (b) by habitat (biotope).

The first of these is fundamental, being indispensable in practice and also illuminating the study of phylogenetics, etc. The second touches a subject of a highly speculative nature but of irresistible interest, whose study is still in its infancy. For the value of the third type I advise readers to refer to Cott's *Adaptive Coloration in Animals*, Methuen, London, 1940. Type 4a is chiefly of practical value, and type 4b has, as far as I know, never been thoroughly made by an entomologist, though in my published record of the Lepidoptera of Iraq[10] I tried to record them according to their respective biotope, since Iraqian biotopes are so well defined.

Phenological, a fifth type of classification might be of two kinds, (a) by season, (b) by hour of flight; the former is here attempted.

In conclusion, I may be reminded that although classification is a typical activity of the human mind, it should only be given rein to in useful directions. In case, however, it has not already appeared, from some of the comments made incidentally, that phenological classification is both illuminating and of practical use, I defend it briefly as follows:—

Practical uses: (a) It may help to identify. An example of this use will be found on p. 37 of *South*, Vol. II, where we find these words: "In England we certainly have a *Cucullia* sometimes appearing in the moth state rather later than *verbasci* and always earlier than *C. lychnitis*; the caterpillar producing it feeds on *Scrophularia nodosa* . . . We shall not be greatly opposed to Continental methods if we continue to allow April and May moths resulting from *S. nodosa* caterpillars to do duty for *C. scrophulariae*." I do not necessarily support this identification, but it is an example of how two criteria, i.e., foodplant and season, other than the more usual ones of structure and pattern, are

[10] *C. lesbia* inhabits oases in very hot districts. I have bred it in June and also taken it in November. Further records may perhaps prove it to be consecutively brooded, but I classify it in B2 provisionally. Its phenology is evidently different from that of its congeners, probably representing a more primitive type.

used to determine specimens. To consider the season will often help in other cases of doubt. (b) It may help entomologists to find a species that otherwise eludes them.

Enlightenment: (a) It sheds light on the question of insect migration. (b) It illumines also the central problem of all zoogeographical speculations, i.e., the past history of a species or race—a problem of importance because we can only understand the present status of an insect if we understand its past history. Entomology and geology here overlap, just as, in the human field, geography and history overlap.

A comparison of the phenology of congeneric species is especially interesting in this connection.

Some of the comments made above will have already illustrated how this classification sheds light on that problem; pursuing those comments further, it may be remarked that Categories A and B are closer together than to C, which is distinguished by a more rigid life-cycle, and has presumably evolved in response to the special conditions of the Temperate Zones (Palaearctic and Nearctic). Cold may retard this life-cycle but heat never accelerates it. Freer behaviour and wider reactions are to be observed in Category A. Category B occupies an intermediate position, perhaps exemplifying how Category C evolved from Category A. The tentative classes A 2 and 3 may similarly exemplify the evolution from A 1 to B. In fact, I have tried to classify Categories A and B in order of development, starting with what I consider the more primitive class. It is, however, arguable that B 1 is less primitive than B 2. I should be interested to learn from any reader about the phenology of *castaneae* in tropical climates.

The example of *machaon*, which in England would seem to belong to B 3 but in well-watered warm biotopes is revealed as a member of Category A, like its tropical congener *demoleus*, L. (which only just enters the Palaearctic Zone in the extreme south and there is able to perform a short hibernation in an early stage in climates with a mild winter) affords a good example of how one class or category may evolve from another; suppose, for instance, that *machaon* died out everywhere except in England, then one would definitely classify it as B 3. If the English climate grew colder and it survived, it might perhaps drop its second (partial) brood altogether (it has done so already in Arctic Russia)) thereby entering Category C, in one of the vernal classes. If these climatic conditions were prolonged, this behaviour might become "fixed," so that, if later it extended its range from the cold centre of distribution to warmer climates again, it would remain single-brooded, i.e., it would behave rather as the peak-dwelling *Papilio alexanor* does to-day in the mountains of Syria and Iran. I do not, of course, suggest that all the species of Category C became single-brooded in this way; indeed, on the contrary, I have suggested previously that many became so "fixed" in a centre of distribution with a warm dry summer. But this hypothetical history would explain very well the single-broodedness of C 5, if we substitute "autumnal" for "vernal."

I have assumed above that the evolutionary order was A, B, C because I understand that it is generally accepted that insect life started developing in an age when a hot moist climate was more widespread in the world than now.

COLLECTING NOTES.

NOTES ON BRITISH LEPIDOPTERA. (GEOMETRIDAE.)—(*Continued from p. 80.*)—*Ortholitha umbrifera.*—On the top of Eggarsdon Hill (Dorset) I took several examples of what I thought to be a variety of *O. plumbaria*, from which it was distinguished by having the dot in the centre of the forewing duplicated. When submitted to Mr Prout, of the Nat. Hist. Museum, it was found to be a new and distinct species, which Mr Prout has named *umbrifera*. I took a second example on the downs above Sheringham (Norfolk).

Ortholitha clavaria (*cervinata*).—Larvae were found feeding on hollyhock, at Camberley, in June. The resulting moths emerged towards the end of September. I have also taken moths, at light, early in October.

Ortholitha chenopodiata (*limitata*).—I have taken this species only once at Camberley; but commonly in other parts of Surrey and Kent. The moths are on the wing during July and August.

Ortholitha bipunctaria.—Common on chalk downs in Kent and elsewhere. I have not met with it near Camberley.

Mesotype virgata.—I have taken this species on Royston Heath (Herts) in August.

Odezia atrata.—I found the moths, fairly common, at Llangammarch (Wales) in July.

Anaitis plagiata.—Common around Camberley, both on the wing and at light, towards mid-July and early September; more sparsely in June.

Anaitis efformata.—The males of this species are distinguished from *plagiata* by the shorter anal segment. Both sexes have the inner band, on the forewings, more sharply angled. I have taken the moth, at light, in my moth-trap in August and have raised it from ova from moths caught at Box Hill.

Chesias legatella (*spartiata*).—Very abundant at light, at Camberley, throughout October.

Chesias rufata.—Almost equally common as the previous species; but occurring in late March, throughout April and again during June and July up to early in August.

Nothopteryx (*Lobophora*) *carpinata.*—Abundant at Camberley throughout April. I have beaten the larvae from Birch; have found the moths at rest on tree trunks and have taken them at light.

Acasis (*Lobophora*) *viretata.*—Common at Camberley, at light and at rest on tree trunks. I have taken the moths during May and June; but—more usually—in August.

Lobophora halterata.—Taken at light; but not commonly, at Camberley, during May and early June.

Mysticoptera (*Lobophora*) *sexalata.*—I have not found this species at Camberley, but have taken it at light in the Wicken Fen, in July, and on the wing in the New Forest, in June.

Operophtera (*Cheimatobia*) *brumata.*—Common, at light, throughout the Camberley district in the winter months.

Operophtera (*Cheimatobia*) *boreata.*—Equally common with the previous species.—(*To be continued*).—E. ERNEST GREEN, F.R.E.S., Camberley, Surrey.

TWO ABERRATIONS OF BRITISH COLEOPTERA NOT PREVIOUSLY DESCRIBED. (1) *Trechus 4-striatus*, Schrk. (*minutus*, F.), ab. *flavohumeralis*, ab. n. Head and thorax jet black, the latter with the borders narrowly yellow. The elytra brown with yellow side-borders and a large yellow patch, rather sharply defined, at each shoulder. Legs yellow; antennae yellowish-brown. The structure, sculpture, etc., are similar to those of the typical form. This very striking and beautiful aberration was taken by shaking cut-grass over paper in the Churchyard at Old Heston, Middlesex. 4.vii.41. (2) *Phyllotreta cruciferae*, Goez., ab. *nigrobasis*, ab. n. In this aberration the antennae are entirely black, not showing any trace of red at the basal joints. It is probably common; but rather confusing, as it does not fit into the tables of the genus. I have beaten it off Tamarisk blossoms (*Tamarix gallica*) at West Worthing, 11.vii.17; and have swept it off Shepherd's Purse (*Capsella bursa pastoris*) in Windsor Forest (in some numbers when the typical form was not present), 15.vi.34; and off cabbages at Heston in company with the typical form, 4.vii.41.—HORACE DONISTHORPE, British Museum (Nat. Hist), Entomological Department, 25.viii.41.

A STRANGE FOOD PLANT.—Recently I found a larva of *Acronicta psi* on a rose growing on the wall of my house. It is now in its last larval stadium. Last night at 10 p.m. (G.M.T.) I found that it had left the food plant and was eating a dried leaf of Hazel which contained a cocoon of *Demas coryli*, left on the floor of the cage. It ate a piece about the size of a threepenny-bit and seemed to enjoy it, though the leaf was hard and brittle. This morning it is back on its proper food plant again. This is one of the species which (in my experience) seems to dislike dew and to prefer its food dry. But dead Hazel! *De gustibus non est disputandum.*—P. B. M. ALLAN.

UNDER the heading "The Karroo Caterpillar," Mr J. S. Taylor, Entomologist-in-charge, the Prickly Pear Laboratory, Graaf Reinet, has given a very long and detailed account of the serious pest of the sheep fodder growth in many parts of S. Africa. The Seasonal History and Incidence of the activities of the Pyralid moth, *Loxostege frustralis*, is discussed in every detail and figures are given in *Farming in South Africa*, 1940. The life-history with a figure of the larva and pupa, with dates of major infestation, favourable and unfavourable conditions. The various food plants are given, the most important being the "Sweet Karroo," the main fodder plant for the sheep. Eggs, larva, pupa and adult are described with habits and devastation caused. A section is devoted to the "Natural Enemies" and control measures suggested. In certain seasons countless thousands are present all over the Karroo and the loss of natural fodder must cause a huge loss of wool production on the sheep farms.

OUR S. African correspondent, Mr J. S. Taylor, M.A., F.R.E.S. (and E. E. Cresswell), has sent us some records he has published on a few species of Lepidoptera which exist under typical Karroo conditions, chiefly from Graaf-Reinet. Both butterflies and moths are included, and there are notes on the larvae and food plants. The Pierid *Belenois mesentina* often occurs in clouds around its food plant, a species of *Boscia*, an indigenous tree. It is an interesting and pretty species with

a wide distribution in Africa and Asia. The common Nymphalid *Vanessa cardui* has recently been found in the larval stage on the Karroo bush, an important fodder plant on the Karroo. *Charaxes jahlusa* is one of the small species of the genus. The Sphingids are represented by the *livornica* form of *Celerio lineata*, whose larva feeds on the valerian. The curious Notodont, *Braura truncata*, is a common species, whose larva feeds on the *Acacia*. This insect was described many years ago, and as the *Acacia* is not indigenous we have wondered what the larva fed upon years ago in Walker's time before the introduction of *Acacia*, I believe from Australia. There are two Arctiids, seven Noctuids, and one Cossid in the list.

Cosmia pyralina in Somerset.—I was pleased to net an example of *Cosmia pyralina* ♂ at dusk in my garden on 2nd August. Although reported from the neighbouring counties of Gloucestershire and Devon, this insect has not, hitherto, been recorded from Somerset.—J. F. Bird, Redclyffe, Walton Park, Clevedon, Somerset, 14th September 1941.

Second Brood of Brenthis euphrosyne?—On 24th July last I took a fresh, rather small *B. euphrosyne*. Is this possibly a second brood? The species had not been seen in the district for some weeks.—G. V. Bull, Sandhurst, Kent.

A New Vice-County Record for Two Common British Ants.—Mr S. O. Taylor, of Leicester, recently sent specimens of *Acanthomyops* (*Donisthorpea*) *niger*, L., and *Myrmica laevinodis*, Nyl., to me from East Gloucestershire, the former at Bibury, under stones, and the latter at Fairford, under the bark of an elm trunk. This is, of course, a new vice-county record for both species. For the *Myrmica* I have still no records in England from South Wilts., Bedford, Stafford, Salop, Mid-Lancashire, Mid-West Yorkshire, Cumberland, and Northumberland; and for *A.* (*D.*) *niger*, South Wilts., Huntingdonshire, Shropshire, Cheviotland, and Westmorland.—Horace Donisthorpe, British Museum Natural History, Entomological Department, 6th September 1941.

Zeugophora subspinosa, F., in Cumberland.—This little Chrysomelid beetle has hitherto been uncommon in this district. In the county list of Coleoptera published in 1923 in the *Trans. of the Carlisle Nat. Hist. Soc.* I recorded it as "rare, Orton." I first took it in that locality in June 1898 and subsequently met with odd specimens from time to time. It has now turned up in abundance on young aspens in the Kingmoor Nature Reserve on the outskirts of Carlisle. I discovered it there on 3rd September last and could have taken almost any number. This was rather surprising to me as I have collected in the Reserve for more than 40 years and taken nearly 400 species of Coleoptera there but never met with *Z. subspinosa* before. At one time, however, there was not much aspen on the ground but lately a good many young saplings have sprung up and it was noticeable that the beetle occurred mostly on these.—F. H. Day, 26 Currock Road, Carlisle, 18th September 1941.

Colias croceus, Fourc., etc., near Carlisle.—A few examples of the "Clouded Yellow" have been observed this month in this district, some in the Solway area, others on the east and west sides of the city.

Since 1933, when it occurred rather freely, I have not met with it here. I am glad to report that for several years past *Nymphalis io*, L., has been increasing in numbers near Carlisle after a long period of almost total absence. When I started collecting nearly 50 years ago it was reputed to be locally extinct. About five or six years ago, however, it began to re-establish itself, and this present season has been a common garden butterfly, along with *Vanessa atalanta*, L., and *V. cardui*, L. The local colonies of *Euphydryas aurinia*, Rott., are still flourishing. As a rule the larvae are much infested with the parasite *Apanteles spurius*, but this year they were almost immune. Out of a dozen larvae I took home for observation on this point not one was "struck."—F. H. Day, 26 Currock Road, Carlisle, 18th September 1941.

Notes on Variation from the Worthing Museum Collection (*continued from p. 99*).—*P. aegon*.—I use this name because I am quite certain that it is correct as I have shown on more than one occasion (e.g., *Ent. Rec.*, xxvi, p. 34). Observations in the field make it probable, and the Linnean collection places it beyond all doubt, that Linnaeus knew both species and regarded them as one. His name *argus*, therefore, included both; and when Schiffermuller (whether intentionally or accidentally makes no difference) designated this insect as *aegon*, he left the other species in sole possession of the name *argus*; *argyrognomon*, therefore, is merely the name of the blue ♀ of *argus* and can uphold no claim to specific rank. This is entirely in accordance with the rules followed by even the most determined advocates of priority.

With regard to the specimens in this collection there are two rows of the heath form from the New Forest, Hambledon, and Storrington, one of the ♀s from Lyndhurst is very close to the race *corsica* on the underside in its loss of black centres to many of the eye-spots; there is a row of the chalk form, *cretacea*, from Snodland and Otford, rather larger than the heath form, the Otford specimens conspicuously so; the northern moss form, *masseyi*, is well represented by a row from Witherslack, one of the ♂s having leaden-coloured hindwings and another being striated on the underside. This race is not really like the Corsican race at all. The blue of the ♀ *masseyi* is bright and generally well defined, the blue of *corsica* is dull and much suffused with blackish from the border; placed in contiguous rows as they are here they do not look in the least alike. *Corsica* is represented by a series from Tattone and another from the Col di Vizzavona, the latter being slightly the smaller. The Swiss specimens from the Rhone Valley are generally larger than the English ones; the mountain ones from the second Refuge on the Simplon Pass show the usual broad border of the mountain specimens, but are sometimes as large as those of the Rhone Valley; those from the Laquinthal and from Alpien are smaller. The very small form *alpina* sometimes swarms at the Ganter Bridge. This very small race occurs again in the Abruzzi and is the usual form there. Another very small race occurs at Plouharnel in Brittany. This is very remarkable as the locality is very little above sea-level. The form at Oberbozen in the Tyrol is like that which occurs at the second Refuge below Bérisal. At Aix-les-Bains the species has become double-brooded. The first brood is rather larger than the average; the second brood is small, in some cases very small. It must also be double-brooded at

Digne, but only the second brood is represented; here the ♀s show a very broad orange band on both sides. At Assisi in Central Italy it is again double-brooded. Here the second brood specimens are generally rather the larger and the underside of the ♂s is almost as white as the Pyrennean *hypochiona*. The second brood is also common at Perugia, Orvieto and Siena. In Finland the ♂s are small and the ♀s show very little orange on the upper side.—(*To be continued.*)—Rev. G. Wheeler, M.A., F.R.E.S.

CURRENT NOTES.

In the present number the *Revision* of Tutt's *British Noctuae*, Vol. III, is continued. In the November number it is intended to complete the Appendix to Vol. II, and to furnish the Index to the volume; thus in subsequent issues it is hoped to go on more rapidly. The species of the genus *Xanthia* will be dealt with. *Citrago*, *fulvago*, *lutea* (*flavago*), *aurago* (with an analysis kindly furnished by A. J. Wightman), *gilvago*, *ocellaris* (not dealt with as a species by Tutt), *circellaris*, *xerampelina*, etc.

The cessation of the activities of Stevens' salerooms had incidentally stopped for the time being collections of insects being brought under the hammer. But our advertisement pages give information of the sale of a portion of the wonderful collection of the late Mr P. M. Bright of Bournemouth The Sale will take place at Messrs Glendining & Co.'s Rooms, 7 Argyll Street, Oxford Circus, on Wednesday, 29th October.

The *Pan-Pacific Entomologist*, published at San Francisco, California, in its July number has an article on the "Expedition of Lord Walsingham in California and Oregon in 1871-72." It consists of details of the somewhat elaborate equipment for collecting, and extracts from local newspapers of the type one might expect at that date. This is followed by copies of the Diaries kept by Lord Walsingham and of his groom Carrier, consisting of short notes from each camp, numbering 54. There are two maps of the country traversed, showing the positions of the various camps. Many kinds of birds were shot or noted. Lord Walsingham was interested mostly in the "plumes" and Microlepidoptera. Naive remarks are made in the diary on various incidents of the journey. A visit to a geyser: "Arrived at hotel and saw geyser, a regular tourist haunt puffed by a penny peep-show—sort of a German landlord. Guide talked a good deal about the devil." "Saw a skunk—heeled a stone at him—didn't he stink." Hunting bears and fishing took up part of the time.

Parts 1 and 2 of Vol. XVII of *Eos*, the Spanish Journal of Entomology, were published in July, consisting of 240 pages, six plates, and many text figures. Senor Agenjo contributes a "Monograph of the family *Thaumetapoeidae*," illustrated by five plates, two of which contain figures of the various species and forms. The species recognized by the author are *Thaumetopoea solitaria*, Freyer (1838), with one form; *T. processionea*, L. (1758), with one form; *T. pityocampa*, Schiff. (1775),

with 13 forms, five of which are new; *T. wilkinsoni*, Tams. (1924-5); *T. pinivora*, Tr. (1834); *T. bonjeani*, Powell (1922); *T. herculeana*, Rmbr. (1840), with 11 forms; *T. jordana*, Stdgr. (1894). There are 48 very well produced figures of the imagines, species and forms. Three other articles make up the volume: (1) On *Ichneumonidae* of Spain; (2) On a group of the *Carabidae* of Spain; (3) On a group of the *Sphegidae*. All well illustrated.

The Royal Entomological Society has recently published the series of parts one expects to get about July. There are four parts of the *Transactions*. Of the *Proceedings*, series A, parts 4-6; series B, parts 4-6; and series C, Journal of Meetings for 1940 with Reports of the Council and Treasurer, and List of Members.

More or less recently there has crept into our entomological literature the desire to study the elements of the markings and shape of wings. In the June number of the *Entomological News* there is an article on the "Line-elements in Butterfly Patterns" and in the July number of the same magazine we have the first portion of an article on a somewhat similar study, "The Genus *Colias* in N. America;" an intensive study of the minute variation in size, shape, pattern and colour of the wings. In this case the species reviewed is the common *Colias eurytheme* and its form *philodice*.

The *Indian Jr. of Agricultural Science* has published a very useful article, "The Parasites of the Insect Pests of Sugarcane in the Punjaub," by Khan A. Rahman. Sugarcane is attacked by several Pyralid moths and a Fulgorid bug which together destroy between 30 and 40% of the crop each year. About 14 species of parasite are described in this paper and many facts relating to them are given.

Our friend and correspondent of many years, Capt. Kenneth J. Hayward, has forwarded a parcel of the more recent separates of articles written by himself on the *Hesperiidae* of the Argentine, and others written as part of his duties in the Agricultural Experimental Establishment, dealing with insect pests of crops. Parts xi and xii, of *Hesperioidea Argentina* contain descriptions of numerous new species (based on genital structures) and notes on longer known species. His researches have led him further afield and another separate deals with about 20 new species and races of "skippers" from Ecuador, sent to him by Mr Wm. Clarke MacIntyre, and also from the American Museum of Natural History. He has compiled a List of the *Hesperiidae* of Entre Rios, and besides numerous pamphlets connected with his daily duties he has compiled a "Bibliography of the Flies which attack Fruits in the Argentine."

Correction.—P. 94, "Many *Xylina socia*" should read "May *Hadena protea*." The latter is now appearing in my cages in some numbers. I am not familiar with either species in the larval state; they seem to me unusually large for such a small moth.—C. Q. Parsons, Torquay, "Alma Marceau," Seaway Lane, 2nd October 1941.

Dup., *Hist. Nat.*, VII (1), 450, plt. 128, 2-3 (1827), gave two excellent figures, 2 typical and 3 an ab. smaller, shorter wings with disposition of the transverse lines somewhat different.

Freyer, *Neu. Beitr.*, IV, 151, plt. 376 (1842), gave a beautiful figure.

H.-S., *Sys. Bearb. Noct.*, II, 221 (1849), said that fig. 188 Hb. was "somewhat too red."

Splr., *Schm. Eur.*, I, 251, plt. 46, f. 19 (1907), gave a figure too uniformly yellow-red and the hindwing too yellow. He recognized one form, the *subflava*, Evers.

South, *M.B.I.*, II, 17, plt. 10, fig. 1 (1907), gave a good figure. He mentioned an orange-red form as *aurantiago*, Tutt.

Warr.-Stz., *Pal. Noct.*, III, 155, plt. 28 i (1910), treated *ochrago*, Esp., as a synonym and gave (1) *subflava*, Evers., (2) ab. *incolorata*, Warr., a new form, ground pure pale ochraceous, (3) ab. *aurantiago*, Tutt.

Culot, *N. et G.*, I (2), 84, plt. 54, f. 17-18 (1914), gave two excellent figures. He recognized one form, *subflava*, Evers., f. 18, of much deeper colour generally.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 154, plt. 19 e (1934), added the forms ab. *umbrata*, Heinr., ab. or r. *fasciata*, Groub., ab. *signata*, Krüg., and *appennina*, Dnhl. The *japonago*, Wilem., described as a ssp. of *citrago* but is now considered a true species.

Two figures are given—a typical figure omitted in the main volume and a figure of the very distinctive ab. *subflava*.

Barrett said of the Variation:

Rather variable in the tone of ground colour—from pale yellow to rich ochreous or reddish-ochreous—less so in the distinctness of the markings, though the central shade is sometimes very strongly marked, and when this occurs in a pale yellow example it becomes a conspicuous complete bar. In rare instances the hind marginal region from the second line is dusted or clouded with pale purple.

The Forms and Names to be considered:

citrago, L. (1758), *Syst. Nat.*, Xed., 518.

ochrago, Esp. (1790-?), *Abbild.*, IV, 2 (2), p. 667, plt. 175, 5-6, probably a small *fulvago*.

ab. *subflava*, Ev. (1848), *Bull. Mosc.*, III, 219; IV, 171 (1855); plt. 1, f. 3 (1856).

ab. *aurantiago*, Tutt (1892), *Brit. Noct.*, 9.

ab. *incolorata*, Warr.-Stz. (1911), *Pal. Noct.*, III, 156, plt. 28 i.

ab. *umbrata*, Heinr. (1916), *Deutsch. ent. Zts.*, 520.

r. *signata*, Krüg. (1920), *Soc. Ent.*, XXXV, 14.

ab. *fasciata*, Groubl. (1923), *Not. Ent.*, III, 10, fig.

[ssp. *japonago*, Wilm. (1929), *Nov. Zool.*, XXXV, 2] "a sp." Drdt. in Seitz.

r. *apennina*, Dnhl. (1933), *Ent. Zt.*, XLVI, 260.

Tutt dealt with (1) the typical form; (2) ab. *aurantiago*, with orange-red ground, and (3) the banded *subflava*, Ev.

ab. *subflava*, Evers., *Bull. Mosc.*, III, 219 (1848); IV, 371 (1855); and II, plt. 1, f. 3 (1856).

Tutt quoted Stdgr. descrip. in Cat. II, 117 (1871). Below is Hampson's full descrip., *Lep. Phal.*, VI, 508 (1900).

DESCRIP.—" Forewing with the antemedial, post medial and terminal areas suffused with deep rufous; hindwing with indistinct rufous, subterminal band and the cilia tinged with rufous, or wholly suffused with brown." Urals and Petropolis.

ab. *incolorata*, Warr.-Stz., *Pal. Noct.*, III, 156 (1911).

FIG.—*l.c.*, plt. 28 i.

ORIG. DESCRIP.—" The ground colour is pure pale ochreous, without any orange freckling, the veins and lines faintly brownish, the stigmata all but obsolete, the fringe pale; hindwing white." Very rare.

ab. *umbrata*, Heinr., *Deutsch. ent. Zts.*, 520 (1916).

ORIG. DESCRIP.—" The central transverse line has on its outer edge a shade of dark scales about 1 mm. wide, the colour of the transverse line."

race *signata*, Krüger, *Soc. Ent.*, XXXV, 14 (1920).

ORIG. DESCRIP.—" At Lake Lugano, on the meadows near Maroggia, I caught in September at light a very fine form of *citrago*, which I name *signata* on account of its marking and here describe. The male forewings are yellow, those of the female ochre-yellow, veined and dotted with rust colour, with similarly coloured transverse lines of the same moderate thickness as in typical *citrago*. The basal, which is wanting in the female, is short; it reaches from the base of the inner marginal vein to the costa. The uninterrupted submarginal line is broadly red-brown scaled inwardly, so that the ground between this and the submedian line is band-like, as in *Gortyna ochracea* and the *Hydroecia* species, *moesiaca* and *franciscae*. It may be a derivative of ab. *subflava* of *citrago*.

" The orbicular in the male is a circular red-brown spot; the reniform is also filled up with red-brown, but it is in the upper as well as in the lower half slightly touched with yellow, so that it is 8-shaped. In the female also the stigmata are dense red-brown with a slight yellow kernel.

" What makes the insect particularly notable is the red-brown stigma, which I do not see in *Citrago*; in the male it touches the middle of the third line, in the female the inner.

" The hindwings are yellowish, grey scaled along the margin: in the male broad and spotted, in the female running together but narrower."

ab. *fasciata*, Groubl., *Not. Ent.*, III, 10, fig. (1923).

DESCRIP.—Drdt.-Stz., *Pal. Noct. Supp.*, III, 154 (1934). " The entire area between the central shade and the posterior transverse line appears shaded with brown." Finland.

ab. *apennina*, Dnhl., *Ent. Zeits.*, XLVI, 260 (1933).

ORIG. DESCRIP.—" The dark orange spottings are wholly wanting so that the insect appears unicolorous dull yellow. But veins and lines are sharply brown marked. Stigmata are very weakly developed but still quite clear. Usually the orbicular is represented by a fine point. Hindwings whitish-yellow, usually with slight iridescence. Marginal lines thin; now and then a very fine submarginal line is present. Fringes very clear white-yellow." S. Tyrol, 800-1500 m.

Xanthia, Ochs. & Tr. (1816-25), Dup., H.-S., Gn., Barr., Stdgr., Splr., Sth., Culot, etc. [*Orthosia*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Cosmia*, Ochs. & Tr. (1816-25), Warr.-Stz., Drdt.-Stz.: *Citria*, Hb. (1821) Chapman, Tutt] *fulvago*, L. (1761).

Tutt, *Brit. Noct.*, III, 9 (1892): Meyr., *Handb.*, 61 (1895): Barr., *Lep. Brit. Is.*, V, 365, plt. 230, 2 (1899): Stdgr., *Cat.*, IIIed., 208 (1901): Hamp., *Lep. Phal.*, VI, 502 (1906): Splr., *Schm. Eur.*, I, 259, plt. 46, 23 and ab. (1907): South, *M.B.I.*, II, 20, plt. 10, 6-8 (1907): Warr.-Stz., *Pal. Noct.*, III, 154, plt. 24 i, k (1910): Culot, *N. et G.*, I (2), 88, plt. 55, 7-8 (1914): Meyr., *Rev. Hand.*, 121 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 153, plt. 19 e (1934).

Ernst & Engram., *Pap. d'Eur.*, VII. 165, f. 523 (1790), gave four excellent figures, a, b, c, d, including an under side.

Hufn. in the *Berl. Mag.*, III, 296, described a Noctua under the name *icteritia*, which was considered *cerago* by Bork. and others.

Schiff., *Verz.*, 86, S (1775), referred to *fulvago*, L., as the white birch Noctua, No. 1, and to the sallow Noctua *cerago*, No. 9, p. 87.

Illiger, *Verz.* (neu. ausg.), I, 303 (1801), suggests a better arrangement of species and would place *cerago* immediately after *fulvago* and not No. 9 as did Schiff. He treated *flavescens* as a var. of *cerago*.

Bork., *Naturg. Noct.*, IV, described *fulvago*, L., in *Sys. Nat.*, XIIed., and *cerago*, Fab., *Mant.*, II, as separate species. The former, p. 664, the latter, p. 681. Curiously he noted they are the same in size. He also described *flavescens*, Esp., as a species, *l.c.*, 684.

Bork. had previously described this species, Scriba's *Beitrage*, II, 144 (1791), and gave an excellent figure of the usual form on plt. x, f. 3, but strangely he described the form *flavescens* under the name *gilvago* although he gave an excellent figure of it, plate x, f. 1, and referred to Esper's figure, *Abbild*, plt. 122, 2, of the same. His synonymy said that it was the *croceago*, Schiff., 87 S (1775).

Hb., *Samml. Noct.*, 190 (1800-3), under *cerago*, gave a very good typical figure: *l.c.*, 444 (1808), an excellent figure with a darker ground and central band. *l.c.*, 445 (1808), an excellent figure of a sparsely marked form, and very pale. Possibly a transition to *flavescens*.

Dup., *Hist. Nat.*, VII (1), 459, plt. 129, 1-2 (1827), gave two excellent figures under the name *cerago*. 1, the almost unicolorous ab. *flavescens*; 2, a heavily marked form.

Haw., *Lep. Brit.*, 236 (1809), said that the *rubago*, Donovan, was more beautiful than his own examples of *fulvago*, and that *fulvago* was the *cerago*, Hb., 444. He described, *l.c.*, 237, f. *gilvago*, which was, he said, the *cerago* of Hb., 445. It was, no doubt, ab. *flavescens*.

H.-S., *Sys. Bearb. Noct.*, II, 217 (1849), as *cerago*, referred to the extensive variation. (1) Almost without marking, only a brown ring in place of the inner half of the reniform, with a white centre; (2) All markings extremely thin, only the dots of the waved line distinct; (3) All markings thick and dark purple-brown, the darkest places on the costa in areas 1 and 3, then between the stigmata.

Gn., *Noct.*, V (1), 393 (1852), treated it under the name *cerago*, Schiff.: he queried the *fulvago*, L. He gave under var. A *flavescens*, Esp., (1) *cerago*, Hb., 445; (2) *gilvago*, Fb., 219.

Splr., *Schm. Eur.*, I, 252, plt. 46, f. 23a-23b (1907), gave two very good figures. 23a typical. 23b, ab. *flavescens*, Esp. He referred to the numerous intermediate forms. His figures were quite good, dark typical and ab. *flavescens*.

South, *M.B.I.*, II, 20, plt. 10, f. 6-8 (1907), gave four forms—*flavescens*, Esp., *cerago*, Hb. (fainter markings), *aurantia*, Tutt, and *imperfecta*, Tutt. His three figures are quite good.

Warr.-Stz., *Pal. Noct.*, III, 154, plt. 24 i, k (1910), treated *cerago*, Fab., as a synonym. He recognized ab. *flavescens*, Esp., ab. *cerago*, Hb. and r. *asiatica*, Hamps. He gave five very good figures, 24 i, ♂ *fulvago*, 24 k, *fulvago* ♀, *flavescens* ♂, *flavescens* ♀, and *cerago*, Hb.

Culot, *N. et G.*, I (2), 86, plt. 55, f. 7-8 (1914), gave two excellent figures. 7, a typical ♂. 8, ab. *flavescens*, Esp. He mentions no other form.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 153, plt. 19 e (1934), gave the four more recently described forms and a figure of the new form, *fulvescens*, Drdt.

Barrett summed the Variation as follows:

Very variable in the extent and intensity of the purple clouds of the central band, which sometimes are extremely dark, in other cases pale purplish-pink and very obscure, or reduced to a few fine lines or dapplings, while in other instances the wing is to a great extent filled up with paler or darker clouding. A distinct variation in the ground colour to ochreous or orange-yellow is not infrequent in Southern woods. On the other hand a well known recurrent form, called var. *flavescens*, is found more often in Northern localities; in it the colour is pale yellow, either totally without the purple red lines and cloudy band, or with these but very faintly indicated, while the dark spot in the base of the reniform stigma is conspicuous and of a red-brown, and the cilia distinctly purplish-red.

He reported one specimen taken in Surrey in which "these colours are obscured and the whole surface is pale yellow."

Another "has only a row of dark red-brown dots along the hind margin."

The Names and Forms to be considered are:

fulvago, L. (1761), *Fn. Suec.*, 312.
icteritia, Hufn. (1766), *Berlin Mag.*, III, 296, 423.
cerago, Fb. (1787), *Mant.*, II, 159.
ab. *flavescens*, Esp. (1788-?), *Abbild.*, IV, 322, plt. 122, 2.
cerago, Hb. (1808-9), *Samml. Noct.*, 190.
gilvago, Haw. (1809), *Lep. Brit.*, 237.
ssp. *tunicata*, Graes. (1888), *Berl. Ent. Zts.*, 259.
ab. *suffusa*, Tutt (1892), *Brit. Noct.*, III, 9.
ab. *imperfecta*, Tutt (1892), *l.c.*
ab. *aurantia*, Tutt (1892), *l.c.*
ab. *obsoleta*, Tutt (1892), *l.c.*
ab. *virgata*, Tutt (1892), *l.c.*
ab. *decolor*, Schultz (1904), *Jahrb. Wien Ent. Ver.*, 89.
r. *asiatica*, Hamp. (1906), *Lep. Phal.*, VI, 502.
f. *togatoides*, Snell. (1910), *Tijds. v. Ent.*, LIII, 316.

ab. *sigmago*, Dorng. (1934), *Int. Ent. Zts.*, XXVIII, 6.
ab. *rubrago*, Hörhm. (1934), *Int. Ent. Zeits.*, XXVIII, 87.
ab. *fulvescens*, Drdt. (1934), *Pal. Noct. Supp.*, III, 153.
ab. *albescens*, Dorng. (1935), *Int. Ent. Zts.*, XXVIII, 467.
ab. **peraurantia**, n. ab. (1941).

Tutt dealt with (1) f. *flavescens*, pale yellow, lower part of reniform a dark spot; (2) *cerago*, Hb. and Fb., pale yellow, indistinct red marking; (3) *fulvago*, L., pale yellow, distinct red marking; (4) *cerago*, Newm. = ab. *suffusa*, Tutt, pale yellow, purplish-red band; (5) f. *obsoleta*, orange-yellow, central spot; (6) *imperfecta*, orange-yellow, indistinct red marking; (7) f. *aurantia*, orange-yellow, with distinct markings; (8) *virgata*, orange-yellow, distinct red band.

icteritia, Hufn., *Berlin Mag.*, III, 296 (1766).

Orig. Descrip.—" Pale sulphur-yellow, with reddish streaked spots and dots; the lower wings white."

l.c., 423. An additional note.

Orig. Descrip.—" A uniform pale yellow, only in the middle of the upper wing a small brownish-red spot." This doubtless refers to the var. *flavescens*.

Rott., *Naturf.*, IX, 117 (1776), said that the latter was not a pale variety of *icteritia*. It is strange that Bork. gave Rottemberg's opinion exactly the reverse.

cerago, Fb., *Mant.*, II, 159 (1787).

Orig. Descrip.—" Cristata, alis deflexis, flavis fusco subfasciatis; posticis albis."

f. *gilvago*, Haw., *Lep. Brit.*, 237 (1809).

Orig. Descrip.—" Alis sulphureis fulvo vix nebulosis, puncto pone medium strigaque postica punctulorum fuscorum." " Praecedenti certe affinis, at longissime pallidior, et absque fasciis nebulosis; puncto sive annulo incompleto loco basis stigmatis postici; strigaque juxta apice et punctis circiter sex fuscis minutissimis. Posticis ciliisque absolute albis." This is, of course, ab. *flavescens*.

ssp. *tunicata*, Graes., *Berl. Ent. Zeits.* (1888), 259.

Orig. Descrip.—" It was sent from the Amur with *X. togata* and *X. fulvago*. But it is on the average somewhat larger than these very nearly related species and extremely easily to be distinguished from both of them by its brown-red coloured thorax. One can thus, in short, characterize it, that in respect to the markings of its forewings it resembles *togata*, but in respect to its colour it resembles *fulvago*. Ground of forewings pale yellow, not so bright and turning somewhat to clay-yellow as in *fulvago*, with brown-red (violet-red) markings, etc."

Graeser gives a long, detailed description of all minute points, but as Warren (Seitz) remarks, it would seem to be merely a form of *fulvago*.

Hamp., *Lep. Phal.*, VI, 503, treated this form as a species. ab. *decolor*, Schultz, *Jahrb. Wien Ent. Ver.* (1904), 89.

Descrip.—(Drdt.-Seitz, *Pal. Noct. Supp.*, III, 153)—" Very pale sulphur-yellow, completely devoid of markings, reniform stigma also absent."

race *asiatica*, Hamp., *Cat. Lep. Ph.*, VI, 502 (1906).

DESCRIP.—" Forewing more orange-yellow, the markings dark brown, the ante- and post-medial costal patches absent; cilia dark brown at tips."—Sir Daria.

r. *asiatica*, Bng.-Hs., *Int. Ent. Zts.*, XXVIII, 3 (1934).

Is a redescription.

ab. *togatoides*, Snellen, *Tijds. v. Ent.*, LIII, 316 (1910).

ORIG. DESCRIP.—" The ground colour of the forewings is not sulphur-yellow but vividly citron-yellow as in *togata* (*lutea*, Strom.). Head and collar as well as the markings are, however, as in the type of the species."

var. *sigmago*, Döring., *Int. Ent. Zts.*, XXVIII, 6 (1934). " An especially small *asiatica form*," Drdt.

FIGS.—*l.c.*, plt. 1, figs. 15, 18, 21, 22.

ORIG. DESCRIP.—" They are small insects. The wings are slightly orange-yellow like the thorax. The brown marking is obsolescent, the costal spots are present. From the costal margin there extends beyond the discal spot to the inner margin of the forewing a dark brown obsolescent band, partly wide and partly narrower, forming also a so-called angle spot. I think that this is a high altitude race." Alveander Mts. in Turkestan, 2000-2500 m. 29-31.5 mm. expanse. (*fulvago*, 30-34 mm.)

f. *rubrago*, Hörhmr., *Int. Ent. Zts.*, XXVIII, 87 (1934).

FIG.—Plt., fig. 8.

ORIG. DESCRIP.—" The general colour of the forewing is a bright warm red-ochre. The markings are as in the normal *fulvago* and are clearly to be seen in somewhat brighter reddish-yellow. The stigmata dark with pale centres. Hindwings quite white. This example corresponds to the var. *palleago* of *gilvago*." Leipzic.

ab. *flavescens*, Döring. (of ssp. *asiatica*), *Int. Ent. Zts.*, XXVIII, 3 (1934).

ORIG. DESCRIP.—" Occurs, as it appears to me, in a strikingly higher percentage than in ours. But I also found imagines even which are orange-yellow, or such like, in which even under a glass no marking at all was to be discovered."

ab. *fulvescens*, Drdt., *Pal. Noct. Supp.*, 153 (1934).

FIG.—*l.c.*, plt. 19 e.

ORIG. DESCRIP.—" Is a form of *asiatica*, Hmps., that corresponds to *flavescens*; deep yellow, devoid of markings except for the lower half of the reniform stigma, only the extremities of fringes are slightly darker." Ili and Issyk-kul.

ab. *albescens*, Dörng.

Döring., *Int. Ent. Zts.*, XXVIII, 467 (1935), gave the following table:

	White (*albescens*).	Yellow (*fulvago*).	Orange (*aurantia*).
(a) *fulvago*.	Ground colour white. Markings strong.	Ground colour yellow. Markings strong.	Ground colour orange. Markings strong.
(b) *cerago*.	Ground colour white. Markings slight.	Ground colour yellow. Markings slight.	Ground colour orange. Markings slight.
(c) *flavescens*.	Ground colour white. Markingless except at base of reniform.	Ground colour yellow. Markingless except at base of reniform.	Ground colour orange. Markingless except at base of reniform.

ab. **peraurantia**, n. ab.

Tutt named an " orange-yellow " form with distinct typical marking as ab. *aurantia*. Capt. C. Q. Parsons, of Torquay, has kindly sent me a form he has just bred (April), which has an orange ground (not yellow) with much extended and intensified red marking forming a wide irregular band, which in a bright light is strongly purple, such as no other example I have seen possesses. In about 150 *fulvago* before me from many localities there is not one approaching this specimen in any of its characteristics and Captain Parsons informs me that he knows of no other example of this form having occurred in the Devon area.

Xanthia, Ochs. & Treit. (1816-25), Dup., H.-S., Gn., Led., Barr., Stdgr., Splr., South, Culot [*Ortholitha*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Cosmia*, Ochs. & Tr. (1816-25), Hamps., Warr.-Stz., Drdt.-Stz.: *Citria*, Hb. (1821), Chap., Tutt] *flavago*, Fb. (1787) = *lutea*, Ström. (1783).

Tutt, *Brit. Noct.*, III, 12 (1892): Meyr., *Hand.*, 61 (1895): Barr., *Lep. Br. Is.*, V, 368, plt. 231, 1 (1899): Stdgr., *Cat.*, IIIed., 207 (1901): Hamps., *Lep. Phal.*, VI, 501 (1906): Splr., *Schm. Eur.*, I, 252, plt. 46, 22 (1907): South, *M.B.I.*, II, 19, plt. 10, 4-5 (1907): Warr.-Stz., *Pal. Noct.*, III, 154, plt. 24 i, k (1910): Meyr., *Rev. Hand.*, 121 (1928): Drdt.-Stz., *Pal. Noct. Supp.*, III, 153 (1934).

Ernst & Engram., *Pap. d'Eur.*, VII, 167, f. 524 (1790), gave three very good figures. They cited the *togata*, Esp., and cited Scriba, *Beitrage*, pt. II, plt. x, f. 2.

Esp., *Abbild.*, IV, *Noct.*, 2 (2), p. 671, plt. 176, 1 (1792+?), gave a very fair figure ♂. *l.c.*, 2 (1), p. 336, plt. 124, 1 (1788+?), gave a good figure of a form under the name *togata*.

Bork. dealt with *flavago*, *Naturg.*, IV, 671, under the name *ochreago*, because the name *flavago* had already been used for a *Phalaena* (Noctua) *flavago* by Hüb. In Scriba's *Beitrage*, Bork. had previously treated of the species under the name *flavago*. He recognized *togata*, Esp., as this species, but noted the figure was too red.

Bork. had already described and figured this species in Scriba's *Beitrage*, II, 142, plt. x, f. 2 (1791), under the name *flavago*. His references are to Schiff., Fab., Esp., de Vill. (*togata*), etc. The figure is a good one, but it has the ground colour almost of the same shade of yellow as the very good figure of *fulvago* on the same plate, but the collar (dark red-brown) is that of *flavago*.

Hb., *Samml. Noct.*, 191 (1800-3), gave an excellent figure under the name *silago*.

Treit., *Schm. Eur.*, V (2), 368 (1825), said " This species was at first considered a variety of *cerago* (*fulvago*). Later on it was recognized in Vienna as a good species and it received a name. Esper was the first to describe and figure it as *Noctua togata*." This name of Esper's, however, was not followed as there was a Geometer, *togata*, Hb., and it was renamed *silago*, Hb. It is only recently that the *lutea*, Ström. (1783), was recognized as this species.

Dup., *Hist. Nat.*, VII (1), 462, plt. 129, 3 (1827), gave an excellent figure under the name *silago*. He gave *flavago*, *togata* and *ochreago* as synonyms.

H.-S., *Sys. Bearb. Noct.*, II, 217 (1849), as *silago*, said that, 191 Hb. was often much brighter purple-red. He gave *flavago*, Fb., *togata*, Esp. and *ochreago*, Bork., as this species.

Gn., *Hist. Nat. Noct.*, V (1), 394 (1852), treated this species under the name *silago*, Hb. He gave *togata*, Esp., *flavago*, Fab., *citrago*, Wilk., *ochreago*, Bork., and *rubago*, Don., as belonging to this species. He adds that probably the *fulvago*, Steph., is this species.

Lederer, *Noct. Eup.*, 39 (1857), used the genus *Xanthia* and put the *togata*, Esp., as the specific name with *silago* and *flavago* as synonyms in order of date.

Smith, *Cat. N. Am. Noctuae*, p. 223 (1893), included *flavago* in his List of Noctuae from Canada and the northern United States, including New York. Walk., *Cat. B.M.*, IX, 156 (1856), had previously recorded it from the U.S.A., etc.

Splr., *Schm. Eur.*, I, 252, plt. 46, 22 (1907), gave a good figure. He recognized only two forms, ab. *ochreago*, Bork., and *togata*, Esp.

South, *M.B.I.*, II, 19, plt. 10, 4-5 (1908), gave two very good figures, the former is quite typical with the oblique band of forewings purplish, the latter is more red and referable to ab. *ochreago*, Bork. He used the name *lutea*, Ström.

Warr.-Stz., *Pal. Noct.*, III, 154, plt. 24 i, k (1910), treated *rubago*, Don., *silago*, Hb., and *flavago*, Fb., as synonyms. He recognized ab. *ochreago*, Bork., and ab. *togata*, Esp. He gave three very good figures, 24 i, ♂ and ♀ *lutea* and ab. *togata*, Esp.

Culot, *N. et G.*, I (2), 85, plt. 55, f. 6 (1914), gave an excellent figure and considered *flavago*, Fb., and *silago*, Hb., as synonyms.

Meyr., *Rev. Hand.*, 121 (1928), did not accept the name *lutea*, Ström., and retained the genus *Ortholitha*.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 153 (1934), included one recently added ab.

The typical form of this species was independently described under four different names: *lutea*, Ström., fig. (N. Europe); *flavago*, Fab. (Mid Europe); *rubago*, Don., fig. (Britain); *silago*, Hb., fig. (Europe).

Barrett's notes on the Variation are as follows:

More constant in colour than *fulvago*, but the markings vary in rare instances to very faint pale purple-red on the one hand and to deep dark purple on the other, and all on the wing to the same degree. There is also some irregularity in size, and even in the breadth of the forewings.

He reports one example "has the spots of the transverse stripe united into a broad band."

In all cases the collar is purple or purple-red and by this it can be separated from *fulvago*.

The Names and Forms to be considered are:

lutea, Ström. (1783), *Danske Vid. Sel. Skrift.*, 78, f. 26.
flavago, Fab. (1787), *Mant.*, II, 160.
ab. *togata*, Esp. (1787-?), *Abbild.*, IV, 336, plt. 124, 1.
ab. *ochreago*, Bork. (1792), *Naturg.*, IV, 671.
rubago, Don. (1801), *Brit. Ins.*, X, plt. 338, 2.

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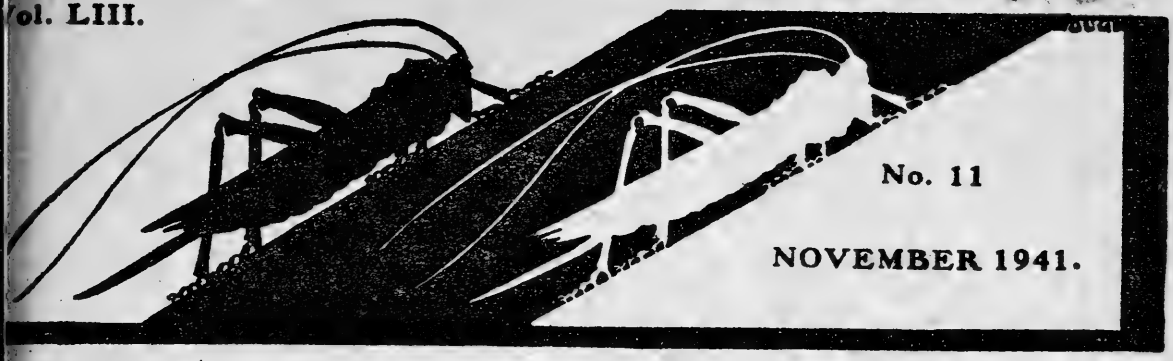
Printed by T. Buncle & Co. Ltd., Arbroath.

Vol. LIII.



No. 11

NOVEMBER 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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Fig. 1. ZYGAENA LONICERAE.

Fig. 2. WILD HYBRID, Z. LONICERAE × Z. FILIPENDULAE.

Fig. 3. ZYGAENA FILIPENDULAE.

WILD HYBRIDS OF ZYGAENA FILIPENDULAE, L., × Z. LONICERAE, ESP.

By E. A. Cockayne and H. M. Darlow.

(Plate VI.)

In a piece of rough ground near Bedford, where both five-spot and six-spot burnets are very common, one of us, H.M.D., took two males, one in June 1931 and the other in June 1935, which were intermediate in appearance. A very small sixth spot was present and the dark margin of the hindwing was broader than that of *Z. filipendulae*. He believed that they were hybrids.

There are many records of two different species of *Zygaena* having been found paired in a wild state, but proof that they produce offspring under natural conditions is lacking. Captured specimens of various wild hybrids have been reported and in some cases they have even been named, but their authenticity is doubtful, for the genitalia, so far as we know, have not been examined. We decided to settle the status of the Bedfordshire specimens by making a preparation of the genitalia of one of them and of a five-spot and a six-spot burnet taken in the same locality. The dissections were done by E.A.C., the mounting by H.M.D., and the photographs were taken by Mr W. H. T. Tams, to whom we wish to express our thanks. The genitalia show very clearly that the specimen is a hybrid. The uncus in *Z. filipendulae* (Fig. 3) is bifid and the two processes are long and slender and curve away from the middle line, whereas in both *Z. lonicerae*, Esp., and *Z. trifolii*, Esp., the processes are short, broad and rounded (Fig. 1). In the specimen with an appearance intermediate between *Z. filipendulae* and a five-spot species the uncus also is intermediate (Fig. 2). The processes are much longer than those of a five-spot burnet, but much shorter than those of *Z. filipendulae*. Instead of being curved like those of *Z. filipendulae* they are straight, and the tips are sharp pointed instead of being blunt like those of a five-spot species. The differences might have been shown more clearly in a line drawing, but we thought a photograph would be more convincing evidence of the truth of our statement.

The next step was to determine whether the five-spot burnet was *Z. lonicerae* or *Z. trifolii*. *Z. lonicerae* is much the commoner species in the latitude of Bedford, though there are some doubtful records of the occurrence of *Z. trifolii* even further north. The locality makes it more probable that the five-spot species is *lonicerae*.

The probability is increased by our knowledge of the hybridisation of *Z. filipendulae* with the two five-spot species. Weir records the capture of wild hybrids of *Z. filipendulae* × *Z. trifolii*, but W. H. B. Fletcher, whose work on hybrid burnets is so well known, says "seeing the great difficulty of pairing *filipendulae* with *trifolii* in captivity, I should want strong evidence, actual paired specimens with history, before believing they paired in nature, and actually bred and labelled hybrids before believing in them at all." Fletcher had two reputed hybrids (*trifolii* × *filipendulae*) from Weir but thought one was *Z. trifolii*, ab. *basalis*, and the other *Z. hippocrepidis* Steph. Fletcher found not only that pairings between *Z. filipendulae* and *Z. trifolii* were difficult to get, but that when obtained the eggs were always infertile. On

the other hand he had no great difficulty in obtaining pairings between *Z. filipendulae* ♂ and *Z. lonicerae* ♀ and *Z. lonicerae* ♂ and *Z. filipendulae* ♀ and in rearing the hybrids. Standfuss, however (*Handbuch der paläarktische Gross-Schmetterlinge*, 1896, p. 55, Taf. III, fig. 5), says he found a *Z. trifolii* ♂ paired with a *Z. filipendulae* ♀ in a wild state and bred the hybrid *escheri*, Stndfs. Even if his identification of the five-spot male is correct the weight of evidence is in favour of the Bedfordshire specimen being a hybrid *Z. filipendulae* × *Z. lonicerae*.

Finally we compared the genitalia of the Bedfordshire five-spot burnet with those of *lonicerae* and *trifolii* and believe it belongs to the former species. The intermediate specimen we examined is therefore a wild hybrid, *Z. filipendulae* × *Z. lonicerae*, but there is no clue to indicate whether the male parent was *filipendulae* or *lonicerae*. There can be little doubt that the other intermediate specimen is also a hybrid, and the occurrence of wild hybrids in two different years adds interest to this record.

LEGEND FOR PLATE VI.

Fig. 1. Male genitalia of *Zygaena lonicerae*.
Fig. 2. Male genitalia of wild hybrid, *Z. lonicerae* × *Z. filipendulae*.
Fig. 3. Male genitalia of *Zygaena filipendulae*.

RED HINDWINGS.

By An Old Moth-Hunter.

It was seven o'clock in the evening, Greenwich mean time, when it happened. My wife and I were walking along the bank of a river in mid-Wales, prospecting oak trunks for sleeping moths. The day had been fine and warm, and although a light mist was already beginning to shroud the meadows there was still light enough for entomologising. As we approached a giant oak growing right on the brink of the river a large moth flew from the trunk. To my great surprise I saw that it was a Red Underwing. It flew across the river and into the foliage of a small oak growing on the opposite bank. I was only a few paces from the tree, walking along the bank, and my wife was a little ahead of me, in the meadow and a yard or two to my right. The moth appeared to come from low down on the trunk, on the river side; we both saw it at the same instant and both had it in view until, as I have said, it disappeared among the leaves of the tree opposite.

"A Red Underwing, wasn't it?" said my wife.

And indeed there was no mistaking it. *Catocala nupta* is one of the commonest moths at our Hertfordshire home: sometimes, as in 1934, he is a pest at sugar, and often when motoring we used to count the number seen on telegraph posts. For *nupta* does not always go to sleep on lichened trunks and cement walls: with curious contrariety as often as not he roosts on the blackest of black telegraph poles. I suppose he has an *idée fixe* that every passer-by will mistake him for a splash of mud thrown on to the pole by some passing car. And in the Kennet valley in my youth I once took thirty-one at my sugar in the garden on three successive evenings, to wit, August 13th, 14th, and 15th, 1896, so my diary records. *C. nupta* therefore is an old acquaintance. We

have seen him on the wing scores of times both by day and in the lantern's gleam at night.

"I cannot think of any other moth it could possibly have been," said I to my wife. "I know, and you know, *C. nupta* as well as we know the fingers on our hands. But—*C. nupta* does not occur in Wales."

"Who says so?"

"Everybody. All the books. To the best of my knowledge, so far from occurring in mid-Wales *C. nupta* has never been recorded from Wales at all."

"Then what do you suggest that it was?"

"I don't suggest anything. I have just seen, and you have just seen, a specimen of *Catocala nupta*. We are at this moment standing on the bank of a river in mid-Wales, where *Catocala nupta* does not occur. Therefore you and I have just experienced a simultaneous identical hallucination."

"Don't be silly. What about *sponsa* and *promissa*? It seemed to me to be a little smaller than *nupta* and to fly more straight than *nupta* does."

"I noticed that too. It certainly seemed a little smaller than *nupta* and it undoubtedly flew straight across the river. I've not seen *sponsa* nor *promissa* on the wing since I lived in the New Forest, years ago; so I've forgotten what their flight is like. But that the moth which we have just seen was a Red Underwing of sorts there can be no possible doubt."

"Then I should say it was *promissa*—a large female probably. Look at those huge oaks in the park opposite: they must be hundreds of years old. I expect there's been a colony of *promissa* there since Cromwell's time. Pity we can't sugar."

"Curse the war," said I.

Presently my wife said: "How long did we have it in view?"

I took out my watch. "I'll say 'go' when the moth flew off the tree, and you say 'stop' when it's flown into the tree opposite."

We did this for each other, three times each. Her times were 8, 8, and 9 seconds; mine were 7, 8, and 7 seconds.

"If we can't identify a large moth on the wing, in clear view of us for, say, eight seconds," said I, "we ought to give up entomology."

We turned and walked back to the house.

"I've never seen *nupta* at rest on an oak trunk," mused my wife, "though often on ash and lime. It was very low down, wasn't it?"

"Yes; quite close to the ground, I should think."

"Do *sponsa* and *promissa* rest on the trunks of oaks low down?"

"I don't think I ever found one otherwise than at my sugar."

Presently she said: "Will you record it?"

"Yes. I think I shall write to *The Record* to-night, while it's fresh in my mind."

And that was the end of the Red Underwing incident—for that evening. The more I thought about it the more certain I became that we had actually and in very fact seen a Red Underwing of sorts in mid-Wales. It could not possibly have been anything else. I went to bed convinced at least of the identity of the genus.

That night I slept uneasily, dreaming all manner of fantastic dreams. First I was in a forest where every oak trunk was crawling with Catocalas of all kinds and sizes; even the Continental ones with yellow hind-

wings were there. Then all at once the locale of my dream changed: I was standing in my larva-room when suddenly I heard a scraping sound that came from one of the cages; then it came from each cage in a row; then there arose a hubbub of wings. I opened the first cage. Out flew a swarm of *Arctia caja*. I opened another; more Tigers. I opened them all, and from each one surged swarms of Tiger Moths. The air was full of them; they filled the room; they buzzed in my face and neck. I beat them off with my hands, I trampled them underfoot. Then I hit my hand against the wall, and the pain of it woke me up. Inside the wall near my head a mouse was nibbling something with a rasping sound . . .

At breakfast I related my dream. "What do you think it portends?" I asked.

My wife looked at me and drew in her chin.

"It's lucky, isn't it," she said slowly, "that you didn't write that letter to *The Record* last night."

I put down my eggspoon and stared at her. "Why?"

"Because—it's possible that—the moth we saw—was not resting on the trunk but on the grass at its roots."

"What on earth do you mean? You don't mean to say——"

"And Tiger Moths fly straight, don't they? And you can see the red of their hindwings quite plainly when they fly, can't you? And they're not quite so big as *nupta*, are they? And the light wasn't as good as it might have been, was it?"

I gazed at her in horror.

"It just shows," she went on, "how very careful one ought to be before——"

"That'll do," said I, bitterly. "It's just like you to pour cold water on everything I suggest." I got up from the table.

"Aren't you going to finish your breakfast?"

"No. The coffee's lukewarm, the toast is like leather, and the margarine smells like train-oil. I hate my breakfast. And I hate *caja* and *nupta* and all the silly tribe of moths. I'm going to smoke a pipe in the garden."

I heard her chuckle as I went out. Women have no sense of the fitness of things where moths are concerned. And the trouble with them is that they are always right. At least, nearly always.

Now, all this happened on September 6th. When I had finished my pipe I went indoors and began to wade through my diaries. And the latest date upon which I had recorded *A. caja* in the imago state was August 14th, and that was in a very late year indeed, much later than was 1941. So that when I refilled my pipe doubt as to the infallibility of my wife's intuition reared its head. Surely a man of my age could not mistake a common or garden Tiger for a Red Underwing? The light, she had said, was not as good as it might have been. In spite of that, I refused to believe that I could possibly have mistaken one moth for t'other, even had a belated *caja* managed to survive till September 6th. "Dash it all," I said to myself; "it *was* a *nupta*: I don't care what the books say." But this time I kept my opinion to myself.

On September 24th, just as I was wondering why the tea-bell had not rung, a message came to me from my wife. She was in the meadow by the river, and would I please go to her at once, taking with me the largest entomological box that I possessed.

I found her standing beside a large oak in a hedgerow.

"Well," said I as I came up, "I suppose it's a Clifden Nonpareil this time. Where is it?"

"I'm most frightfully sorry," said she.

"Oh, it's gone, has it?"

"I mean, about that *nupta*."

"Why? What about it?"

"You were right after all." She extended an arm slowly towards the tree. I followed the movement of her hand until it came to a stop, and after staring hard at the trunk for a moment or two saw that her index finger was six inches from a large, a very large, grey moth.

"These Tiger Moths," said I, as I deftly boxed a fine fresh female *nupta*, "are a perfect pest, aren't they."

COLLECTING NOTES.

Notes on British Lepidoptera (Geometridae).—(*Continued from p. 107.*)—*Triphosa dubitata.*—Taken frequently at light, in Camberley, towards the end of July and throughout August, and again, after hibernation, in May.

Eucosmia certata = *Calocalpe cervinalis.*—Not found at Camberley. Pupae, purchased from Mr Newman, of Bexley (Kent), emerged as moths in early April.

Eucosmia undulata = *Calocalpe undulata.*—I have taken larvae on Aspen and Vacciniun, but, more frequently on Sallow, in September and October. They are enclosed in webs in terminal leaves of the shrub. Many of their retreats are found to be occupied by earwigs which have probably devoured the rightful owners. Moths have appeared during June and July.

Scotosia rhamnata = *Philereme transversata.*—I have not seen this species in Camberley, but have taken it in the neighbourhood of Maidstone, in July.

Scotosia vetulata = *Philereme vetulata.*—I have been given larvae on *Rhamnus cathartica* from Milton Ernest (Bedfordshire). The resulting moths appeared early in July.

Lygris prunata.—Does not occur anywhere around Camberley. I have received moths from Barnard Castle (Durham).

Lygris testata.—I have taken the larvae on Sallow. Moths come to light in August and September.

Lygris populata.—I have not found this species anywhere in Surrey, but have taken moths, at light, in North Wales and also at Moffat (Scotland).

Lygris associata = *Lygris mellinata.*—I have found larvae on *Ribes*, from which moths emerged early in July. Other moths have come to light towards the latter end of June and early July.

Cidaria pyraliata.—I have taken this species only once in Camberley, but found it frequently at Freshwater (Isle of Wight), where it was on the wing at dusk.

Cidaria fulvata.—Uncommon about Camberley, towards the end of June. I have taken it on the wing in the New Forest and found it at Moffat (Scotland) in August.

Cidaria corylata.—Abundant at Camberley, on the wing, on stems of trees and at light, throughout May and June to early in July. I have found the larvae chiefly on Birch.

Cidaria truncata.—I have taken the moth, both at light and on the wing, in May and June, but, more commonly, from August up to early October.

Cidaria immanata = *Cidaria citrata.*—Almost equally common, but not coming out so early. I have disturbed it from bushes throughout August.

Cidaria sagittata.—Raised from ova taken on seed-heads of *Thalictrum* at Wood Walton Fen. The resulting moths appeared in June. I took the moth, on the wing at dusk, in Wicken Fen, in July.

Cidaria miata.—As a boy, I used to find this species on ivy blossom. Later, I have taken moths at light, in Kent and at Llangammarch (Wales) in September. I have only once seen it in Camberley when I took a specimen in my moth-trap on 20th October.

Thera obeliscata.—Very abundant in the Camberley district. I have taken larvae on Spruce and have disturbed the moths from Pine and other trees. I have also taken them at light and at sugar in May and June and, again, from August to December.

Thera variata.—I have not found this species (which was at first confused with *obeliscata*) in Camberley; but I have been given, by Dr Cockayne, a series from the New Forest.

Thera cognata.—I have found larvae on Juniper in Scotland. The moths emerged early in August.

Thera firmata.—I have caught this species commonly at light, in July, and have bred it from larvae on Pine as early as mid June. But the bulk of my captures have been taken from August to October.

Thera juniperata.—Larvae were beaten from small juniper bushes on the Hogsback (Surrey) in September. The moths emerged in mid October.

Lampropteryx suffumata.—I have not found this species around Camberley; but have taken it, on the wing at dusk in the neighbourhood of Maidstone, in April and May.

Coremia quadrifasciata = *Xanthorhoë quadrifasciata.*—I have taken this species in the same neighbourhood of Kent, where it may be disturbed from hedges in July.

Coremia unidentaria = *Xanthorhoë unidentaria.*—Common throughout Camberley in May and, again, in July and August.

Coremia ferrugata = *Xanthorhoë ferrugata.*—About equally common as the previous species, and on the wing during the same months.

Coremia designata = *Xanthorhoë designata.*—On the wing, around Camberley, in May and August.

Amoebe olivata = *Calostigia olivata.*—Have not found this species at Camberley; but have beaten it from hedges in Kent, in July.

Amoebe viridaria = *Calostigia pectinitaria.*—Common everywhere. Usually on the wing, at dusk, throughout June and July. I caught an example on the 10th September 1927.

Melanydris salicata = *Calostigia salicata.*—I have taken this species in Aberdeenshire (Scotland), in June.

Melanydris multistrigaria = *Calostigia multistrigaria.*—Rare in Camberley. A single example was taken, at light, on 24th March.

Melanydris didymata = *Calostigia didymata*.—Common at Camberley throughout July. I have taken males, in Scotland, in late August.

Oporabia dilutata = *Oporinia dilutata*.—Abundant at light during October.

Oporabia autumnata = *Oporinia autumnata*.—What I take to be *autumnata* is equally abundant in the same month.

Entephria caesiata.—I took this species, on the wing at dusk, at Moel Faddur (N. Wales) in July.—E. Ernest Green, F.R.E.S., Camberley, Surrey.

Dicranura vinula, L., in the Isle of Harris.—During the present season this insect was very common both on North and South Harris. In general, it was attached to *Salix aurita* and *S. atrocinerea* in the river gorges and in open places where these shrubs grew. On inland cliffs, and on rock ledges along the various burns, whenever these supported the aspen, *Populus tremula*, then that plant was preferred. For the most part, the larvae had the normal patterns and colouration. However, in the gorge of the Abhaina Gillan Tailleir, where aspen was the preferred food the dorsal purple band was replaced by green, thereby giving the larvae a rather novel appearance. At some points, as in Glen Skeandale and along the Allt Trollamul where the larvae were feeding on isolated aspens stretching finger-like from the sheer cliffs, it seemed a matter of wonder in what situations the larvae spin their cocoons. I climbed to one such tree along the Allt flowing into Beesdale and searched the stem for old or new cocoons, but had no success. In Tarbert, several larvae were found on black poplar.—Prof. J. W. Heslop Harrison, F.R.S., King's College, Newcastle-upon-Tyne.

Euclidia mi in the Isles of Muck and Rhum, and E. glyphica in the Isle of Rhum.—*Euclidia mi* appears to be rather plentiful and fairly well distributed in Muck, but in Rhum, as far as I could see, it was confined to the marshy ground along the left bank of the Kinloch Burn as it approaches the head of Loch Scresort. On the other hand, its congener, which is now reported for the first time from any Hebridean island, was only found on Rhum where it must be very rare. Only two specimens were seen, and these were probing the flowers of *Lotus corniculatus* on the west side of Rhum not far from Kilmory and opposite the Isle of Canna.—Prof. J. W. Heslop Harrison, King's College, Newcastle-upon-Tyne.

Bombus smithianus, Wh. on the Isles of Scarp and Scotasay.—Of these two islands, the former lies off the west coast of North Harris, whilst the latter lies in East Loch Tarbert, between Scalpay and the head of the Loch. Both are therefore somewhat isolated; nevertheless, the "Ginger" Bee, as all my people have learnt to call the most widely distributed of the Hebridean Bombi, was quite common on Scarp at flowers of Lousewort, Erica, Thistle, Lotus, etc., and much less plentiful, chiefly on Erica on Scotasay. Strangely enough, although Scarp is much the larger island, the only Bombus there is *B. smithianus*, whilst the Isle of Scotasay also produces *B. hortorum*.—Prof. J. W. Heslop Harrison, King's College, Newcastle-upon-Tyne.

Ypsipetes ruberata, Frr., a Geometrid new to the Outer Hebrides.—Throughout our botanical and entomological investigations in the

Outer Hebrides I have kept a constant look out for this insect, which is common enough in the Inner Isles on Raasay and Rhum, but, until this season, without success. However, during August whilst we were working the Uamadale area of South Harris I made my way down the stream to Kendibig on the coast. Here, on the grassy banks near the sea, grew numbers of the sallow, *Salix aurita*. Quite by accident I began to examine them for sawfly galls, and almost the first leaves examined revealed the familiar spun leaf characteristic of *Y. ruberata*. Searches in other suitable areas were, unfortunately, wholly unsuccessful. In the absence of alders in the wild state on these islands one doubts Outer Hebridean records of *Y. trifasciata*; in all probability the old confusion between "*ruberata*" and "*trifasciata*" is responsible for the records.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

PHIGALIA PEDARIA, FAB., IN RHUM, EIGG, AND RAASAY (INNER HEBRIDES.—Although there were no records for the Hebrides previous to our Raasay captures, we were not surprised to find this insect in the woods near Raasay House and along the Arish Burn, for the oak and birch woods were just the same in appearance as those in which we had seen it on the mainland. However, the occurrence in Rhum seems much more important as the faunal alliances of the island lean toward the Outer Isles. The captures were rendered the more striking in as much as the larvae, in addition to favouring birch, etc., in the Kinloch Woods, were beaten from *Betula pubescens* in the dry gorges on the slopes of Askival and Halival. Perhaps their presence in the woods around Poll nam Partan, Eigg, need less emphasis.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

ORGYIA ANTIQUA, L., IN THE HEBRIDES.—Up to the present, the Vapourer Moth has been seen only in the Isles of Soay and Raasay, and in both cases in the larval condition. In Soay, the larvae were quite typical, as indeed were most on Raasay. However, in others, the red colour was replaced by white, and the anterior and lateral hair-pencils were less than one third of their usual length. In fact, placed amongst larvae of the British Columbian *O. badia*, which I had just been breeding, they would be regarded as slightly aberrant examples of that species. The resulting imagines of all the larvae were all on the light side.—Prof. J. W. HESLOP HARRISON, King's College, Newcastle-upon-Tyne.

COLIAS CROCEUS, FOURC., IN PERTHSHIRE.—On 28th July a specimen of this immigrant species was noted near Comrie in Perthshire. As this date is too early for the emergence of the British-born brood, it seems likely that this example was one of the remains of the original immigration.—Prof. J. W. HESLOP HARRISON, F.R.S., King's College, Newcastle-upon-Tyne.

NOTES ON VARIATION FROM THE WORTHING MUSEUM COLLECTION.—(*Continued from p. 111*).—A DIGRESSION ON COLORATION.—It so happened that while I was preparing these notes I was reading Pycraft's very interesting book, "Camouflage in Nature." In this he sometimes gives a great number of facts in illustration of some point but leaves the direct application largely to the reader. This, whether intention-

ally or not, gives considerable incentive to thought, and in studying the Lycaenids (*sensu latiore*) I began to investigate how far his theories threw light on the coloration of the specimens under consideration and how far they threw light on his theories. I shall later have a few words to say about camouflage in the sense of protective colouring, but there were two points in the book, not directly concerned with the main subject, which specially engaged my attention—the evolution of colour in species and the evolution of spots by the breaking up of lines. These seemed to me to throw a good deal of light on the evolution of the three groups—" hairstreaks," " coppers," and " blues." (I shall constantly use these three words because they are universally understood.) It must be borne in mind that these inferences, for what they are worth, are drawn exclusively from the species and the specimens in this collection, and it is quite possible that a collection of wider range might show results which either added to or detracted from their probability. Pycraft shows that ancestral colours were generally dull, and that bright colours were a later (often much later) development. Now in these three groups one colour largely predominates in each; brown in the " hairstreaks," orange in the " coppers," blue, shading off into purple, in the " blues." This would, on Pycraft's theory, point to the hairstreaks as being nearest to the common ancestor. (The fact that there was a common ancestor is vouched for by all the earlier stages of the three groups.) But there is a further indication in the fact that while all three colours are to be found in all three groups brown is by far the most persistent. It enters largely into the coloration of the ♀s of nearly all the coppers, is the ground colour in the upperside of some of them and of both the ♂ and ♀s of others. Thus the upperside of both sexes is brown in *L. subalpina* (though a little copper sometimes shews in the ♀ of the var. *brunnea*), the ♂ of *L. dorilis* is brown except for the orange spots, the hindwings of the ♀ are also brown, and in southern specimens the forewings as well; the ♀ of *C. hippothoë* shows much brown in most specimens and is entirely brown in those of the var. *eurybia*; the ground colour of the hindwings in both sexes of *R. phlaeas* is brown and there is a good deal in the forewings also; in some forms of the ♀ of the var. *gordius* of *L. alciphron* there is much brown in the hindwings, especially in the ab. *intermedia*. (I do not cite the typical ♀ as there are no specimens in the collection.) There is also a good deal of brown in the ♀s of *H. virgaureae*, and in a dark form in those of *L. amphidamus*. The same is true of many of the " blues." Both sexes of *H. admetus* and *A. eumedon* are brown and so are those of *A. medon* except for the orange spots which are not always present. The ♀s of *L. semiargus*, *P. hylas*, *H. damon*, *P. lycidas*, and *A. anteros* are brown, and with very rare exceptions those of *P. amandus* and *P. escheri*, so is the one ♀ of *H. dolus* in the collection. The ♀ of *P. meleager*, var. *steveni*, is almost entirely brown, and it is very rarely that any touch of blue shows in the ♀s of *P. eros*. Although blue ♀s, sometimes very bright blue ♀s, of *P. icarus*, *A. bellargus* and *A. coridon* exist, brown is the normal colour of the ♀ as also in *A. thersites*, *P. argus* and *P. aegon*. If we turn to the underside of those that have no brown on the upperside we shall find that colour in *L. arion*, *L. alcon*, to some extent in *L. euphemus* and in a very pronounced form in *L. arcas*. These instances will show how persistent this colour is in all three groups.

In accordance with Pycraft's theory we should expect to find in the "hairstreaks" as the older group, at least the rudiments of the dominant colours of the other two. It is usual to place the "coppers" between the "hairstreaks" and the "blues," but I think the opposite arrangement will be more suitable for our present purpose. I also spoke of the dominant colour of the "blues" as blue shading off into purple, but logically it would be better described as purple shading off into blue, for in the "hairstreaks" there is more purple than blue and much more of this colour than of orange, though the latter has its place in this group as well. Blue first shows itself on the underside of *K. spini* in a single spot on the hindwing, but I doubt whether this has much, if any, significance. It is more apparent in *B. quercus*, as a suffusion over the whole upper surface of the ♂ and as a bright patch on the forewing of the ♀. In English and other northern specimens this patch is usually of a decided purple, but in southern specimens, except from Digne, e.g. from Assisi in central Italy, and in the race *iberica* from Spain and Algiers, it is of a brilliant blue. This sometimes occurs in English specimens and I took one on the downs last year with the patch nearly as bright, and quite as blue, as the southern specimens. The purple also shows itself on the upperside in *L. roboris*, but the spots near the edge of the hindwing of the ♀ are often blue. Among the "blues" the ♂s of *C. semiargus*, *C. sebrus*, *C. lorquinii* and both sexes of *V. optilete* are definitely purple, the ♂s of *E. argiadus*, *E. coretas*, *C. galba*, *Z. karsandra*, *P. icarus*, *P. escheri*, *P. lycidas* and *A. thersites* have all more or less of a lilac tinge, but leading up to the brilliant blue of *P. hylas*, *P. meleager*, *P. eros*, *P. eroides*, *A. bellargus*, and the scarcely less brilliant blue of *A. anteros* and *A. pheretes*. The blue shades off in various directions such as *H. damon*, *C. argiolus*, etc., becoming increasingly paler in *A. hispana* and *A. coridon* until it almost loses itself in *H. dolus* and the var. *albicans* of *A. coridon*. With regard to the purple or blue among the "coppers" the ♂ of *L. amphidamas* is sometimes so completely suffused with purple that it loses all trace of any other colour, and always shows considerable purple suffusion, while the spots on the hindwing of the ♀ are often decidedly blue. The ♂s of some forms of *L. alciphron*, var. *gordius* are much suffused with purple (I omit reference to the type), and so are the hindwings of *C. hippothoë*. Blue spots sometimes occur on the upperside hindwings of ♀ *C. hippothoë*, and are common on the hindwings of *R. phlaeas*; similar spots of a more lilac tone sometimes occur on the hindwings of *L. dorilis*.

There is much less orange than purple to be found among the "hairstreaks" but it shows itself pretty generally in small quantities. It occurs both on the upper and underside of *K. spini*, *S. pruni* and *N. ilicis*, on the underside of *C. w-album* and *L. roboris*, and also in smaller quantities on the underside (and sometimes in the case of the ♀s on the upperside) of *N. acaciae* and *B. quercus*, but it is only in *Z. betulae* ♀ that a conspicuous patch occurs on the upper side, though there is an orange tinge over the whole underside of this sex; a duller orange invades most of the upperside of *N. myrtale* (the dull blue tinge suffusing that of the ♀ is most remarkable, reminding one in a way of *L. baeticus*). Orange in the "blues" is also in small quantities, being confined to spots which occasionally coalesce into bands; it is perhaps most conspicuous in *A. medon* on both sides, but occurs on both sides

of *C. trochilus*, *S. bavius*, var. *fatma*, often of *P. argus*, *P. aegon* and *P. arnoricanus*; conspicuously on the underside of *S. orion*, also on the underside of *S. baton*, *P. eros* (sometimes on the upperside also), *P. eroides*, *P. hylas*, *P. amandus*, *P. zephyrus*, *P. icarus*, *A. bellargus*, *A. coridon*, *A. anteros* (sometimes on the upperside of the ♂), *P. lycidas* and others, while the brown ♀s of most of these often have orange spots on the borders of the uppersides as well, even in specimens which are entirely covered with blue as, e.g. *A. coridon*, var. *syngrapha*. If Pycraft's theory is correct that spots are formed by the disintegration of bands, a further suggestion is added in support of the "hairstreaks" being the oldest group, and also suggests that the "blues" are older than the "coppers"; we find very little suggestion of bands in the latter though they occasionally appear in *H. virgaureae*, in the ♀ *L. amphidamas* and generally on the border of *R. phlaeas*; but in the "blues" there are species represented here in which bands, or rather broken bands, are the normal markings of the underside such as *T. balcanicus* and *T. mediterraneae*; a tendency to break up into spots is discernible in *L. boeticus* and *S. telicanus*, and further advanced in *C. gamra*, but in almost all cases eyespots on the underside are the rule.

I said that I should have a few words to add on the subject of camouflage in the way of protective resemblance brought about by colour and pattern. It is of course generally recognized that in butterflies this is to be looked for on the underside when at rest. Pyecroft frequently insists on the necessary connection between protective resemblance and "behaviour," the former would avail nothing for instance if the insect could not, or would not remain motionless. I do not think, however, that the protective use on the two sides in the case of insects in motion has received much attention.* This of course cannot be judged by insects in the cabinet, but more than 70 years of field work do give one some opportunity of judging the matter. The most obvious case is that of an insect with a dark upperside and a light underside (or *vice versa*); this to be effectual must be accompanied with a form of flight involving rapidly moving wings—if a zig-zag flight is added so much the better. An excellent illustration of this is formed by the difficulties of following *A. medon* in flight, but there are many such instances. It might be thought that bright colour would tell against protection in flight, but if the other side is dull this is by no means the case; somewhat the same effect is produced as by that of a dark and light side. Of course an irregular flight unaided by contrasting colour is very efficacious. I suppose everyone has noticed how difficult the two common whites are to capture in flight; they do not seem to take any means to get out of the way, but where you expect them to be when you aim the net, is just where they are not. Sparrows find the same difficulty. I have more than once watched the efforts of a sparrow to catch a "white" on the wing; the attempt was always unsuccessful however often repeated. When the flight is of a gliding kind such a contrast of colour would be useless, and so we find for instance that there is very little difference of pattern between the two surfaces of the "swallow-tails." As an instance of how different an insect can

*See Dr E. H. Hankin's "Note on the comparative invisibility of *Papilio demoleus during flight*" in *Proc. Third Entom. Meeting Pusa*, III, pp. 900-903 (1920).—T. B. F.

look in flight and in the cabinet I might mention *Z. medesic ae* and *Z. cassandra*. In the cabinet they look a good deal alike, on the wing the former is a light, the latter a dark butterfly. It would be possible to enlarge on this subject, but perhaps enough has been said to show that the colouring of the upperside may often offer some protection in flight as that of the underside does at rest.—(*To be continued*).—Rev. G. WHEELER, M.A., F.R.E.S.

MR E. P Wiltshire reports the capture of *Nonagria algae* (*cannae*) at Shiraz in Iran (Persia). He has also diagnosed two new *Melitaea* species from the same area.

CURRENT NOTES.

THE South London Entomological Society after a lapse of two years held its Annual Exhibition of Varieties on Saturday, 11th October. Of course it was, under present circumstances, considerably limited in its scope, with so many members and their friends away on service. However, there was an attendance of over 100 in the room, the Hall attached to the Chapter House of Southwark Cathedral, and there were a good number of very interesting exhibits. We hope to give a detailed report later on with the kind assistance of Mr S. G. Castle-Russell.

THE first portion of (the late) Mr Percy Bright's collection of British butterflies was dispersed on 29th October. The venue of sale has now changed from Messrs Stevens & Co., of Covent Garden, W.C., to Messrs Glendinning & Co., of Argyle Street, London, W.1. The catalogue showed 192 lots, mostly single specimens and the whole was contained in three cabinet drawers. The specimens offered were remarkable forms, aberrations, albinistic, some of them unique and included so-called hermaphrodites, gynandromorphs, and the extinct *Chrysophanus dispar*. Not only were some of the specimens unique but so also were the prices at which they were sold, as can be seen from the following:—One black ♀ *machaon*, £12 10/-; a ♂ albino *paphia*, £23; a tawny *euphrosyne* with metallic markings, £23; one ♀ ditto, nearly all black, £15; another ditto, form *obsoleta*, £11; a rayed specimen of *selene* with spots obsolete, £7; an entirely black ditto, £26; ♂ albino *aglaia*, £23; ♀ *adippe*, heavily suffused with black on all wings, £13; a light yellow ♀ ditto, £8; a white ♂ *paphia*, £13; ♂ *rhamni* with all wings suffused black, £10 10/-; *paphia* ♂, ab. *melaina*, £10; two specimens of *P. brassicae*, one a yellow ♂ and a coffee coloured specimen, £4 10/-; one *plexippus*, £5 5/-; *cardamines* with lemon tips to forewings, £8 10/-; ditto, albino underside, £7 10/-; form *valezina*, nearly all black, £13 10/-; ditto ♂, almost entirely black, £12; *c-album*, fore and hindwings heavily banded, £6; *V. urticae*, ab. *nigrocaria*, £7; *cardui*, rayed form, £13 10/-; *antiopa*, a black variety, £7; *aegon*, ab. *striata*, £5; *minima*, ab. *striata*, £12 10/-, and so on up to a total of £931 5/6. London is a wonderful city. And there's a war on too.—H. E. P.

SUPPLEMENT

TO

TUTT'S
BRITISH NOCTUAE

AND

THEIR VARIETIES

BY

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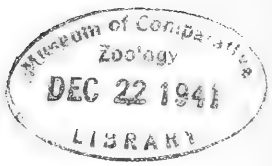
VOLUME II.

1935 - 1941.

T. BUNCLE & CO. Ltd., Printers, Market Place, Arbroath.
1941.



ORIG. DESCRIP.—" Complete absence of the black mark on the waved line near the costa." Holland.

P. (131) Add to the List of Forms of *T. subsequa*, Schiff., = *orbona*, Hufn., ab. *brunnea*, Lempke, ab. *distincta*, Lempke, ab. *maculata*, Lempke, and ab. *grisea*, Lempke.

P. (133) Add the Original Descriptions of the above four forms 12 lines from the top.

ab. *brunnea*, Lempke, *Tijds.* (1939), 258.

ORIG. DESCRIP.—" Ground of forewings pure brown." Holland.

ab. *distincta*, Lempke, *Tijds.* (1939), 258.

ORIG. DESCRIP.—" Forewings having double transverse lines, dark and prominent." Holland.

ab. *maculata*, Lempke, *Tijds.* (1939), 258.

ORIG. DESCRIP.—" Reniform stigma filled with dark colour." Holland.

ab. *grisea*, Lempke, *Tijds.* (1939), 258.

ORIG. DESCRIP.—" Ground of forewings grey." Holland.

P. (142) Add to the List of Forms of *T. pronuba*, L., ab. *nigra*, Lempke, ab. *immaculata*, Lempke, and ab. *juncta*, Lempke.

P. (143) Add the Original Descriptions of the above three forms 11 lines from the bottom.

ab. *immaculata*, Lempke, *Tijds.* (1939), 254.

ORIG. DESCRIP.—" The black costal spot of the forewings wanting." Holland.

ab. *juncta*, Lempke, *Tijds.* (1939), 254.

ORIG. DESCRIP.—" The two stigmata touching, encirclements intact." Holland.

ab. *nigra*, Lempke, *Tijds.* (1939), 254.

ORIG. DESCRIP.—" ♂, ground of the forewings black. Almost unicolorous." Holland.

P. (148) Add to the List of Forms of *N. castanea*, Esper, f. *signata*, *juncta*, Lempke.

P. (146) Add the Orig. Description of the above form 5 lines from the bottom.

ab. *juncta*, Lempke, *Tijds.* (1939), 235.

ORIG. DESCRIP.—" The two stigmata touching but with unbroken encirclement." Holland.

P. (148) Add to the List of Forms of *N. castanea*, Esper., f. *signata*, Lempke.

P. (149) Add the Orig. Descrip. of the above form 16 lines from the bottom.

f. *signata*, Lempke, *Tijds.* (1939), 250.

ORIG. DESCRIP.—" The waved line is margined on the inside with black." Holland.

P. (151) Add to the List of Forms of *N. baja*, Schiff., ab. *clausa*, Lempke.

P. (153) Add the Orig. Descrip. of the above form 11 lines from the top.

ab. *clausa*, Lempke, *Tijds.* (1939), 245.

ORIG. DESCRIP.—" The two transverse median lines converge to a point on the inner margin." Holland.

P. (162) Add to the List of Forms of *N. triangulum*, Hufn., ab. *immaculata*, Lempke, and ab. *signata*, Lempke.

P. (163) Add the Orig. Descriptions of the above two forms 7 lines from the top.

ab. *immaculata*, Lempke, *Tijds.* (1939), 247.

ORIG. DESCRIP.—The black costal spot of the forewings is wanting." Holland.

f. *signata*, Lempke, *Tijds.* (1939), 247.

ORIG. DESCRIP.—" The waved line is bordered on the inside with black." Holland.

P. (164) Add to the List of Forms of *N. c-nigrum*, L., ab. *immaculata*, Lempke, ab. *juncta*, Lempke, and ab. *confluens*, Lempke.

P. (165) Add the Orig. Descriptions of the above three forms 23 lines from the bottom.

ab. *immaculata*, Lempke, *Tijds.* (1939), 247.

ORIG. DESCRIP.—" The black apical spot of the forewing absent." Holland.

ab. *juncta*, Lempke, *Tijds.* (1939), 247.

ORIG. DESCRIP.—" The two stigmata touch, but the encirclements are intact." Holland.

ab. *confluens*, Lempke, *Tijds.* (1939), 247.

ORIG. DESCRIP.—" The two stigmata unite under one encirclement." Holland.

P. (166) Add to the List of Forms of *N. ditrapezium*, Bork., f. *signata*, Lempke.

P. (167) Add the Orig. Descrip. of the above form 9 lines from the top.

f. *signata*, Lempke, *Tijds.* (1939), 248.

ORIG. DESCRIP.—" The waved line is bordered on the inside by a dark line." Holland.

P. (179) Add to the List of Forms of *N. rubi*, View., ab. *obsoleta*, Lempke, ab. *confluens*, Lempke, and ab. *xanthostaxis*, Lempke.

P. (181) Add the Orig. Descrip. of the above three forms 9 lines from the top.

ab. *obsoleta*, Lempke, *Tijds.* (1939), 244.

Orig. Descrip.—" Forewings unicolorous, without trace of stigmata; only the waved line is feebly seen." Holland.

ab. *confluens*, Lempke, *Tijds.* (1939), 244.

Orig. Descrip.—" The two stigmata united into one with broken encirclements." Holland.

ab. *xanthostaxis*, Lempke, *Tijds.* (1939), 244.

Orig. Descrip.—" The three stigmata are yellowish standing clear from the ground." Holland.

P. (186) Add to the List of Forms of *N. festiva*, Hb., ab. *uniformis*, Lempke, ab. *semiconfluens*, Lempke, and ab. *mediorotundata*, Boldt. (Lempke).

P. (190) Add the Orig. Descriptions of the above three forms 5 lines from the bottom.

ab. *uniformis*, Lempke, *Tijds.* (1939), 242.

Orig. Descrip.—" Forewings of a pale unicolorous ochreous-yellow with very pale markings." Holland.

ab. *semiconfluens*, Lempke, *Tijds.* (1939), 242.

Orig. Descrip.—" The two stigmata united by a double line, the encirclement being broken in both." Holland.

ab. *mediorotundata*, Lempke, *Tijds.* (1939), 242.

Orig. Descrip.—" The median shade setting out from the costa along the outer margin of the orbicular goes on in a semicircle towards the inner margin." Holland.

P. (193) Add to the List of Forms of *N. xanthographa*, Schiff., ab. *signata*, Lempke.

P. (196) Add the Orig. Description of the above form 13 lines from the top.

f. *signata*, Lempke, *Tijds.* (1939), 249.

Orig. Descrip.—" The waved line is bordered on the inside with black." Holland.

P. (198) Add to the List of Forms of *N. plecta*, L., ab. *albilinea*, Lempke, ab. *pallida*, Lempke.

P. (200) Add the Orig. Descrip. of the above two forms 7 lines from the bottom.

ab. *albilinea*, Lempke, *Tijds.* (1939), 231.

Orig. Descrip.—" The forewings have a clearly detached waved line." Holland.

ab. *pallida*, Lempke, *Tijds.* (1939), 231.

Orig. Descrip.—" The basal half of the forewings up to beyond the reniform is whitish. In this part is found the black radial markings as well as the two stigmata and a streak of the ground colour under the median cell." Holland.

P. 275, line 4 from the top, substitute " *nickerlii* " in place of " that species."

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Printed by T. Buncle & Co. Ltd., Arbroath.

Vol. LIII.

No. 12

DECEMBER 1941.

ENTOMOLOGIST'S RECORD AND JOURNAL OF VARIATION

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THE INSECT FAUNA SUPPORTED BY THE APPLE AND PEAR TREES IN LEBANON.

By Abdul Mon'im S. Talhouk
(Assistant, Plant Protection Service, Government of Lebanon)

The insects enumerated here are only those that I actually found on both Apple and Pear trees during five years of observation. The list is by no means exhaustive, but with its 55 species it throws a light on the food plants of some of the rarer insects, and shows the distribution of the insects on the different parts of the trees.

I want to acknowledge my gratitude to the staff of the British Museum, the Imperial Institute of Entomology, the Berlin Museum, and the Museum of Bremen for their determination of the more difficult species; to Dr A. Diakonoff, of Amsterdam, for the description of *Blastodacna libanotica*; and to Mr E. P. Wiltshire for the determination of some moths.

The 55 species are distributed thus:—Lepidoptera, 18; Coleoptera, 18; Homoptera, 10; Diptera, 4; Hymenoptera, 3; Orthoptera, 1; Thysanoptera, 1. Trunk and Branches, 16.2%; Twigs, 16.2%; Leaves, 37.9%; Roots, 5.7%; Fruits and Flowers, 24.3%.

The Lepidoptera, together with the Homoptera, cause the greatest damage. Amongst the Lepidoptera, the Leopard Moth, (1) *Zeuzera pyrina*, L., causes the greatest trouble, as it completes its life's cycle in one year, and, as an old inhabitant, is not appreciably affected by its parasites. When attacking thin stock, the larvae, instead of burrowing in an upward direction, go downwards so as to reach thicker parts to accommodate their ever-fattening bodies. (2) *Carpocapsa pomonella*, ssp. *putaminana*, Stgr., is very destructive. It has two full generations and sometimes a very small partial third; the first generation of moths appears in early May, the second in July (in middle heights). Caterpillars of (3) *Diloba caeruleocephala*, L., sometimes cause great injury to young apple trees; in one instance I saw five caterpillars that were able to defoliate a two years old tree. The larvae pupate in early May, to emerge as moths in December of the same year. (4) *Papilio podalirius*, f. *virgatus*, Butler, is double brooded. Its plump larvae are mostly found on pear leaves in early Spring, ready to show their osmeteria as soon as they are molested. The *Tortricina* proper are represented by four species only, all of which were observed on apple but not on pear. (5) *Argyroploce variegana*, Hüb., is very abundant; at one time as many as 36 moths were trapped in a single *Carpocapsa* bait trap in a single night. This insect is sometimes a real pest. (6) *Argyroploce pruniana*, Hüb., is much rarer, and (7) *Peronea variegana*, Schiff., is still rarer. (8) *Cacoecia* sp. is commoner than the two previous species. (9) *Lymantria dispar*, L., is surprisingly very rare on apple and pear leaves as well as on oak; probably this is due to parasites. (10) *Acronicta rumicis*, L., is also somewhat rare on apple leaves and was not observed on pear. However, it is common on apricot leaves in Autumn. Larvae of (11) *Synanthedon (Aegeria) myopaeformis*, Borkh., attack the stems and roots of apple and pear seedlings. The moths come freely to Codling Moth bait traps in early

May. (12) *Coleophora hemerobiella*, Scop., is not common. Its larvae are usually found on the leaves of apple trees near blackberry bushes or in the darker corners of the orchard. The larvae of (13) *Schiffermuelleria* (*Borkhausenia*) *formosella*, F., are found feeding on the cambium layer of the trunk of both apple and pear as well as under that of *Platanus*. I have also found a caterpillar of this moth inside a " mummied " apple fruit. The moth appears in May. (14) *Recurvaria nanella*, Schiff., is not uncommon; it was bred from Quince leaves also. The moth sometimes comes to *Carpocapsa* bait traps.

To the Lepidoptera belong the three leaf-miners that attack both apple and pear leaves. (15) *Lyonetia clerckella*, L., attacks the apple in large quantities so that most of the leaves on apple trees are mined; pear leaves seem to be free from the visits of this moth. (16) *Lithocolletis blanchardella*, F., confines almost all its attacks to apple leaves, very rarely to pear. (17) *Nepticula* sp. mines pear leaves only. A new and very rare moth (18) *Blastodacna libanotica*, Dkf., causes galls of different sizes on pear twigs and branches.

Among the Coleoptera the Rhynchophora are well represented. (19) *Anthonomus pomorum*, L., may be considered a pest only in some parts of Lebanon where it causes damage to apple blossoms. (20) *Rhynchites schilsky*, Voss (*splendidus*, Stev.), is sometimes very destructive to young pear fruits. The females, after laying their eggs in the small fruits, by their mouths sever the upper side of the fruit stalk at its point of contact with the spur, thereby causing the fruit to shrivel and fall to the ground. The female of this beetle seems to be very particular with regard to the pear variety it chooses for oviposition. The attack may be so severe on one tree that no fruits are left. On another one, sometimes touching it, but of a different variety, all the fruits may remain intact. This accounts for the fact that this beetle is quite localised. (21) *Rhynchites ruber*, Faim., is also particular in choosing the apple variety and is not widespread. The crescent-shaped bites it makes are quite common in some years. (22) *Limobius borealis*, Payk., also eats holes in apple fruits but is pretty rare in Lebanon. The very rare (23) *Tropiderinus interruptus*,* Reitter (det. by Dr Jordan) was found feeding on the dying cambium under apple bark. The small, black Pear Flea-Weevil, (24) *Rhamphus pulicarius*, Hbst., is very abundant on apple and pear leaves in Spring, where its damage is imperceptible. *Magdalis cerasi*, L., is quite rare in Lebanon; the beetle was found feeding on the chlorophyll of a pear leaf.

The Bostrychid (25) *Sinoxylon perforans*, Schrank, burrows a short tunnel just over a bud, downwards, thereby causing the shoot to break by its excavation. The adults appear inside apple and pear twigs in early Spring. The larvae of the Buprestid, (26) *Capnodis? tenebrionis*, L., are sometimes found in the roots of apple and pear; it is much easier to remove them from the roots of pome fruit trees than from those of stone fruits due to the absence of gum. Its attack on apple and pear is not common.

Both (27) *Gynandrophthalma limbata*, Ster., and (28) *G. judaica*, Lef., as well as (29) *Malathius bipunctatus*, L., feed on the leaves and petals of both the apple and pear. The adults of (30) *Epicometis squalidus*, L.,

*Probably the only specimen in the British Museum is from my collection.

abound sometimes in large quantities on the blossoms where they feed on the filaments; the beetle is quite polyphagous. The beetle (31) *Longitarsus pellucidus*, Foud., is not often met with on apple leaves. Both the beetles (32) *Cantharis funebris*, Mars., and (33) *C. livida*, L., feed freely on the tender foliage of both trees. (34) *Scolytus rugulosus*, Ratz., deals the " coup de grace " to a suffering tree, thereby ending its life. I have found a specimen of this beetle† tunnelling inside the petiole of an apple leaf in mid-summer. (35) *Carpophilus hemipterus*, L., is very common inside rotting or dry apple and pear fruits, and is especially attracted to *Carpocapsa* baits. It passes the Winter in the adult stage well hidden under apple bark.

Almost all species of Homoptera are either serious or very serious pests. (36) *Psylla pyricola*, Först., is one of the worst and most unwelcome guests that this country has ever harboured. It has several generations per year; the most troublesome are the late Summer and early Fall ones. As far as I can see, this insect seems to attack mature trees and causes great damage in some localities and a negligible one in others. This insect is by far the worst enemy of the pear. Its equivalent on the apple is the American Blight, (37) *Eriosoma lanigerum*, Haus., which is extremely troublesome. The very hot and dry desert winds that blow in Spring do not affect this insect to the same extent as they do affect its parasite, *Aphelinus mali*, Hald., so that its numbers are not checked except in Autumn, when the number of *Aphelinus* becomes high enough to stop the multiplication of the aphid. (38) *Aphis pomi*, de Geer, is found in great abundance on the extremity of vigorous apple shoots and inside curled apple leaves, thereby causing severe injury. A black sooty fungus grows on the honey-dew of this species. (39) *Lachnus* (*Pterochloros*) *persicae*, Chlodk., is gradually increasing its visits to the trunks and branches of apple in Spring. (40) *Tingis pyri*, L., is very common on the leaves of both trees, but never in quantities high enough to necessitate control; this is due to an entomophagous fungus that attacks this insect shortly after its establishment on the leaves.

(41) *Aspidiotus hederae*, Vallot, is very common on both trees, sometimes causing severe injury, and, in acute cases, might kill the young tree. (42) *Ceroplastes rusci*, L., is neither common nor widespread. I have so far only found it on pear nursery stock in the coastal area. (43) *Parlatoria oleae*, Ldgr., is local but sometimes causes severe injury. (44) *Lecanium ? corni*, Bché., is found on the mid rib of pear leaves; up till now I regard it a curiosity, due to its rarity. Another curiosity is a " White Fly " (45) Aleurodid, which remains undetermined.

The Diptera are represented by 4 species. (46) *Apiomyia bergenstammi*, Wacht., almost exclusively attacks the Hawthorn and the native pear, *Pyrus syriaca*. Larvae of (47) ?? *Scaptomizella* sp. are usually met with, 3 or 4 together, feeding on the sap of both trees, inside the galleries excavated by the *Zeuzera*. Larvae of (48) *Ceratitis capitata*, Wied., are only found inside thin-skinned varieties especially in late Summer and Autumn. They are not commonly met with at all. Adults of (49) *Drosophila ampelophila*, Loew, pass in and out of decayed fruits.

†Det. by British Museum.

Only three Hymenoptera live on these trees. (50) *Eriocampoides limacina*, Konow, is commoner on the mountains than at low altitudes. It prefers pear leaves, and is more than single-brooded. The dotted greyish larvae of (51) *Cimbex quadrimaculatus*, ssp. *humeralis* are sometimes met with on pear leaves; this insect is not common. The larva of (52) *Arge cyanocrocea*, ssp. *syriaca*, Moes., develops inside shoots of both apple and pear; it is heavily parasitised.

One Orthopteron, the large (53) *Anacridium aegyptiacum*, is met with in all stages, on both trunk and twigs in Winter and early Spring peeling bark from them.

(54) *Tenuithrips inconsequens*, Uzel, represents the Thysanoptera. It is very common on the flowers of both trees; it rarely does enough damage to necessitate control.

This list will not be complete unless I mention the Red Spider, *Tenuipalpus ? bodenheimeri*, of which a nurseryman used to tell his customers that the red colour is a sign of good health on the part of the apple yearling as are the red cheeks of human beings!

BUTTERFLY COLLECTING IN WOOD WALTON, HUNTS., AREA DURING 1941.

By H. A. Leeds.

During the latter part of 1940 season the *Pieris* pests were extraordinarily plentiful and in no case could I find an ichneumoned larva. Normally *rapae* and often *brassicae* are to be seen in this area about the 3rd or 4th of April and I was watching for their appearance this year, but the first seen was a fresh female *brassicae* on 17th May, followed by a male the next day and three males on 4th June, also two male *rapae*; *rapae* had only previously been seen on 23rd and 24th May, two males, widely apart, each day, and the first female on 3rd June; after this both species were very sparse. I am at a loss to account for their scarcity. Later on in August and September large quantities, possibly immigrants, of both kinds appeared and the ensuing larvae skeletonized the cabbages, etc. April was wet and colder than usual but there were periods of brightness; sharp frosts, down to 16 degrees, occurred during the first ten days of May, followed by 14 degrees on the 16th, when I went into Monks Wood and found the early leaves of the blackthorn killed by the frost. Eventually they fell off, leaving a bright brown collection beneath each bush. *T. pruni* larvae are susceptible to sharp frosts and I was afraid that they had perished; heavy rains made the Wood inaccessible during the latter half of May and early June, but the weather much improved on 12th June, became very hot on the 14th, and so continued until 12th July. On 1st July *pruni* appeared in fair numbers, mostly males, and continued hatching until the 12th, fresh females predominating the latter part of the time; no egg-laying was seen and apparently this was done high up amongst the dense blackthorns, where probably they pair, as I cannot remember ever seeing them copulated. For the first few days I looked in vain for them feeding on the privet flowers. Dogwood provided refreshment for one female; afterwards both sexes frequented the privet flowers

along with *A. cydippe* and *A. paphia*, together with a few *S. w-album* and worn *C. rubi*. The imagines of *T. pruni* were very late and no doubt their larvae hatched after the May frosts; some unusual variation occurred and *pruni* was more widespread and numerous than in any year since 1933.

In 1934 I noticed a larva of abnormal size and fatter—as if it had been inflated; subsequent beating obtained 24 more large ones and a male larva of ordinary size, which was the only one to produce an imago. The other 25 pupated in two or three days, but all the normally *white spots* were very *dingy* and *dull;* they were left for about twenty days, when on cutting the pupae open it was found that they were completely hollow inside a thick, tough and leathery outer casing. They had been placed for rearing in glass-topped metal boxes and no ichneumons emerged, so apparently it is a fatal disease. I previously had some little experience of a similar happening several years before and at that time I expected to get some very large imagines. This recurred to my mind when I saw the first larva again, and I told my brother that I thought only one would emerge out of the 26 larvae obtained. Not many *pruni* were flying in 1934, but they have gradually increased since, and this season they had such fine and hot weather during their main flight.

At the end of June *Brenthis euphrosyne* was fairly plentiful in one opening; *aglaia* was scarce and no aberrations of any Fritillaries occurred. Previously I had not observed *L. camilla* in this district, but saw one flying in Monks Wood during the evening of 11th July, and I hope they will get established, as Colonel F. A. Labouchere states two or three were seen in woods nearer Abbots Ripton during July. The May was not in full flower until 1st July; worn *rubi* and *argiolus* were feeding on it. *T. quercus* was plentiful around three exposed oaks in a field, but only four were seen elsewhere; *R. betulae* was seen singly about during August. Of the Skippers, *tages* and *malvae* were late and scarce; *venata* (*sylvanus*), *sylvestris* (*thaumas*), and *lineola* were common, the last locally on wide grass verges of the roadside. The following were scarce: *c-album*, *rhamni*, *aegeria*, *hyperantus*, *cardui*, *io*, *atalanta* and *agestis* (*medon*). A fair quantity of *cardamines*, *jurtina*, one ab. *pallidula-transformis*, female upperside, but very few partly bleached ones; *pamphilus*; *urticae*; *galathea*, more females than in 1940; *megera*, but females scarce, one of the latter with larger spot on each upperside forewing. *M. tithonus* was abundant and, contrary to last year, many had extra spots; only one, a female, had these spottings extremely large, but it was too damaged to retain; it was near a stile and kept in its locality for several days. *Heodes* (*L.*) *phlaeas* had only two broods, viz., in the latter half of June and during August and early September; the most examined in one day were 14 on 7th August, yielding abs. *antieleus* and *linea*, male uppersides; they occurred in a meadow near this hamlet, across which is a much-used footpath towards Abbots Ripton station. Later I took three partimtransformis males in the same field, which is shortly to be ploughed, also 150 acres, which well nourished 96 fine bullocks this year. It adjoins the Walton embankment of the L. & N.E. Railway, on one lower part of which the third brood of *phlaeas* was so plentiful last year. Not more than six were seen there on any visit this year, while elsewhere

they were very scarce. Only in one small area could I find a fair number of *icarus* and there for three evenings, beginning 23rd June, about 80 fresh ones were examined each time, then very few emerged afterwards; male undersides taken included *grisea*, uniformly darker grey; *costajuncta*, *transiens*, *obsoleta*, and *postcaeca*; a female upperside postradiosa-caeruleo. The second brood, still sparse, began at the end of August; it provided a few *confluentiae*, the best being a strongly-defined I-nigrum-arcuata-basijuncta female. A female *croceus* taken on 25th June was sent to a friend by post and commenced laying freely on arrival; on 21st July I netted a very worn male and released it. There are no lucerne fields here, but during September several *croceus* were seen on the railway embankment; all were typical.

(Mr A. H. Turner, of Wendling, Norfolk, informs me that " An almost perfect specimen of *phlaeas*, ab. *alba*, was taken in his garden on 7th September.)

PHENOLOGICAL CLASSIFICATION OF PALAEARCTIC LEPIDOPTERA.

A DISPUTED EXAMPLE.

By A. J. Wightman.

In the October " Record " Mr E. P. Wiltshire, discussing the usefulness of " phenological classification by season " (page 105), quotes South, Vol. II, " In England we certainly have a *Cucullia* sometimes appearing in the moth state rather later than *C. verbasci* and always earlier than *C. lychnitis*, etc., etc." as an example of a species being identified and shown to be distinct by " season."

I cannot imagine a more unhappy choice, as not only is the statement purposely vague but its final sentence is an apology for the whole idea. South did not believe what he wrote and shortly afterwards said so publicly, also the supposed identification of *C. scrophulariae* from *C. verbasci* and *C. lychnitis* by season is purely imaginary. South got this " season " idea from Tutt (see Note C.) and also the food-plant idea.

South had previously said that the British *scrophulariae* were an enigma to him and suggested they were, in fact, *verbasci*. Tutt mocked at him for this (see Note J.), and so in his book he tried to baulk the question by making a confusing and non-commital statement acceptable to Tutt, excusing himself for it by saying the Continental collectors were just as much at sea. Neither South nor Tutt ever identified a third species of *Cucullia* in the *verbasci* group as British.

In *British Noctuae and their Vars.*, Vol. III, Tutt makes or accepts the following statements about *scrophulariae*:—

A. (page 111). " Of our British species *scrophulariae* and *lychnitis* are somewhat difficult to distinguish, but the other species are distinct enough."

B. (page 112), under *scrophulariae*. " It is almost impossible to explain why Newman should say that ' it is extremely difficult to distinguish this from the proceeding species (*verbasci*) . . . ' " (*British Moths*, 432.)

C. (page 112). " *Lychnitis* moreover appears at a later period of the year in June and July, *scrophulariae* emerging in April and May (Guenée gives March and April), so that if collectors keep their Spring emergences distinct they should have little trouble in coming to a correct conclusion."

D. (page 113). " *C. scrophulariae* has been erroneously recorded dozens of times without doubt by those who have found *C. verbasci* larvae feeding on *Scrophularia*. But the larva of *C. scrophulariae* is very different. Its usual foodplant appears to be *S. nodosa* and not *S. aquatica* . . . "

E. (page 113). " The imagines are not at all like *verbasci* but they are very much like *C. lychnitis*."

G. (page 113). " The three species are well distributed and definitely distinguished on the Continent (principally in the larval stage), where *scrophulariae* appears to be the commonest."

H. (page 113). " The larva of *C. verbasci* often feeds on *Scrophularia aquatica*, but I believe *scrophulariae* only feeds on *S. nodosa*, which always grows in dry places."

I. (page 113). " I suppose there are some true *scrophulariae* in various collections, but all I have ever had sent me have turned out to be *verbasci*."

J. (page 114). " This was written in June 1891 (reference to Bloomfield's *Lep. of Suffolk*), and in the following month Mr South, after stating the opinions of Messrs Harwood, Robson, and Dobrée that *scrophulariae* resembled *lychnitis*, wrote: " Possibly, however, *scrophulariae* may be a form of *verbasci*," although he had previously stated that " the insect known as *Cucullia scrophulariae* has always been an enigma to me," a condition of mind certainly not likely to strike one as being at all favourable to the formation of any useful conclusion."

From the above it is certain that Tutt's *scrophulariae* in the 1890's was a species very like *lychnitis*, not at all like *verbasci* in the perfect state. (See Notes A., B., and E. above.)

Had a larva unlike that of *verbasci* (see Notes D. and G.) occurred earlier than *lychnitis* but later than *verbasci*? (See Note C.)

Larva fed on *S. nodosa* in dry places, not on *S. aquatica* in wet places. (See Notes D. and H.)

Was a rare species in Britain. (See Note I.)

But between 1890's and 1908 the species, according to Tutt, changed not only its appearance in the perfect state, but also the appearance of its larva, its foodplant, its locale, and, not least, its time of appearance and comparative scarcity, for at a meeting of the South London Ent. Soc. on 9th April 1908 the *Ent. Record* for 1908 records that:—

Mr South exhibited (1) typical *Cucullia verbasci*, (2) *Cucullia lychnitis*, (3) a considerable series of specimens sent to him from Germany as *Cucullia scrophulariae*, but which he stated were, in his opinion, a mixture of *C. verbasci* and *C. lychnitis*. He stated that he desired information but believed that *C. scrophulariae* in this country was merely *C. lychnitis*.

Mr L. W. Newman stated that there was a third very distinct species in England, the larva of which he found on the marshes near Dartford, at the same time that those of *C. verbasci* were occurring on the downs in the same district.

Mr Tutt stated that the specimens exhibited by Mr South were of three characteristic species, the *C. scrophulariae* being, with the possible exception of two examples, correctly named. They agreed absolutely with the *C. scrophulariae* found in Kent and were most certainly, he thought, neither *C. verbasci* nor *C. lychnitis*. He would roughly suggest that *C. lychnitis* was a " downs " species, *C. scrophulariae* a marsh species, and *C. verbasci* largely a " downs " species but of wider habitat and sometimes found in marshes.

Tutt therefore accepted in 1908 as true *scrophulariae* the Kent marsh species, which looked like *verbasci*, appeared at the same time as *verbasci*, had a larva like that of *verbasci*, fed on *S. aquatica* in wet places, and was well distributed in collections.

F. N. Pierce has since shown that the genitalia of the Kent marsh " *scrophulariae* " agree with those of *verbasci*. " Gent. Noct.," p. 74.

From all this we can say with certainty that neither South nor Tutt ever were able to distinguish *scrophulariae* from *verbasci* or *lychnitis* by " season " or in any other way.

In conclusion, let me say that I agree with much Mr Wiltshire says and have always considered that the whole life history, wintering stage and pabulum of larva, etc., must be considered when deciding the affinities of species and genera.

I cannot believe that two closely allied species in any definite area will " winter " in different stages.

COLLECTING NOTES.

LEUCANIA L-ALBUM IN CHELSTON, TORQUAY.—I have much pleasure in reporting the capture of a ♀ of this species at ivy on 27th October about 200 yards from my house. It was still in fresh condition. I think it most unlikely this is a stray occurrence as it is the only occasion I have tried ivy and then the only four bushes available besides the one adjoining the house, which has so far not been at all encouraging this year. This neighbourhood is very unlike its reported localities, it has no rough ground or fields adjoining the coast. My own locality is over five miles from here.—Capt. C. Q. PARSONS, Seaway Lane, Torquay.

COLEOPTERA IN LEICESTERSHIRE.—Last September I went to spend a week with my cousins, Captain and Mrs Griffiths (née Donisthorpe), at Congerstone in Leicestershire. On 22nd September I made an excursion to Gopsall Park and Woods, which lie within an easy walk of Congerstone, for the purpose of collecting beetles. The following is a list of all the species I took:—*Notiophilus biguttatus*, F.; *Pterostichus niger*, Schal.; *Anchomenus angusticollis*, F.; *Bembidion quadrimaculatum*, L.; *Phloeodroma concolor*, Kr.; *Atheta trinotata*, Kr.; *A. coriaria*, Kr.; *A. fungi*, Gr.; *Gyrophaena gentilis*, Er.; *Placusa pumilio*, Gr.; *P. infima*, Er.; *Bolitochara reyi*, Shp.; *Tachyporus obtusus*, L.; *Bolitobius trinotatus*, Er.; *Quedius aetolicus*, Kr.; *Philonthus splendens*, F.; *P. aeneus*, Ross.; *Xantholinus longiventris*, Heer.; *Stenus pallitarsis*, Steph.; *Oxytellus sculpturatus*, Gr.; *Phyllodrepa ioptera*,

Steph.; *Phloeonomus planus*, Pk.; *Xylodromus concinnus*, Marsh.; *Proteinus ovalis*, Steph.; *P. brachypterus*, F.; *Coccinella 10-punctata*, L.; *Halyzia 18-guttata*, L.; *H. conglobata*, L.; *Dacne humeralis*, F.; *Ditoma crenata*, F.; *Cerylon* **primroseae**, sp. n.; *Cryptophagus scanicus*, L.; *C. dentatus*, Hbst.; *Triphyllus suturalis*, F.; *Mycetophagus quadripustulatus*, L.; *Dorcus parallelopipedus*, L.; *Sinodendron cylindricum*, L.; *Aphodius contaminatus*, Hbst.; *Lema melanopa*, L.; *Longitarsus luridus*, Scop.; *Plectroscelis concinna*, Marsh.; *Rhinosimus planirostris*, F.; *Apion trifolii*, L.; *Dorytomus melanophthalmus*, Pk. Most of these beetles are, of course, common and widely distributed, but *Quedius aetiolicus*, Kr., taken under fungus on a beech trunk, is a new county record.

Three species, moreover, are very noteworthy:—*Phloeodroma concolor*, Kr., is a genus and species new to Britain, and is very rare on the Continent. Only one specimen of *Bolitochara reyi*, Shp., a male, has occurred in Britain before, which was taken by the writer in Windsor Forest [see Keys; *Ent. Mo. Mag.*, **67**, 271 (1931)]. The two specimens taken at Gopsall are females. The species differs from *B. lucida*, Gr., in its considerably darker colouring, the coarser and larger puncturation of the elytra, and the distinctly longer antennae. These females agree in all those points with my single male. The genitalia of the latter is different to that of the male of *lucida*. They were taken in fungi growing on a beech stump.

The *Cerylon* is a new species which I am naming in honour of my cousin, Primrose Griffiths, who kindly conducted me to Gopsall Park. It was taken under the bark of a beech stump in company with the *Phloeodroma*. It differs in many important particulars from *C. ferrugineum*, Steph.—Horace Donisthorpe, Department of Entomology, British Museum (Nat. Hist.), Cromwell Road, S.W.7, 25.x.41.

A Late Date for Pararge aegeria, L.—A specimen of this butterfly in perfect condition was observed by Mr E. A. Bowles and me in Mr Bowles' garden at Myddelton House, Enfield, Middlesex, on 26th September 1941. It was feeding at a Colchicum bloom. Mr Bowles tells me that although he has taken note of the insects in his garden for 60 years he has never before seen *aegeria*. It is interesting to recall that this insect was named the " Enfield Eye " by Petiver, who took it at Enfield early in the 18th century.—T. R. Eagles, 32 Abbey Road, Enfield, Middlesex.

Osmylus fulvicephalus, Scop.—This handsome Neuropteron was observed by my son and me in the parish of Enfield, Middlesex, on 5th June 1938. I notice that in Killington's *British Neuroptera* (Ray Society, 1936/37) Middlesex does not appear in the list of counties where the species occurs. So perhaps it should be recorded lest building development may drive it away from the spot where I found it.—T. R. Eagles, 32 Abbey Road, Enfield, Middlesex.

Platychirus tarsalis, Schum. [Dipt. Syrphidae] in Surrey.—On 4th June 1939 I took my first specimens of *Platychirus tarsalis*, Schum., in Surrey [see *Ent. Rec.*, li, p. 129]. This year I found the species again in the county, this time at Box Hill on 1st June 1941. A male was visiting the flowers of the Wayfaring tree, *Viburnum lantana*, L., and

a female was taken as it visited the flowers of the Bluebell, *Scilla nonscripta*, L. & H.—L. PARMENTER (F.R.E.S.), 94 Fairlands Avenue, Thornton Heath, Surrey.

DIPTERA VISITING FLOWERS OF DEVIL'S-BIT SCABIOUS, SCABIOSA SUCCISA, L.—On 19th September 1941, despite the dull weather, quite a variety of insects were attracted to the flowers of Devil's-bit Scabious at Bookham Common, Surrey. Besides three species of *Bombus* and one of *Vespula*, the following 14 species of Diptera were noted:—*Bucentes geniculata*, Deg.; *Echinomyia fera*, L.; *Eriothrix rufomaculata*, Deg.; *Eristalis pertinax*, Scop.; *E. tenax*, L.; *E. horticola*, Deg.; *Graphomyia maculata*, Scop.; *Helophilus pendulus*, L.; *Melanostoma scalare*, F.; *Rhingia campestris*, Mg.; *Sericomyia borealis*, Fln.; *Syrphus balteatus*, Deg.; *S. vitripennis*, Mg.; and *Volucella pellucens*, L.

For Germany, H. Müller (*Fertilisation of Flowers*, 1883, 313-4) records 14 species of Hymenoptera, 5 of Lepidoptera, a Chrysomelid beetle and 11 of Diptera. Of the species of flies known in Britain not mentioned above he lists *Empis livida*, L.; *Eristalis arbustorum*, L.; *E. intricarius*, L.; *E. nemorum*, L.; *Musca cornicina*, F.; and species of *Lucilia*.—L. PARMENTER (F.R.E.S.), 94 Fairlands Avenue, Thornton Heath, Surrey.

NOTES ON VARIATION FROM THE WORTHING MUSEUM COLLECTION.—(*Continued from p. 124*).—*L. boeticus*.—The collection contains among others a series of 10 from the Channel Islands (the nearest approach to British specimens), 8 from Switzerland, and 6 from Corsica; the latter are the largest except one from Algeria. The Channel Islands specimens all come from the late Rev. F. C. Lowe's garden in Guernsey, where it managed to establish itself for two or three years, as well as appearing in some numbers on other occasions. These have dark under sides, and are rather small. The smallest of all are from Cyprus; these are very bright on the upper side and rather dark on the under side. The Swiss specimens are fairly large, the under sides being neither specially dark nor light. These were all but one taken at Follaterre, on the same ground that produced *I. iolas*; the one exception came from Sierre. The under side of the Corsican specimens is very light, the under side of the Algerian specimen being almost equally so.

N. lucina.—There is a longish series from the N. Downs and a short one from the White Horse Hill. These are all much smaller than French or Swiss specimens, except that one or two of the latter are nearly as small. There is one very large ♂ and a still larger ♀ from la Chambotte above the Lac de Bourget, and another ♀ from the same place nearly as large. A very dark ♂ and ♀ were taken in the Murgthal on the Walensee. The French mountain specimens from the Grande Chartreuse and the Col de Cucheron are smaller than those taken at lower elevations. There is also a pair of second brood specimens from Grésy-sur-Aix, taken 5th August, rather smaller than first brood examples.

P. machaon.—There are only three English specimens, all of the second brood, easily separable from any other forms; their general appearance is blacker, and the border is very definitely broader, especi-

ally that of the hindwing. One of them is of the *aurantiaca* form. Of the rest, both the largest and smallest specimens come from Switzerland, the latter a ♂ of the first brood, the former a ♀ of the second brood taken by my wife at Brig, 27th August 1897. There is another almost as large from M. Revard. There are very pale specimens from Bolzano and Constantinople. Examples of the *aurantiaca* form, besides the one from Wicken Fen, are from the Rhone Valley, Aix-les-Bains, M. Revard, Digne, Rome, Subiaco and Rapallo. Size is not dependent on date or locality, though on the whole ♀s are larger than ♂s, and the second brood specimens are generally larger than the first, though even to this there are exceptions.

A. crataegi.—There are four English specimens These (with one exception) are the largest, except for one specially large ♂ from Florence. These English specimens differ considerably from all the others; they are of a much dirtier white, and all are very markedly of the *suffusa* form, with long dark triangles at the end of the nervures. This is called " *ab* " by Tutt, but if these specimens are typical of those that used to occur in England, it was evidently racial. This view of the form is rather borne out by the fact that most of those from the Rhone Valley in Switzerland are of this form, though the triangles are both smaller and lighter, except in one bred specimen from Aigle. The ♀ in the English specimens is far less transparent than usual, though some of the Belgian ♀s run it close. This species is represented from France, Belgium, the Tyrol, Switzerland, Italy (Florence, the Lido and the Abruzzi) and Greece. The ♀s from Aix-les-Bains and the Tyrol are semi-transparent over almost the whole surface of all four wings. The ♀ from Salonica has a curious brownish cast. There is a well-marked ab. *flava* from S. Maurice, and almost equally good ones from Aix and the Tyrol. There is no very marked difference in size, but there is one very small ♂ from Aix-les-Bains.

P. brassicae.—Probably because very common species that one thinks one can get at any time are apt to be passed over, *P. brassicae* is rather poorly represented except from England. The best series are from France and Italy, and though there are specimens from Switzerland, the Channel Islands, Norway, Finland, Corsica, Greece, and Palestine, the numbers from these places are very few. What specially strikes one is the very slight variation in all these localities. The ♀s of the first brood from the Riviera, the Rhone Valley, and N. Italy have the hindwings of the under side conspicuously even more dusted with black than the English examples. The first brood from the Italian Riviera are decidedly smaller than the average, as are those from Greece. Beyond this there is nothing to remark. Amongst the English specimens there is a pair taken in my garden in the middle of September 1933, certainly of a third generation, the lower wings on the under side of which have a light greenish ground and also show a good deal of the black dusting of the spring brood. These, I suppose, are really precocious specimens which would normally have remained in pupa over the winter, and in which the full colour had not had time to develop. In July 1940 I took another specimen with the same ground colour but without any blark dusting, which seems rather against the theory, but it is quite possible that it may have remained a shorter time than usual in pupa, others taken at the same time having the ordinary deep yellow

ground colour of the hindwings. What a very handsome butterfly the ♀ would be considered if it were rare.

P. rapae.—Beyond the usual difference between the early brood (*metra*) and later specimens there is remarkably little difference in the ♂s from all localities; generally speaking, the lightness of markings in *metra* is more obvious in southern specimens, but there are many exceptions and the one ♂ from Virton (Belgium) and the one ♂ from Finland have only a trace of grey on the costa and the tip of the forewing. The ♀s vary much more, especially in the ground colour of the upper side; generally the second brood is much yellower than the first, especially in English specimens, which are far brighter than those from any other country represented; the tint in all the latter is both fainter and duller. There is a curious ♀ from Palestine, the hindwings of which on the upper side are of a pale yellowish-brown colour. The yellow of the hindwings on the under side of the British examples, both English and Scotch, is very noticeably brighter than any others; the nearest approach is one from Switzerland. Second brood specimens from the Lido are very large, but all the second brood Italian specimens are larger than the average; those from Mt. Olympus are the smallest. It is curious that the second brood ♂s from Corsica are very large, whilst the ♀s are decidedly small.—(*To be continued.*)—Rev. G. Wheeler, M.A., F.R.E.S.

CURRENT NOTES.

We regret to read the announcement of the death, after an operation, of H. Eltringham, M.A., D.Sc., F.R.E.S., F.R.S. One of the best.

Will subscribers please look up all notes they have and let us have them for publication. We are just now short of articles. Earlier in the year we had sufficient matter in hand and some of it was delayed. Even Current Notes were not always current but over due.

Will correspondents please note that 25 is the number of my house in West Drive. It is difficult for those who deliver letters to see the house in the dark. Also I find that the sorters often have to put 25 on to the address for those who deliver. This is a waste of time for those concerned.—Hy. J. T.

Nos. 3, 4, 5 of the *Revista Soc. Ent. Argentina*, vol. x, have been received. The matter is mainly concerning Argentina entomology written by members of the Society. There is a plate of the Life-history of one of the Bombyces, *Citheronia vogleri*, including figures of the ova, larvae, and imago ♂ and ♀, a very local species, which was sent us some 20 years ago. Another article we note is that of a new *Tortrix*, *Eulia fletcheriella*, the larva of which feeds on a local *Solanum*. The author, Pablo Kohler, named it in honour of Mr T. Bainbrigge Fletcher. There are figures of the larva, pupae, and imagines. Part 5 contains a List of the Contents of the whole ten volumes which have been issued up to date.

CONTENTS OF VOLUME LIII.

By HY. J. TURNER, F.R.E.S., F.R.H.S.

LIST OF CONTRIBUTORS.

LIST OF ILLUSTRATIONS.

SUPPLEMENTS.

silago, Hb. (1800-3), *Samml. Noct.*, 191.
ab. *pallida*, Schwing. (1918), *Verh. z.-b. Wien*, LXVIII (151).

Tutt dealt with (1) *flavago*, Fabricius; (2) the banded *ochreago*, Bork.; (3) the well dotted *togata*, Esp.

lutea, Ström, *Danske Vid. Selsk. Skrift.*, p. 78 (1783).

Fig.—*l.c.*, f. 26. From the figure and from the evidence of Aurivillius (1888), *Nord. Fjar.*, this is our *flavago*.

ab. *pallida*, Schwing., *Verh. z.-b. Wien*, LXVIII (151), 1918.

Orig. Descrip.—" In Prebichl in Stiermark, in July 1915, I took ♂ *ochreago*, Hb., with light yellow-brown very slightly marked forewings and straw-yellow hindwings; the usual very strongly expressed dark grey powdering of the hindwing is completely wanting. Similarly pale grey specimens with much grey-yellow ground lose the stronger colouring. I, as well as Herr Karl Höfer, have been breeding a few of striking appearance, when the larvae occurred in very dry and shady places, with very little difference from those reared in captivity from ova."

Xanthia, Ochs. & Tr. (1816-25), Dup., H.-S., Gn., Barr., Stdgr. (South), Culot [*Orthosia*, Ochs. & Tr. (1816-25), Meyr., Meyr.: *Cosmia*, Ochs. & Tr. (1816-25), Hamps., Splr., Warr.-Stz., Drdt.-Stz.: *Ochria*, Hb. (1821), Tutt, South] *aurago*, Schiff. (1775-6), Fab. (1787).

Schiff., *Verz.*, p. 86, S. 4 (1775-6), introduced the name *rutilago*, and on the same page No. 7 introduced the name *aurago*. Had there been an adequate description to distinctly identify the insects, the former name *rutilago* would have been prior. Adequate descriptions were published by Fab., *Mant.*, II (1787), *aurago*, p. 159, No. 164; *rutilago*, p. 160, No. 167. Mr T. B. Fletcher pointed out that Schiff. called *aurago* the " Goldgelbe, hellstriemige Eule." This seems to be an "indication" and most inadequate as a " description." It has been accepted by some modern authors as the prior description. But this does not alter the nomenclature. Hence *aurago* is the prior based on these descriptions and *rutilago* is the name of the form.

Tutt, *Br. Noct.*, III, 12 (1892): Meyr., *Hand.*, 61 (1895): Barr., *Lep. Br. I.*, V, 371, plt. 232 (1899): Stdgr., *Cat.*, IIIed., 207 (1901): Hamps., *Lep. Phal.*, VI, 498, f. 169 (1906); Splr., *Schm. Eur.*, I, 252, plt. 46, 21 (1907): South, *Moths B.I.*, II, 18, plt. 10, 2-3 (1908): Warr.-Stz., *Pal. Noct.*, III, 153, plt. 24h, i (1910): Culot, *N. et G.*, I (2), 85, plt. 55, 3-5 (1914): Drdt.-Stz., *Pal. Noct. Supp.*, III, 153 (1934).

Hufnagel, *Berl. Mag.*, III, 294 (1766), No. 41, described a species which he called *umbra*.

Schiff., *Verz.*, 86, No. 4 (1775-6), who was the first author to use the name *rutilago*, gave the food of the larvae of the species as *Populus nigra*.

Rottemberg, *Naturf.*, IX, 115, No. 41 (1776), gave a long description of *umbra*, Hufn., and suggested that it might be the *citrago*, L.

Hb., *Beitr.*, I, p. 18, plt. 2, fig. L (1786), described and figured a form of *aurago* under the name *rutilago*. This he corrected later in his *Ver-*

besserungen to the *praetexta*, Esp., *Abbild.*, IV, Noct. 45, 2, and subsequently in his *Nacherrinnerungen* to the *aurago* of Schiff., *Verz.*, p. 86, S. 7 (1775-6).

Fabr., *Mant.*, II, 160, No. 167 (1787), described the *rutilago*, Schiff. This was the first full description, that of Schiff. was only an indication.

Esp., *Abbild.*, IV, Noct. I (1), p. 338, plt. 124, 2 (1788-?), gave a figure under the name *praetexta*; *l.c.*, p. 341, f. 3-4, under the name *fucata*, a form of *aurago*.

Vieweg., *Tabel. Verz. Brand. Schm.*, II, 41 (1790), considered *umbra*, Hufn., as the *rutilago*, Schiff. (1775-6), and reported the larvae of *umbra* as feeding on *Ononis spinosa*.

Ernst & Engram., *Pap. d'Eur.*, VII, 161, 163, f. 520, 521 (1792), gave seven figures; all can be ascribed to *aurago*. These figures are too gaudy, colours too heavy. The authors gave 520 as *aurago*, 521 as *fucata*, Esp., now recognized as a form of *aurago*.

Bork., *Naturg.*, IV, 675 (1792), noted that the markings of *aurago* and *rutilago* were much alike. He considered it to be the *rutilago*, Hb., *Beit.*, I, p. 18, plt. 2, fig. L.

Bork., *Naturg.*, IV, 673 (1792), pointed out that the insects *umbra*, Hufn., and *rutilago*, Schiff., cannot be one and the same species, nor can *umbra* be *citrago* from comparison with the descriptions of the three forms under consideration.

Hb., *Samml. Noct.*, 196-7 (1800-3), gave two striking and excellent forms: one dark generally, the other with a very pale central wide band on the forewings and the hindwings basally much lighter.

Treit, *Schmett. Eur.*, V (2), 363 (1825), gave references to Hb., *Noct.*, fig. 196 ♂, 197 ♀; to Hb., *Beitr.*; to Schiff., *Verz.*; to Esper, *Abbild.*, IV, 338, plt. 124 (45) *praetexta*, and p. 341, fig. 5, to *fucata*; to Ernst & Engr., *Pap. d'Eur.*, VII, 161, f. 52, *aurago*, and p. 163, f. 521.

Dup., *Hist. Nat.*, VII (1), 453, plt. 128, 4 (1827), gave a good figure of one of the many forms of *aurago*. He recognized var. *rutilago*, Bork.

H.-S., *Sys. Bearb. Noct.*, II, 216 (1849), said that Hb. 196, 197, were too variegated. He included *praetexta*, Esp., and v. *rutilago*, Bork.

Gn., *Hist. Nat. Noct.*, V (1), 394 (1852), dealt with *praetexta*, Esp., *rutilago*, Hb., *Beitr.*, plt. 2 L, and var. *A. fucata*, Esp., with its form *rutilago*, Bork.

Stdgr., *Cat.*, IIIed., 207 (1901), gave *praetexta*, Esp., as a synonym, and gave *fucata*, Esp., as the only ab., which he said was Hb. fig. 196, *aurago* (magis unicolor, al. ant. fascia media aurantiaca).

Hamp., *Lep. Phal.*, VI, 498, f. 169 (1906), gave two aberrations: (1) forewing with the median area mottled with red (unnamed); (2) *fucata*, Esp., the median area suffused with red, the basal and marginal areas still redder, and much more uniform in colour.

Splr., *Schm. Eur.*, I, 252, plt. 46, 21r-21z (1907), gave two not very good figures. 21r is labelled *fucata*, a darker more uniform coloured form. He refers to two other forms, ab. *unicolor*, Tutt, and ab. *rutilago*, Fb.

South, *M.B.I.*, II, 18, plt. 10, 2-3 (1908), gave two good figures. 2 is one of the ordinary banded forms; 3 is almost ab. *unicolor*. *Ochria* (*Xanthia*).

Warr.-Stz., *Pal. Noct.*, III, 153, plt. 24h, i (1910), treated *praetexta*, Esp., as a synonym. They gave eight very good figures: ♂ and ♀ *aur-*

ago, ♂ and ♀ *rutilago*, ♂ and ♀ *marmorata*, and ♂ and ♀ *fucata*, and in addition recognized ab. *lutea*, Tutt, and ab. *unicolor*, Tutt. They considered ab. *virgata*, Tutt, as a synonym of *fucata*, Esp., ab. *marmorata* was newly described, fig. 24h.

The remark that *virgata*, Tutt = *fucata*, Esp. seems a very loose statement, the first is a banded form while the latter is almost unicolorous.

Culot, *N. et G.*, I (2), 85, plt. 55, f. 3, 4, 5 (1914), gave three excellent figures. 4, ab. *fucata*, Esp., median space of forewing warm orange. 3, a typical form, with median band a golden yellow. 5, labelled *aurago* ab. The figure given as ab. *fucata* is considered the *virgata*, Tutt, and the *aurago* ab. is considered *rutilago*, Fab. This last, f. 5, is almost concolorous orange and the hindwings almost entirely a coppery lilac. Here again we get a similar confusion as in Seitz's work, *fucata* is a banded form in this case.

Drdt.-Stz., *Pal. Noct. Supp.*, III, 153 (1934), added three newly recognized forms from the Abruzzi. Ab. *pedinea*, Dnhl., ab. *purpurago*, Dnhl., and ab. *pyrroxesta*, Dnhl.

Barrett described the Variation as follows:—

Rather variable in the ground colour, from pale yellow to ochreous, and in the degree of dusting or clouding of rust-red upon the central portion of the forewings, where sometimes there is also a slender indented central line or shade; but among specimens taken near Reading is a greatly extended range of variation. Some individuals have the ground colour in the middle more abundantly clouded and even suffused with rust-red, except a yellow edging to the first and second lines; others without these yellow lines have this middle portion completely and regularly tawny-red or orange-red and quite smooth, and of these some have the basal and hind-marginal bands deeper purple, almost of a leaden tint, while in others the purple becomes in various degrees more tawny or orange-red till in some specimens there is hardly a distinction of colour between the bands and the centre, the whole being of a smooth orange-red; more rarely the same is observable in a paler form, the whole surface being fulvous. In its more typical forms, as well as in these varieties, this is an insect of quite unusual beauty.

Mr A. J. Wightman has taken notes of all specimens of this species that have come under his notice and we are indebted to his kindness for the following analysis:—

This species has strong affinities with *Cirrhoedia xerampelina*, or so I believe. Variation is very great, and many forms are very beautiful indeed; the range in colour in both the ground colour and the dark bands is equally great.

By the ground colour I mean the paler central fascia, small basal and apical patches, and pale line of the same shade, which is apparently a pale edging to the indistinct submarginal; these are always paler in colour than the basal and outer area bands, except in the few unicolorous forms in Group E.

Group A. Banded forms with sharp contrast.

Group B. Banded forms in which contrast is less than in A by reason of the central fascia being mottled with some deeper shade, approaching the colour of the bands.

Group C. Banded forms in which contrast is less than in A by reason of the bands being suffused with pale shade, approaching that of the central fascia. B forms have a rough or matt appearance. C forms are very smooth looking, the bands seem to have a bloom over them evenly distributed.

Group D. Variegated forms with the central fascia heavily mottled with the same colour as the bands, and the bands broken up by lines and patches of the ground colour.

Group E. Unicolorous, either by reason of the bands being obsolete save for a few tiny ill-defined lines, or by the central fascia being of the same shade as the bands, usually there are present two pale lines representing the inner and outer lines. If the central area is not quite as dark as the bands the insect belongs to groups B. or C.

A. 1. Basal and outer bands pale pink, central fascia rich lemon-yellow.
2. Basal and outer bands pale pink, central fascia pale orange.
3. Basal and outer bands pale red, central fascia rich lemon-yellow.
4. Basal and outer bands pale red, central fascia pale orange.
5. Basal and outer bands deep orange-red, central fascia deep orange.
6. Basal and outer bands deep orange-red, central fascia saffron-yellow.
7. Basal and outer bands dark red, central fascia pale lemon-yellow.
8. Basal and outer bands dark red, central fascia pale orange.
9. Basal and outer bands purplish-red, central fascia pale lemon-yellow = *aurago*, Schiff., Fab.
10. Basal and outer bands purplish-red, central fascia pale orange=ab. *virgata*, Tutt.
11. Basal and outer bands purplish-red, central fascia saffron-yellow.
12. Basal and outer bands pale slate-grey, central fascia lemon-yellow (pale).
13. Basal and outer bands pale slate-grey, central fascia orange.
14. Basal and outer bands dark slate-grey, central fascia pale saffron-yellow.
15. Basal and outer bands dark slate-grey, central fascia deep saffron-yellow = ab. *rutilago*, Fab., in yellowest form.

B. 16. Basal and outer bands pale red, central fascia deep orange.
17. Basal and outer bands deep orange-red, central fascia reddish-orange = ab. *rutilago*, Fab., in reddest form.
18. Basal and outer bands dark red, central fascia deep orange.
19. Basal and outer bands deep slate, central fascia deep orange.

C. 20. Basal and outer bands suffused orange on purplish, central fascia deep yellow = ab. *unicolor*, Tutt.
21. Basal and outer bands suffused red on purplish, central fascia red.

D. 22. Basal and outer bands red and yellow mixed, central fascia red and yellow mixed. **intermixta,** n. ab.

E. 23. Obsolete, whole wing orange-yellow, few reddish or purplish lines = ab. *lutea*, Tutt.
24. Obsolete, whole wing deep orange, few reddish or purplish lines.
25. Basal and outer bands carmine-red, central fascia carmine-red, two yellow lines distinct = ab. *fucata*, Esp.
26. Basal and outer bands purple-red, central fascia purple-red, two yellow lines distinct = ab. *fucata*, Esp.

In the extreme dark forms the hindwings may be heavily stained with purplish-red. Some of the named forms are described in such terms as to include several really distinct looking abs.

Tutt's remarks on *fucata*, Esp., *Brit. Noct. and Vars.*, III, 13, are very confusing. He says, " unicolorous purplish-red form," and then again, " the central band is slightly more orange than basal and outer bands," and, finally, " unicolorous reddish," which remarks more apply to *rutilago*, Fab., when orange is mentioned, and to my mind a deep carmine insect is more than reddish.

Tutt's vars. *unicolor* and *lutea* appear from his descriptions to be much alike. In fact they are totally different. In *unicolor* the dark basal and outer bands are present but richly suffused with deep yellow atoms, like a bloom, which destroys the sharp contrast and makes the

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SOCIETY FOR BRITISH ENTOMOLOGY.—All meetings suspended till further notice. *Hon. Sec., E. Rivenhall Goffe*, 102 High Street, Southampton.

Communications have been received from or have been promised by T. Bainbrigge Fletcher, A. J. Wightman, H. Donisthorpe, Rev. G. Wheeler, H. W. Andrews, S. G. Castle Russell, Dr E. A. Cockayne, Prof. J. W. Heslop Harrison, Thos. Greer, Dr Malcolm Burr, E. P. Wiltshire (?), H. A. Leeds, Barton White.

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Printed by T. Buncle & Co., Ltd., Arbroath.